Brief Report

Evaluation of the Brief Questionnaire of Smoking Urges in Black Light Smokers

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Abstract

Introduction: This study evaluated the factor structure of the Brief Questionnaire of Smoking Urges (QSU-Brief) within a sample of Black light smokers (1–10 cigarettes per day).

Methods: The QSU-Brief was administered to 540 (mean age = 46.5; 66.1% women) urban Black light smokers upon entering a smoking cessation clinical trial. An exploratory factor analysis (EFA) was conducted to evaluate the factor structure of this 10-item measure.

Results: An EFA indicated that as in other samples, the construct of craving in a Black sample is defined by 2 factors; 1 factor emphasizing the positive reinforcement of smoking and the other factor emphasizing the negative reinforcement properties of smoking.

Conclusions: Findings largely replicate a 2-factor structure of craving seen in smokers from other racial/ethnic groups, demonstrating the clinical utility of the QSU-Brief in measuring craving in Black light smokers.

Introduction

While Blacks and Caucasians in the United States have a similar prevalence of cigarette smoking, a number of smoking disparities exist between Black and Caucasian smokers (Fagan, King, & Lawrence, 2004; Fagan, Moolchan, Lawrence, Fernander, & Ponder, 2007). For example, Blacks are more likely than Caucasians to be characterized as light smokers, for example, smoke 10 or fewer cigarettes per day (cpd; Okuyemi et al., 2004; Trinidad et al., 2009; Trinidad, Pérez-Stable, White, Emery, & Messer, 2011). Despite lower levels of smoking, Blacks experience higher rates of tobacco-related disease (ACS, 2009) and are less likely to

achieve abstinence when trying to stop smoking (Fagan et al., 2007; Fu et al., 2008). Further, Blacks have been underrepresented in smoking cessation research (Cox, Okuyemi, Choi, & Ahluwalia, 2011; Fiore et al., 2008). Research efforts to enhance understanding of Black smoking behavior may contribute to improved treatment and reduction of tobacco-related disparities.

Craving conceptualization is central to theoretical and clinical understanding of smoking behavior. Craving is influenced by factors including smoking cues (Carter & Tiffany, 1999), affect (Conklin & Perkins, 2005), and abstinence (Tiffany & Drobes, 1991) and may impact smoking satisfaction (Shiffman & Kirchner, 2009), nicotine consumption (Mabry et al., 2007), and smoking relapse (Killen & Fortmann, 1997; Shiffman et al., 2002). Evaluation of craving may contribute to better understanding the role of craving in tobacco use, relapse, and intervention (Tiffany, Warthen, & Goedecker, 2009; West & Ussher, 2010). It has been found that compared with Caucasians, Blacks report higher craving and experience less craving relief from smoking (Carter et al., 2010). Because the experience of craving may differ between Black and Caucasian smokers, evaluation of craving among Black smokers merits further attention.

One measure of craving is the Questionnaire of Smoking Urges (QSU; Tiffany & Drobes, 1991); a 32-item self-reported measure, which was later shortened and validated as a 10-item measure (Brief Questionnaire of Smoking Urges [QSU-Brief]; Cox, Tiffany, & Christen, 2001). The QSU-Brief was developed in order to provide a quick, reliable, and valid measure of craving to be used in both laboratory and clinical settings. Evaluation indicates that a two-factor structure emerges from the QSU and QSU-Brief; one factor captures craving associated with the positive reinforcement of smoking, while the second factor reflects anticipation of the negative reinforcement of smoking (Cox et al., 2001). Another study suggests that the dimension of craving captured by Factor 1 measures intention and desire to smoke rather than general positive reinforcement; however, this

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conclusion was based on elimination of some items from the QSU-Brief most consistent with positive reinforcement (Toll, Katulak, & McKee, 2006). The validity and reliability of the QSU-Brief was originally established with samples of predominantly Caucasian smokers (Cox et al., 2001) and has since been confirmed with a sample of Chinese smokers (Yu et al., 2010) and adapted with a sample of Spanish smokers (Cepeda-Benito & Reig-Ferrer, 2004; Cox et al., 2001; Yu et al., 2010). While the QSU-Brief has been used to assess craving in Black smokers (Mabry et al., 2007; Okuyemi et al., 2006), the validity of this measure among Black smokers has not been evaluated.

To provide the first evaluation of the factor structure of the QSU-Brief in Black smokers, this study evaluated the QSU-Brief in a sample of Black light smokers beginning treatment within a clinical trial. An exploratory maximum likelihood factor analysis was used to test the hypothesis that a two-factor structure would emerge and would reflect expectancies of smoking associated with positive and negative reinforcement.

