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Research report

Validation of a scale for the assessment of food cravings among smokers

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Abstract

Weight gain associated with smoking cessation impedes attempts to quit smoking and may lead to obesity. One factor that might contribute to weight gain is cravings for sweet or rich foods. To date, no reliable measure exists for evaluating these cravings. The purpose of the current study was to validate an assessment of craving for sweet or rich foods for use among smokers. With a sample of 385 smokers enrolled in a clinical trial for smoking cessation, the study examined the factor structure, internal consistency, and convergent and predictive validity of the Questionnaire on Craving for Sweet or Rich Foods (QCSRF). A two-factor model best represented the data. Factor 1 contained six items assessing perceptions about the ability of sweet or rich foods to relieve negative affect and about self-control over eating. Factor 2 contained three items assessing the intensity of cravings. Both factors demonstrated high internal consistency and good convergent and predictive validity. These results suggest the QCSRF is a reliable and valid measure for examining cravings for sweet or rich foods among smokers.

Keywords: Food craving; Sweet; Rich; Smoking; Weight gain

Introduction

People who quit smoking gain an average of 10 to 13 pounds within the first 1 to 2 years of quitting (Hudmon, Gritz, Clayton, & Nisenbaum, 1999; Klesges et al., 1997). This weight gain often prevents successful attempts to quit smoking (Borrelli & Mermelstein, 1998; Meyers, Klesges, Winders, Ward, Peterson, & Eck, 1997; Ockene et al., 2000) and may lead to obesity (Koh-Banerjee et al., 2003). Post-cessation weight gain has been attributed to several processes, including changes in metabolism related to a reduction in nicotine intake (Perkins, 1992) and an increase in the body weight set point among smokers who quit (Cabanac & Frankham, 2002; Perkins, 1993). Another primary contributing factor to weight gain after quitting smoking is eating more (Perkins, 1993). After smoking cessation, individuals may eat more calorie-dense foods (Grunberg, 1982; Hall, McGee, Tunstall, Duffy, & Benowitz, 1989) and more total calories per day (e.g, Hatsukami, LaBounty, Hughes, & Laine, 1993; Perkins, Epstein, & Pastor, 1990; Spring, Wurtman, Gleason, Wurtman, & Kessler, 1991). Increases in caloric intake during smoking abstinence tend to occur in the presence of simultaneous cigarette and food cravings (Kos, Hasenfratz, & Battig, 1996), and in general, increased caloric consumption has been associated with food craving, particularly craving for sweet or rich foods (Mercer & Holder, 1997).

Research on food craving has been somewhat scarce (see Weingarten & Elston, 1990 for a review) and specific to studies involving bulimics (Waters, Hill, & Waller, 2001), menstruating (Cohen, Sherwin, & Fleming, 1987; Kurzer, 1997; Michener, Rozin, Freeman, & Gale, 1999) or pregnant women (Worthington-Roberts, Little, Lambert, & Wu, 1989), and "chocolate addicts" (Bruinsma & Taren, 1999; Macdiarmid & Hetherington, 1995). However, this limited literature on food craving among these specific populations bears many similarities to larger bodies of research on craving in other domains (Weingarten & Elston, 1990). Research on craving for cigarettes

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(Heishman, Singleton, & Moolchan, 2003; Shadel, Niaura, & Abrams, 2004; Willner, Hardman, & Eaton, 1995), alcohol (Sinha & O'Malley, 1999), and other drugs of abuse (Weinstein, Feldtkeller, Malizia, Wilson, Bailey, & Nutt, 1998) is far more plentiful and provides a window into the areas of food craving that have yet to be explored.

One such topic that has been investigated only minimally in food craving research is its conceptualization. That is, does craving represent a unified construct, or does it have a multidimensional nature? A review of drug craving measures supports the idea that craving is best described and assessed in terms of multiple constructs (Sayette, Shiffman, Tiffany, Niaura, Martin, & Shadel, 2000; Tiffany & Drobes, 1991). Accordingly, studies on cigarette and marijuana use have conceptualized craving with separate constructs relating to the intensity of desires or cravings, the anticipation of the immediate effects of fulfilling cravings or urges, and the intentions to satisfy these cravings (Heishman, Singleton, & Moolchan, 2003; Singleton, Trotman, Zavahir, Taylor, & Heishman, 2002; Tiffany, 1990). The Food Craving Questionnaire (FCQ; Cepeda-Benito, Gleaves, Williams, & Erath, 2000), used primarily in eating disorders research, also characterizes craving as multidimensional, with factors representing constructs similar to those used to conceptualize drug craving.

