Eating Behaviors 18 (2015) 97–102

Contents lists available at ScienceDirect

Eating Behaviors

The Chinese version of the Yale Food Addiction Scale: An examination of its validation in a sample of female adolescents

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ARTICLE INFO

Article history:
Received 13 November 2014
Received in revised form 13 March 2015
Accepted 13 May 2015
Available online 19 May 2015

Keywords:
Yale Food Addiction Scale
Binge eating
Psychometric properties
Eating behavior

ABSTRACT

Introduction: The present study developed and tested a Chinese version of the Yale Food Addiction Scale (YFAS-R-C) in a sample of female normal-school students, with the aim of producing a psychometrically sound tool for assessing food addiction in female adolescents.
Methods: A preliminary study of 72 normal-school students tested the YFAS-R-C and collected suggestions to improve it. Twenty days later, the formal YFAS-R-C, the Binge Eating Scale (BES), Eating Attitude Test (EAT-26), BIS/BAS Reactivity (BIS/BAS) scale, and Regulatory Emotional Self-efficacy (RES) scale were administrated to a sample of 950 normal-school students. Test–retest reliability was assessed in 53 students who took the YFAS-R-C twice.
Results: The single factor structure of the YFAS-R-C could be confirmed in our study. The internal consistency (KR-20) for 21 original items (0.857) and diagnostic criteria (0.75) were good. Confirmatory factor analysis verified a one-factor structure with an acceptable fit. The test–retest reliability of the YFAS-R-C was good, with interclass correlations of 0.72 for symptom items and 0.69 for the diagnostic criteria. The YFAS-R-C had good convergent and discriminant validity: symptom and diagnosis versions both had significant correlations with measures of related eating behavior constructs (BES and EAT-26), but had no or moderate correlations with measures of related, yet separate constructs (BIS/BAS and RES).
Discussion: The results indicate the YFAS-R-C has a good psychometric validity to differentiate population with and without food addiction in a group of female normal-school students. Future studies should validate the YFAS-R-C in diverse samples.

1. Introduction

Some people describe their dependence on one or more regularly consumed foods as addiction-like symptom, such as chocolate, sugar and certain other foods (Avena, Rada, & Hoebel, 2008; Bruinsma & Taren, 1999; Yanovski, 2003). Although the term food addiction is often used in popular discourse, such opinion at one time was largely dismissed by the scientific community for various reasons, including the simple fact that food, unlike drugs, is required for survival (Corwin & Grigson, 2009). Interesting clinical and scientific shifts in perspective have occurred in recent years, with many believing that the definition of the term addition should be extended to include some compulsive activities, such as behaviors that are intrinsically necessary for our survival, and those we freely perform for pleasure without social sanction, including sex, gambling, and eating (Davis & Claridge, 1998; Grant, Potenza, Weinstein, & Gorelick, 2010). This is part of the so called behavioral addiction, which resembles chemical or drug addiction in numerous physiological and psychological characteristics (Tonioni et al., 2014). In response to this expanded definition of addiction, the concept of food addiction has been proposed recently. A person who exhibits disorder eating patterns and has clinical symptoms similar to those classically seen in patients with drug addiction is described as having a food addiction (Gearhardt, Corbin, & Brownell, 2009a).

A growing body of evidence has found a number of similarities between food addiction and drug addiction, which has greatly supported the concept of food addiction. Certain foods, particularly those high in grease and sugar, could trigger psychology processes similar to those associated with drug and alcohol addiction (Avena, Bocarsly, Hoebel, Wandler, & Gold, 2012; Blumenthal & Gold, 2010; Kenny, 2011). Animal models of feeding behavior provided some of the initial evidence for these similarities. These studies show that rats given intermittent access to sugar begin to exhibit behavior hallmarks of addiction, such as tolerance, withdrawal, binge eating, and continued use despite the negative consequence (i.e., electric shocks) (Avena et al., 2008; Iozzo, Guiducci, Guzzardi, & Pagotto, 2012). Despite the robust evidence of

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http://dx.doi.org/10.1016/j.eatbeh.2015.05.002
1471-0153/

sugar (or other food high in fat and sugar) dependence in animals, there are few parallel findings in human research because of ethical concerns. However, some findings from brain science are so encouraging. An important research has demonstrated the brain areas responsive to food and drug cravings are overlapping (Pelchat, 2009). Moreover, neuroimaging research has shown that the consumption of either drugs or palatable food produce similar patterns of dopamine-related neural activation (Iozzo et al., 2012; Kiefer & Grosshans, 2009; Stoeckel et al., 2008; Volkow et al., 2009), and biochemical research has found that obesity and substance dependence are both linked to similar neural makers, such as reduced DRD2 receptor (Johnson & Kenny, 2010; Volkow, Wang, Fowler, & Telang, 2008).

Food addiction has been implicated in craving, bingeing and excessive consumption. Moreover, these behavioral hallmarks of food dependence appear to be common in patients with bulimia nervosa (BN), binge eating disorder (BED), and obesity (Drewnowski & Bellisle, 2007; Gearhardt et al., 2009a; Gearhardt, Corbin, & Brownell, 2009b), even in the normal population (Bish et al., 2005; Kruger, Galuska, Serdula, & Jones, 2004). As the evidence of the addictive properties of food steadily grows, food addiction has gained increased attention in both lay media and scientific literature as a contributor to obesity epidemic, also to eating disorders. Although anecdotal reports abound, few studies have assessed the "addictive" properties of foods using rigorous scientific criteria. Turning to the DSM-IV-TR criteria for substance dependence (American Psychiatric Association, 2000), the assessment criteria of food addiction were proposed, e.g., the addictive eating interview (Cassin & von Ranson, 2007), and the Yale Food Addiction Scale (YFAS) (Gearhardt et al., 2009b). Food addiction is diagnosed if at least 3 of 7 symptoms are present during the preceding year and a clinically significant impairment, or level of distress, is endorsed.

