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An examination of reactivity to craving assessment: Craving to smoke does not change over the course of a multi-item craving questionnaire

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HIGHLIGHTS

- We examine reactivity when completing a 32-item cigarette craving assessment.
- Reactivity does not occur as a function of item position or item intensity.
- Reactivity does not differ between nicotine dependent and nondependent smokers.

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ABSTRACT

Introduction: Self-report measures are typically used to assess drug craving, but researchers have questioned whether completing these assessments can elicit or enhance craving. Previous studies have examined cigarette craving reactivity and found null craving reactivity effects. Several methodological limitations of those studies, however, preclude definitive conclusions. The current study addresses limitations of previous studies and extends this area of research by using a large sample size to examine: (1) item-by-item changes in craving level during questionnaire completion, (2) craving reactivity as a function of craving intensity reflected in item content, (3) craving reactivity differences between nicotine dependent and nondependent smokers, and (4) potential reactivity across multiple sessions. This study also used a more comprehensive craving assessment (the 32-item Questionnaire on Smoking Urges; QSU) than employed in previous studies.
Methods: Nicotine dependent and nondependent smokers (n = 270; nicotine dependence determined by the Nicotine Addiction Taxon Scale) completed the QSU on six separate occasions across 12 weeks. Craving level was observed at the item level and across various subsets of items.
Results: Analyses indicated that there was no significant effect of item/subset position on craving ratings, nor were there any significant interactions between item/subset position and session or level of nicotine dependence.
Conclusions: These findings indicate that, even with relatively sensitive procedures for detecting potential reactivity, there was no evidence that completing a craving questionnaire induces craving.

1. Introduction

Drug craving, a core feature of substance use disorders (American Psychiatric Association, 2013), is typically assessed with self-report measures (Rosenberg, 2009; Sayette et al., 2000). Researchers have questioned whether completing craving ratings can elicit or enhance craving (Juliano & Brandon, 1998; Niaura et al., 1998; Sayette, Martin, Wertz, Shiffman, & Perrott, 2001; Sayette et al., 2000). Similar to cue-reactivity procedures in which stimuli are presented to evoke craving (e.g., Carter & Tiffany, 1999), craving items used to assess craving levels may serve as cue-inducing stimuli and heighten the craving response. That is, craving assessment, like measurement of other self-reported constructs (e.g., negative affect; Mark, Sinclair, & Wellens, 1991), might be subject to reactivity.

Eliciting craving via a craving questionnaire may be undesirable for several reasons. For example, a craving questionnaire may be administered to obtain baseline assessments of craving; if the questionnaire enhances or elicits craving, then it would be difficult to gather accurate estimates of baseline craving via self-report. Moreover, unintentionally inducing or increasing craving may introduce measurement error and influence the detection of relationships between craving and other measures of interest such as smoking behavior and relapse (e.g., Wray, Gass, & Tiffany, 2013) and drug use (e.g., Gass, Motschman, &

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Tiffany, 2014). Finally, craving generated via craving assessments could obscure estimates of the full impact of other manipulations intended to induce craving (Sayette & Tiffany, 2013).

Concerns about craving reactivity have prompted investigations of the extent to which completing craving questionnaires induces desire to smoke (De Jong, Gongora, Engelhardt, & Breteler, 2006; Heishman, Saha, & Singleton, 2004; Shadel, Niaura, & Abrams, 2001), with that research finding no evidence of craving reactivity. These studies had several major limitations that precluded unambiguous conclusions regarding the potential reactivity of craving questionnaires. For example, Shadel et al. (2001) examined the influence of completing the 10-item Questionnaire on Smoking Urges (QSU-Brief; Cox, Tiffany, & Christen, 2001) on cigarette craving. Results indicated that completing the QSU did not increase craving. The sample size in the critical condition ($n = 13$ in the QSU completion group) was so small that it is unlikely that the research was sufficiently powered to detect reactivity effects. Craving differences were also measured with a one-item visual analog scale (VAS) administered before and after QSU administration, rather than with an examination of craving differences that may have emerged during QSU completion (on an item-by-item basis). It is possible that craving might increase over the course of completing multiple items but that those effects may dissipate rapidly over time, or any increase may be restricted to the initial items in a series of items but disappear with repeated administrations. A simple pre–post design could not capture these effects. Additionally, participants were nicotine-deprived prior to completing the one-item VAS and the QSU (M length of abstinence = 3.7 h). This abstinence almost certainly elevated craving prior to questionnaire completion and potentially created ceiling effects that may have obscured detection of reactivity.

