Validation of an Italian version of the Food Craving Questionnaire-State: Factor structure and sensitivity to manipulation

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ABSTRACT

Objective: The present paper describes two studies designed to evaluate the construct and the predictive validity of an Italian version of the Food Craving Questionnaire-State (FCQ-S).
Methods: In the first study 368 volunteers aged 18–65 years completed the FCQ-S and the Disordered Eating Questionnaire (DEQ). In the second study 41 females with eating disorders symptoms (mean age: 24.4 yrs., DEQ ≥ 30; Body Mass Index (BMI) in the range 17 to 30.9 kg/m^2, 87.5% in the normal range) and 43 female healthy controls (mean age: 25.6 yrs., DEQ < 30; BMI in the normal range) took part in an experiment aimed at assessing changes in FCQ-S after exposure to words or images of highly palatable foods.
Results: The results of Study 1 showed that the five-factor model had acceptable fit indices. All subscales of the FCQ-S (but Desire) significantly correlated with the disordered eating measure. The strongest relationship was found between disordered eating and fear of losing control over food intake. The results of Study 2 revealed that four out of five FCQ-S subscales significantly increased after exposure to food stimuli. Participants with eating disorders symptoms, as compared to controls, also showed higher fear of losing control over food and higher negative reinforcement, although this difference was only marginally significant.
Conclusions: The Italian version of the FCQ-S has good construct and concurrent validity, and it seems sensitive in detecting changes induced by stimuli related to highly palatable foods.

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1. Introduction

Food craving has been defined as an intense desire to eat a particular food (Hill, 2007). The ability to adaptively regulate food cravings may be crucial for healthy eating habits. In fact, food cravings have been associated with eating disorder psychopathology in people with bulimia (Van den Eynde et al., 2012). Food cravings have been differentiated from hunger as they tend to be more intense and more specifically related to particular foods, such as chocolate and sweets (Hill, 2007).

Nevertheless, people who chronically limit their eating in order to prevent weight gain (restrained eaters) experience more food cravings than non-restrained eaters (Polivy, Coleman, & Herman, 2005) and food cravings increase when overweight/obese people imagine their favorite foods as compared to neutral objects (Bullins et al., 2013).

Cepeda-Benito and colleagues (Cepeda-Benito, Gleaves, Williams, & Erath, 2000b; Cepeda-Benito et al., 2000a) proposed a multi-faceted approach to the assessment of food craving that distinguishes habitual food cravings from short-term changes in food craving. The first is defined as a stable characteristic of individuals who habitually tend to experience food cravings across times and situations, whereas the second is considered as the experience of a momentary increase of food craving. The authors developed two questionnaires (Food Craving Questionnaire-Trait, FCQ-T, and Food Craving Questionnaire-State, FCQ-S) that have been translated in different languages, validated both in clinical and general populations, and proposed also in short versions (e.g., Iani, Barbaranelli, & Lombardo, 2015; Vander Wal, Johnston, & Dhurandhar, 2007).

The FCQ-S assesses food craving as a current psychological state in response to specific situations (e.g., food deprivation, stressful events) and consists of five subscales (Cepeda-Benito et al., 2000a, 2000b): intense desire to eat, anticipation of positive reinforcement that may result from eating, anticipation of relief from negative states and feelings

as a result of eating, lack of control over eating, and craving as a physiological state of hunger. The questionnaire showed good reliability and validity in general populations (Cepeda-Benito, Fernandez, & Moreno, 2003; Cepeda-Benito et al., 2000a, 2000b). Evidence of FCQ-S' validity was provided by Meule, Lutz, Vögele, and Kübler (2012), who found that FCQ-S discriminated between dieters and non-dieters, and state cravings were moderately correlated with negative affect, as well as weakly and negatively correlated with positive affect. Moreover, other studies showed that Lack of Control scores were moderately correlated with the Bulimia scale scores of the Eating Disorders Inventory-2, and that food deprivation predicted FCQ-S scores (Cepeda-Benito et al., 2003). Evidence of validity also comes from an experimental study in which state craving was manipulated through a 12-hour food deprivation condition, before and after breakfast (Cepeda-Benito et al., 2000b). Participants in the after-breakfast condition reported significantly lower levels of cravings for each of the five FCQ-S domains than participants in the before-breakfast condition. Accordingly, another study found that FCQ-S scores were correlated with the length of time passed since the last intake of food (Cepeda-Benito et al., 2000a). Moreover, the state food craving measure may be helpful in capturing the effects of the exposure to food on the onset of food cravings (Bernabé, Martínez, Rodríguez, & Ruiz, 2013).

Studies conducted in clinical populations (e.g. Van den Eynde et al., 2012) also confirmed the validity of the FCQ-S. For example, FCQ-S scores pre- and post-breakfast in overweight and obese women were found to be sensitive to state changes in food cravings after a 12-hour fasting, but the magnitude of the changes was moderate. Moreover, state food cravings were significantly higher in people with a bulimic disorder compared to healthy controls (Van den Eynde et al., 2012).