Methods

Study Design

This study evaluated data from smokers enrolled in a placebo-controlled smoking cessation treatment study for Black light smokers. Participants were 540 Black adult light smokers (smoked 1–10 cpd). Eligible participants were self-identified as Black, aged 18 or older, interested in quitting smoking, smoked 10 cpd or less for 2 years or more, and smoked on 25 days or more in the past month. Exclusion criteria were consistent with contraindications for bupropion use (Cox et al., 2011). Study design and methodology have been described in detail previously (Cox et al., 2011). The University of Kansas Medical Center Human Subjects Committee approved the study in its entirety.

Measures

Self-report assessments were administered verbally by study staff during the baseline visit. In order to ensure that participants were able to understand the content of all questionnaires, it was concluded that verbal administration would ensure greater construct validity. Both the Fagerström Test for Nicotine Dependence (FTND; Ahluwalia, Harris, Catley, Okuyemi, & Mayo (2002); Ahluwalia et al., 2006; Cox et al., 2011) and the QSU-Brief (Okuyemi et al., 2006) have been administered verbally in previous studies using a similar sample. However, the validity of verbal administration has not been investigated. Assessment was conducted during the baseline visit, approximately 1 week prior to the scheduled quit date.

Demographic Information

Participants reported age, gender, marital status, income, and education. Additional demographic information is available (Cox et al., 2011).

Smoking Behavior Measures

Smoking history included cpd, number of previous 24-hr quit attempts in the past year, and level of nicotine dependence as measured by the FTND (Heatherton, Kozlowski, Frecker, & Fagerström, 1991). Baseline serum cotinine was also collected. Craving was measured with the 10-item QSU-Brief (Cox et al., 2001) using a 7-point Likert scale (Cepeda-Benito & Reig-Ferrer,

2004; Toll et al., 2006; Yu et al., 2010) from 1 (*strongly disagree*) to 7 (*strongly agree*). Participants were unable to smoke once entering the clinic for their baseline visit. Craving was not induced. QSU-Brief was completed approximately 40 min after beginning the baseline session.

Statistical Procedure

A descriptive analysis summarized by *Ms* and *SDs* for continuous variables and frequency and percentage for categorical variables was conducted. An exploratory factor analysis (EFA) was performed to illustrate the factor structure of the items of the QSU-Brief among Black light smokers. A Promax method was applied to factor rotation to maintain the native interitem correlation structure. The Kaiser–Meyer–Olkin measure was utilized to access sampling adequacy. A scree plot was utilized in determining the number of factors in the EFA solution: Factors achieving an eigenvalue ≥ 1 were retained. All analyses were performed using SAS v. 9.2 (SAS Institute, 2009).

Results

Participant characteristics and smoking information are presented in Table 1. Participants had a mean age of 46.5 years, with 66.1% of the sample female. Those individuals with a monthly income less than \$1,800 represented 60.7% of the sample. The majority (84.2%) reported obtaining a high school diploma. Mean craving of all 10 items was 2.90 (*SD* = 1.67) with a range of 1–7.

The overall Kaiser–Meyer–Olkin measure of .92 was above 0.5, indicating the sample size was adequate for EFA. A one-solution factor structure was compared with a multifactorial structure based on all items in the measure. Only items that loaded .40 or more on one factor were assigned to that factor. The total weighted variance explained by Factor 1 and Factor 2 was 21.22% and 2.30%, respectively. The interfactor correlation

Table 1. Descriptive Statistics and Sample Characteristics

	Summary statistics	(<i>n</i>)
Demographic variables		
Age, <i>M</i> (<i>SD</i>) years	46.5 (11.3)	540
Women, <i>n</i> (%)	357 (66.1)	540
Married or living with partner, <i>n</i> (%)	166 (30.8)	539
Monthly family income < \$1,800, <i>n</i> (%)	327 (60.7)	539
Education, high school or more, <i>n</i> (%)	454 (84.2)	539
Psychosocial variables		
Smoking urges (QSU-brief), <i>M</i> (<i>SD</i>)	2.9 (1.7)	540
Factor 1, <i>M</i> (<i>SD</i>)	3.6 (2.0)	540
Factor 2, <i>M</i> (<i>SD</i>)	2.1 (1.4)	540
Tobacco related variables		
Serum cotinine in ng/ml, <i>M</i> (<i>SD</i>)	275.8 (155.8)	536
Cigarettes per day, <i>M</i> (<i>SD</i>)	8.0 (2.5)	540
FTND, <i>M</i> ± (<i>SD</i>)	3.2 (1.7)	540
Number of previous 24-hr quit attempts in past year, <i>M</i> (<i>SD</i>)	3.7 (7.7)	540

Note. All descriptors with the exception of the QSU-Brief are described in trials (Cox et al., 2011). FTND = Fagerström Test for Nicotine Dependence; QSU-Brief = Brief Questionnaire of Smoking Urges.

was .76. The largest proportion raw variation was accounted for by Factor 1 (95.43%) compared with Factor 2 (8.72%). Results from the factor analyses are presented in Table 2.