Heishman et al. (2004) also examined reactivity in smokers' self-reported craving using the 12-item version of the Tobacco Craving Questionnaire (TCQ; Heishman, Singleton, & Moolchan, 2003). In that study, the TCQ was administered over a 15-minute time frame either two times (once at minute 1 and once 15 min later) or 15 times (one TCQ administration per minute). Results indicated that craving ratings were not affected by repeated administrations of the TCQ. Again, however, the sample was limited in size, restricted to examining reactivity effects in two of the subgroups of the study ($n = 20$ total between the two groups), and craving reactivity was not assessed in an item-by-item manner. Additionally, the TCQ does not explicitly assess the desire to smoke. Given that craving is typically defined as the desire for a drug, it is questionable whether the TCQ adequately assesses tobacco craving (Tiffany & Wray, 2012). Null reactivity effects of state and general heroin and drug craving have also been observed among patients treated for opioid dependence (De Jong et al., 2006). Similar to Shadel et al.'s (2001) study, however, a one-item VAS was used to determine differences in craving pre- to post-craving questionnaire administration and the sample size for examining reactivity effects was restricted to two small groups ($n = 26$ total between the two groups).

The current study was designed to overcome the limitations of the previous investigations of the potential reactivity of craving assessment. This study used a much larger sample size ($n = 270$) of non-deprived smokers more suitable for detecting potential reactivity effects. A majority of previous studies also assessed reactivity before and after the craving questionnaire relative to during questionnaire completion. Item-by-item changes in craving levels over the course of a multi-item questionnaire may reflect position effects (i.e., reactivity) or systematic differences in craving levels as a function of specific item content. In order to avoid content differences in the current study, craving items were randomized across presentation positions.

Previous craving reactivity studies have also utilized craving questionnaires ranging from 10 to 14 items, despite concerns about craving reactivity emerging with the use of even longer craving assessments (e.g., Rosenberg, 2009; Sayette et al., 2001). Administering a longer craving measure would allow for a more thorough exploration of craving trends; thus, the current study utilized the 32-item QSU (Tiffany & Drobes, 1991). The variety of craving relevant items in this measure also allowed for the examination of craving reactivity as a function of item content that captured different levels of craving intensity. In addition, craving reactivity studies have not examined the influence of nicotine dependence on craving reactivity. Dependent and nondependent smokers exhibit different craving levels in response to smoking stimuli during cue-reactivity procedures (e.g., Sayette et al., 2001). Thus, dependent and nondependent smokers may show differential craving reactivity during craving questionnaire completion and, therefore, the current study examined nicotine dependence as a potential moderator of craving reactivity. Finally, previous studies have examined potential craving reactivity effects using data from only one occasion. Craving reactivity effects might be apparent at an initial session of craving assessment, but those effects may disappear over repeated sessions. Thus, participants were tested over six sessions distributed across 12 weeks to determine whether craving reactivity was affected by session of testing.

2. Methods

2.1. Participants

Two hundred and seventy adult smokers were recruited based on eligibility determined through phone screening. Individuals were eligible if they were between 18 and 45 years old, proficient in reading English, not trying to quit over the past month nor intending to try to quit over the next two months, had not used nicotine or tobacco in any form other than cigarettes in the past 12 months, and had not been diagnosed with drug dependence (other than nicotine) in the past 12 months. Low-level smokers were over-recruited to ensure a wide range of smoking levels in the sample. Study participation occurred across six sessions. Participants were compensated with $30 at the end of Sessions 1, 2, 3, and 4, $70 after Session 5, and up to $110 after Session 6. Participants were recruited as part of a larger study evaluating the validity of various biomarkers and self-report assessments of smoking (Wray et al., 2014).

2.2. Assessments

2.2.1. Cigarette craving

Craving was assessed at each of the six sessions using the 32-item Questionnaire on Smoking Urges (QSU; Tiffany & Drobes, 1991). In general, the QSU has exhibited high reliability (Tiffany & Drobes, 1991), consistent with the reliability of the total score derived from the QSU in the current study ($\alpha = .96$; reliability calculated at each session and averaged across sessions). Instructions specified that participants answer each item for how they were "thinking or feeling" during the time they completed the questionnaire ("right now"), using a 7-point Likert scale, from 1 (strongly disagree) to 7 (strongly agree). Participants viewed craving items on a computer monitor one item at a time, and answers were selected using a mouse-controlled cursor. After participants responded, the screen advanced to the next item. In order to eliminate item-position effects, the presentation order of the QSU items was randomized for each participant at each session.

2.2.2. Nicotine dependence

Participants completed the 12-item Nicotine Addiction Taxon Scale (NATS; Goedeker & Tiffany, 2008), an empirically validated instrument that has identified an explicit categorization of dependence. The NATS parameters were established from two large sample replications generated from a national data set (The National Survey of Drug Use and Health; Goedeker & Tiffany, 2008). Based on a taxometric analysis of scores derived from this nationally representative sample, scores greater than or equal to 14.33 were considered within the nicotine addiction taxon and indicated nicotine dependence, whereas scores