Another well-researched aspect of cravings for tobacco and other drugs, which has shed some light on preliminary food craving research, involves the biochemical mechanisms hypothesized to underlie craving. Several neurological pathways have been implicated in drug use, craving, and addiction including those related to neurotransmitters such as dopamine, opioid peptides, serotonin, GABA, and glutamate (Koob, 2000). Like drug craving, craving for foods, especially those high in sugar and fat, may also involve the opioid reward system (e.g., Drewnowski, 1992, Mercer & Holder, 1997) and the serotoninergic system (Wurtman & Wurtman, 1995). In particular, changes in endogenous opioid activity may elicit food craving and result from food intake (Mercer & Holder, 1997), and certain levels of brain serotonin may trigger cravings for foods rich in carbohydrates and fats and result from satisfying these cravings (Wurtman & Wurtman, 1995).

The notion that the same biological processes and chemicals associated with cravings for substances of abuse are implicated in cravings for sweet or rich foods is of particular interest to researchers of smoking cessation and weight gain. Because both eating sweet, rich foods and smoking may affect levels of endogenous opioids and serotonin, cravings for sweet or rich foods and cigarette cravings may co-occur during attempts to quit smoking. Furthermore, satisfaction of either type of craving may alleviate the need to satisfy the other. Accordingly, several controlled studies have shown that food deprivation increases self-administration of nicotine (de la Garza & Johanson, 1987; Donny, Caggiula, Mielke, Jacobs, Rose, & Sved, 1998) and nicotine craving (Saules, Pomerleau, Snedecor, Brouwer, & Rosenberg, 2004) and that smoking deprivation increases food consumption (Hatsukami, LaBounty, Hughes, & Laine, 1993), particularly that of sweet foods (Rodin, 1987). Hence, some smokers attempting cessation may experience cravings for sugary foods, which tend to be high in fat and calories and to lead to weight gain. Although research on the relationship between smoking cessation and sweet cravings is equivocal (e.g., Pomerleau, Garcia, Drewnowski, & Pomerleau, 1991), studies indicating that glucose may reduce cigarette cravings and withdrawal discomfort after quitting smoking (McRobbie & Hajek, 2004; West, 2001) support this idea.

Despite studies that point to a relationship between smoking and craving for sweet or rich foods, a standard scale for testing this relationship or these types of cravings has not been developed. Various measures of food craving have been created for specific use among eating-disordered and other populations (e.g., Gendall, Joyce, Sullivan, & Bulik, 1998), and scales have been designed to measure cravings very narrowly with lists of specific foods (Harvey, Wing, & Mullen, 1993; White, Whisenhunt, Williamson, Greenway, & Netemeyer, 2002) or very broadly with questions about food craving in general (Cepeda-Benito, Gleaves, Williams, & Erath, 2000). Still, no published scale exists to assess cravings for sweet or rich foods, despite evidence suggesting that foods from this category may be craved often, particularly among smokers, and may contribute largely to excess caloric intake and weight gain associated with quitting smoking.

Thus, the purpose of the current study was to refine and validate a self-report questionnaire for the assessment of craving for sweet or rich foods among smokers. To this end, this study examines the factor structure, internal consistency, and convergent and predictive validity of the Questionnaire on Cravings for Sweet or Rich Foods (QCSRF).

Method

Participants

The study sample included 385 daily smokers (48.1% female; 87.3% white) enrolled in a clinical trial comparing the effectiveness of the nicotine patch in combination with placebo or naltrexone for smoking cessation (O'Malley et al., 2006). Participants were eligible for the trial if they were at least 18 years of age, smoked an average of at least 20 cigarettes per day for at least one year, and had a baseline expired carbon monoxide (CO) level of at least 10 ppm. Participants were excluded for unstable medical or psychiatric problems, current alcohol dependence, or opiate use. The mean age of eligible participants was 45.95 ($SD = 11.17$), and the mean number of cigarettes smoked per day was 27.70 ($SD = 10.30$). On average, participants reported having smoked for 28.67 years ($SD = 11.09$).