Although the FCQ-S' validity is well documented, different factor solutions have been proposed (e.g. Cepeda-Benito et al., 2000a; Meule et al., 2012; Vander Wal et al., 2007). Most studies report a five-factor structure for the FCQ-S (e.g. Cepeda-Benito et al., 2000a; Moreno, Rodríguez, Fernandez, Tamez, & Cepeda-Benito, 2008). Vander Wal et al. (2007) proposed a four-factor model, while Meule et al. (2012) a three-factor one. Since the factorial structure of the FCQ-S is still an issue, and given that there are no previous validation studies of this questionnaire in Italy, the present study aims to assess the factorial structure of the FCQ-S in an Italian community sample.

The present paper describes two studies conducted to examine validity and reliability of an Italian version of the FCQ-S. The first study aimed to evaluate the latent factor structure of the FCQ-S in an Italian community sample. Moreover, since chronic restriction of eating is predictive of higher food cravings (e.g., Polivy et al., 2005), the study evaluated the association between FCQ-S subscales and disordered eating attitudes and behaviors. Finally, since previous research showed significant correlations between FCQ-T total scores and measures of impulsivity (e.g., Meule et al., 2012), but no significant relationship has been reported between the FCQ-S total score and the BIS-15 total score (Meule, Lutz, Vögele, & Kübler, 2014), measures of impulsivity, of behavioral inhibition and behavioral activation systems were included in the study.

The second study evaluated predictive validity of the FCQ-S by assessing changes in FCQ-S after exposure to food stimuli in people with disordered eating symptoms and healthy controls. Stimuli were words and images. A list of words indicating highly palatable foods was presented within a Stroop Task and randomly mixed with lists of words indicating colors, animals and vegetables. This task was used for assessing whether the FCQ-S was sensitive to detect increases of self-reported craving induced by stimuli to which people were not explicitly paying attention, as compared to stimuli to which people were explicitly instructed to pay attention (images of highly palatable foods). In particular, consistently with previous studies (Bullins et al., 2013), it was expected that people with disordered eating would have

shown higher levels of cravings after exposure to food stimuli than the healthy control group.

Both studies were approved by the Ethical Committee of the Department of Psychology, Sapienza University of Rome.

2. Study 1

2.1. Materials and method

2.1.1. Participants

Participants were 368 individuals aged 18–65 years ($M = 28.40$, $SD = 8.77$; 79.3% females); they were recruited through advertisements at University places. Before obtaining written consent, trained interviewers informed participants that the aim of the study was to examine the relationship between personality characteristics and disordered eating attitudes and behaviors. No reimbursement was offered for participation.

2.1.2. Measures

2.1.2.1. Food craving.
An Italian translation of the FCQ-S was used to assess participants' levels of state food craving. The Italian translation was back-translated into English by an English native speaker. The back-translation and the original English version were compared, and inconsistencies were resolved through consultation between the two translators. For each item, participants reported the extent to which each statement would be true for them at that moment from 1 (*strongly disagree*) to 5 (*strongly agree*). A sample item is "If I had one or more specific foods, I could not stop eating it."

2.1.2.2. Disordered eating attitudes and behaviors.
Participants' disordered eating attitudes and behaviors were assessed with the DEQ, a validated measure containing two sections (Lombardo, Russo, Lucidi, Iani, & Violani, 2004). A first section with 20 items evaluates the frequency and intensity of disordered eating attitudes and behaviors within a time frame of three months. Answers are given on a 6-point scale from 0 (*never*) to 5 (*more than once a day*). A sample item is "Indicate how much you have reduced the intake of food or calories in order to lose weight".

A second section with six additional items assesses the discomfort with body weight and shape. Participants are asked to indicate the intensity of these feelings experienced during the last three months on a 7-point scale from 0 (*not at all*) to 6 (*absolutely*). A sample item is "Indicate how much you have felt your self-esteem was influenced (positively or negatively) by thoughts about your intake of food and calories." Both validation studies (Lombardo, Cuzzolaro, Vetrone, Mallia, & Violani, 2011; Lombardo et al., 2004) evidenced that all the items of both sections loaded on one factor, and could be summed in order to compute a total score, notwithstanding the different response scales. Higher scores indicate higher disordered eating attitudes and behaviors. The DEQ also includes four questions on purging behaviors and self-reported body weight and height, with the same response format. These four additional items were not included in analyses of the DEQ.

Moreover, a comparison between the clinical and the control groups evidenced statistically significant differences, with much higher DEQ scores in the group of patients. The clinical cut-off score is 30, reflecting a sensitivity of 83% and a specificity of 66% (Lombardo, Cuzzolaro, Vetrone, Mallia, & Violani, 2011). Cronbach's α in the current study was 0.92.

2.1.2.3. Personality.
The BIS/BAS is a 20-item questionnaire used to assess personality dimensions reflecting sensitivity of the aversive (BIS, seven items) and the appetitive (Drive, four items; Fun Seeking, four items; Reward responsiveness, five items) motivational systems (Carver & White, 1994). Participants were asked to indicate to what extent the