The YFAS is a psychometrically sound tool, which has demonstrated adequate reliability and validity in clinical and non-clinical samples (Brunault, Ballon, Gaillard, Réveillère, & Courtois, 2014; Cassin & von Ranson, 2007; Gearhardt et al., 2009b, 2012; Meule, Heckel, & Kübler, 2012). Moreover, Gearhardt, White, and Potenza (2011) have demonstrated that its score was quite correlated to the neural activation of reward circuitry. The YFAS can be used to distinguish people with or without food addiction, and also can be used to assess subjects' disordered eating using symptom scores. Over the past 5 years, the YFAS was translated into multiple languages and it is widely used in western countries (Brunault et al., 2014; Innamorati et al., 2014; Meule, Vogele, & Kubler, 2012). Studies used with clinical and non-clinical samples show similar indices of its validity, such as a one-factor structure, appropriate internal consistency, and medium-to-high positive correlations with other eating disorder measures (Brunault et al., 2014; Gearhardt et al., 2009b; Meule, Heckel et al., 2012). Studies using the YFAS have found that prevalence rates of food addiction range between 5% and 10% in the general population, and between 15% and 25% in obese samples (Meule & Gearhardt, 2014). Furthermore, 40% to 60% of obese patients with binge-eating disorder and those undergoing bariatric surgery met the criteria of FA (Gearhardt, White, Masheb, & Grilo, 2013; Gearhardt et al., 2012; Meule, Heckel et al., 2012). These findings support the appropriateness of this scale for assessing food addiction.

To our knowledge, there is no effective measuring tool for the concept of food addiction in China, and correspondingly the research on food addiction is also limited in China. The aim of the current study was to translate the YFAS into a Chinese version (YFAS-R-C) and examine its psychometric properties with a sample of female normal-school students. The factor structure, internal consistency, and convergent and discriminant validity of the YFAS-R-C were examined. Eating disorders are common in late adolescent and young adult women in westernized countries (Fichter, 1985). Yet, in China, females were also found to more often endorse the criteria for eating disorders in this age stage (Chen & Jackson, 2008). Therefore, the revised YFAS will offer an important basic tool for the study of eating disorders in the future China.

2. Methods

2.1. Subjects and setting

This study was conducted with normal-school students from two normal colleges in Hunan Province. The normal-school students undertake 7 years of continuous study after junior high-school to obtain an undergraduate diploma. The psychological teachers of the two schools were responsible for the entire survey. The participants were recruited in their psychological classes, and then finished the corresponding survey in class. Five classes of each school have participated in this survey. The questionnaire was distributed to every student present, and was submitted to the teacher voluntarily. Most normal-school students are female, so we did not consider including males in the final sample.

The preliminary version of the YFAS-R-C was distributed in two classes and 72 students returned the questionnaire. The questionnaire packet used in the major study contained the formal YFAS-R-C and related measures. The packet was distributed to 950 students, of which 608 completed and returned the questionnaires, with a response rate of 64%. The final sample size was 584 female students. The sample has a mean age of 16.47 years ($SD = 0.92$ years; range: 14–19 years). The average self-reported body mass index (BMI) was 19.87 kg/m^2 ($SD = 2.27$ kg/m^2; range: 14.93–30.48 kg/m^2). According to the BMI reference norms for screening overweight/obesity in Chinese children and adolescents (Group of China Obesity Task Force, 2004), 9 students were obese (1.54%), 29 students were overweight (4.97%), and the majority of students were within normal weight range (93.49%). The participants in our major study were randomly divided into 2 samples: Sample 1 was used for exploratory factor analysis and Sample 2 was used for confirmatory factor analysis. Sample 1 comprised 283 participants (31 underweight, 224 normal-weight and 28 overweight), and Sample 2 comprised 301 participants (33 underweight, 245 normal-weight and 23 overweight). There is no significant ratio difference on weight status between two samples ($\chi^2 = .939$, $p > .05$). The time-interval between the scale's two administrations was 20–26 days. After matching, we found 53 students who completed the scale's test twice.

2.2. Translation process

We obtained permission from Ashley Gearhart for the translation and validation of the Chinese version of the YFAS. The English version of the YFAS was translated into Chinese by two doctors majoring in psychology. Two graduates majoring in English then back-translated the Chinese version of the YFAS (YFAS-R-C). The final translated questionnaire was examined and discussed by the two translators and a psychiatrist with expertise in substance abuse. The preliminary version was then administrated to a small sample of college students to collect suggestions about content expression. The students marked vague statements and answered open-ended questions seeking suggestions about the scale. The YFAS-R-C was modified in response to the students' suggestions, and the final version was reviewed by the first two doctors to ensure semantic, criterion and conceptual equivalence, as far as possible (Flaherty et al., 1988).

2.3. YFAS and its development

The original YFAS is a self-report survey, consisting of 27 questions, which were designed by Gearhardt et al. (2009b) to measure symptoms of food addiction. Questions 26 and 27, which are not scored, ask respondents to select certain foods and provide additional information about them regarding problematic eating behaviors. The first 25 items have different scoring options (dichotomous and five-point scales) to measure experiences of addictive eating behaviors within the past 12 months. Three questions (17, 18, and 23) serve as primers for other questions and are not included in the evaluation. Twenty of the remaining 22 items measure the 7 food-dependence criteria stated in the DSM-