Discussion

Findings support the utility of the QSU-Brief as a measure of craving among Black light smokers and further maintain a multidimensional conceptualization of craving to smoke. Results indicated that in a sample of Black light smokers, the QSU-brief demonstrated the same two-factor structure previously identified in samples of Chinese and U.S. Caucasian moderate to heavy smokers (Araujo, Oliveira, & Mansur, 2006; Cox et al., 2001; Yu et al., 2010) and similar to that found in a Spanish sample (Cepeda-Benito & Reig-Ferrer, 2004).

Overall findings were consistent with the original evaluation of QSU-Brief in a predominantly Caucasian sample of moderate to heavy smokers (Cox et al., 2001). With the current sample of Black light smokers, results found Items 1, 3, 6, 7, and 10 loaded on Factor 1, indicating a strong desire to smoke with smoking perceived as rewarding. Items 4, 8, and 9 loaded on Factor 2 representing anticipated relief from depressed mood and an urgent desire to smoke. These findings support the conceptualization of craving reflecting smoking anticipated to produce both positively reinforcing (Factor 1) and negatively reinforcing (Factor 2) effects. Further, as found in the original study, Item 2 ("nothing would be better than smoking a cigarette right now") did not demonstrate strong loading on either Factor 1 or Factor 2. Similar to laboratory and quitting conditions of the original QSU-Brief evaluation, but unlike the pre-treatment condition (Cox et al., 2001), Item 5 ("all I want right now is a cigarette") demonstrated moderate loadings on both Factor 1 and Factor 2. Within the previous Caucasian sample under the condition of smokers entering treatment, Item 5 showed strong loading on Factor 2; however, Item 5 demonstrated only modest loading on both Factor 1 and Factor 2 after smokers quit smoking (Cox et al., 2001). Whether such a finding

would be replicated in other samples (e.g., Caucasian or Black, light or heavier smokers) merits further study.

The current findings are also consistent with the two-factor structure found in previous evaluation of a sample of recently quit (≤ 7 days of self-reported abstinence) Chinese moderate to heavy smokers (≥ 10 cpd; Yu et al., 2010). Further, while the Spanish version of the QSU-Brief adapted wording of some items, a similar two-factor structure was maintained (Cepeda-Benito & Reig-Ferrer, 2004). In all studies, results indicated the QSU-Brief may serve as a measure of global craving or may be used to capture multiple dimensions of craving (Cepeda-Benito & Reig-Ferrer, 2004; Cox et al., 2001; Yu et al., 2010). Findings across these studies further suggest the construct of craving shares commonalities across a variety of smokers.

This evaluation was limited to a convenience sample of Black light smokers entering a treatment study of bupropion. Potential limitations in generalizability may be related to a sample restricted based on cigarettes smoked per day, medical and psychiatric history, level of alcohol use, and use of other tobacco. Specifically, participants were light smokers (≤ 10 cpd), had no history of psychiatric illness, substance abuse, alcohol abuse, and other tobacco use. A full list of exclusion criteria can be found in Cox et al. (2011). The evaluation of craving was also limited to baseline assessment, while participants were still smoking, prior to beginning treatment, setting a quit date, or making a quit attempt. Future evaluation could examine craving level and QSU-Brief factor structure for Black light smokers trying to stop smoking with attention to smoking or abstinence status and use of pharmacotherapy. Craving assessment within multiethnic samples would further add to the literature, examining potential differences in craving severity, cue reactivity, craving management, and the relationship between craving, smoking behavior, treatment outcomes, and relapse.

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Declaration of Interests

J.S.A. serves as a consultant to Pfizer Pharmaceuticals, Inc. None of the authors have a conflict of interest.

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Table 2. Factor Structure of Brief Questionnaire of Smoking Urges Items

Item	Factor 1	Factor 2
1. I have a desire for a cigarette right now	.910	-.067
2. Nothing would be better than smoking a cigarette right now	.640	.283
3. If it were possible, I probably would smoke right now	.790	.008
4. I could control things better now if I could smoke	.022	.833
5. All I want right now is a cigarette	.410	.558
6. I have an urge for a cigarette	.878	.042
7. A cigarette would taste good right now	.702	.164
8. I would do almost anything for a cigarette right now	.028	.803
9. Smoking would make me less depressed	.015	.551
10. I am going to smoke as soon as possible	.564	.084

Note. Bold values represent factor loadings for items assigned to the respective factor.

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