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## Validation of the French Version of the Yale Food Addiction Scale: An Examination of its Factor Structure, Reliability, and Construct Validity in a Nonclinical Sample

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**TITLE PAGE:**

**Title: Validation of the French version of the Yale Food Addiction Scale: An examination of its factor structure, reliability and convergent validity in a non-clinical sample.**

**Short title: Validation of the French version of the YFAS**

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**ABSTRACT:**

Objective: Food addiction is a concept that has recently been proposed by applying the DSM-IV-TR criteria for substance dependence to eating behavior. Food addiction has received increased attention given that it may play a role in binge eating, eating disorders and the recent increase in obesity prevalence. Currently, there is no psychometrically sound tool for assessing food addiction in French. The present study aimed to test the psychometric properties of a French version of the Yale Food Addiction Scale (YFAS) by establishing its factor structure, internal consistency and convergent validity with a non-clinical population.

Method: A total of 553 participants were assessed for food addiction (French version of the YFAS) and binge eating behavior (Bulimic Investigatory Test, Edinburgh (BITE) and Binge Eating Scale (BES)). We tested the factor structure (factor analysis for dichotomous data based on tetrachoric correlation coefficients), internal consistency and convergent validity of the scale with measures of binge eating.

Results: Our results supported a one-factor structure, which accounted for 54.1% of the variance. We demonstrated that this tool had adequate reliability and highly convergent validity with measures of binge eating, both in its diagnosis and symptom count version. A two-factor structure explained an additional 9.1% of the variance, and could help to differentiate between patients with high vs. low levels of insight regarding addiction symptoms.

Conclusions: In this study, we validated a psychometrically sound French version of the YFAS, both in its symptom count and diagnosis version. Future studies should validate this tool with clinical samples.

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**CLINICAL IMPLICATIONS:**

- Food addiction is a prevalent disorder that can be reliably assessed in French using the Yale Food Addiction Scale (YFAS).
- The French version of the YFAS has a one-factor structure and a high convergent validity with measures of binge eating.
- A two-factor structure explained an additional 9.1% variance, and may distinguish between patients with and without insight regarding addiction symptoms.

**LIMITATIONS:**

- We did not assess the YFAS factor structure, internal consistency and validity with clinical samples.
- The cross-sectional study design did not permit test-retest validity to be established.

**KEY WORDS:** food addiction; addiction; addictive behavior; Yale Food Addiction Scale; French; psychometrics; factor analysis; binge eating disorder; Bulimic Investigatory Test, Edinburgh; Binge Eating Scale.

## INTRODUCTION

Drug addictions are chronic relapsing disorders characterized by compulsion to seek and take the drug, a loss of control over drug-seeking and drug-taking behaviors, and the addictions typically involve maintaining drug use despite adverse consequences.<sup>1</sup> In recent years, interesting clinical and scientific shifts in perspective have occurred, with many believing that addiction should include individuals' compulsive engagement in activities such as gaming, internet use, and shopping, in addition to pharmacologic rewards.<sup>2</sup> Current debates have even extended the definition of addiction to so-called "behavioral addictions" (also called "non-chemical addictions" or "non-drug addictions"), which include the use of natural rewards, such as behaviors that are intrinsically necessary for our survival and in which we freely engage with pleasure and without social sanction, including sex, gambling and eating.<sup>3,4</sup> A growing body of evidence suggests that behavioral addictions resemble substance addictions across a number of domains, including natural history, phenomenology, tolerance, comorbidity, overlapping genetic contributions, neurobiological mechanisms, and responses to treatment.<sup>2</sup>

As a part of this growing body of research, the concept of food addiction has recently been proposed by applying the DSM-IV-TR criteria for substance dependence to eating behaviors. Patients who exhibit eating patterns that are similar to behaviors classically seen in drug-addicted patients are described as having a food addiction.<sup>5</sup> This concept has received increasing attention given the role it may play in binge eating, eating disorders and the recent increase in obesity prevalence.<sup>6</sup> Although the evidence for and against the food addiction or compulsive eating model is debatable<sup>6-8</sup> and it is unclear whether this model explains the increased prevalence in obesity,<sup>9,10</sup> the possibility that addiction to food represents a reliable phenotypical description of a number of patients is increasingly supported by research with humans and animals.<sup>5,11,12</sup> Current literature suggests that a wide range of patients exhibit

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2  
3 significant distress in their relations to food, lose control over their food consumption, suffer  
4 from repeated failed attempts to reduce their intake, and are unable to abstain from specific  
5 types of foods or reduce their consumption despite negative consequences.<sup>5,12</sup>  
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10 Specifically, a growing body of research supports the hypothesis that specific types of food  
11 (e.g., refined foods that are high fat and sugar) may have addictive properties similar to those  
12 of classic substances such as alcohol, tobacco or cocaine.<sup>10,13</sup> Refined food addiction has been  
13 proposed as a classic substance use disorder.<sup>10</sup> Thus, researchers have been motivated to  
14 apply the DSM-IV-TR substance dependence criteria to the field of eating behaviors. Food  
15 addiction is diagnosed when at least three symptoms (out of seven) are present during the  
16 past 12 months and a clinically significant impairment or level of distress is endorsed.  
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20 Therefore, a psychometrically sound tool for assessing food addiction that applies the DSM-  
21 IV-TR substance dependence criteria to the field of eating behaviors is needed. Gearhardt et  
22 al.<sup>14</sup> developed the Yale Food Addiction Scale (YFAS) to identify individuals who are  
23 exhibiting signs of addiction with regard to specific types of food (e.g., high fat and sugar) by  
24 extrapolating the seven DSM-IV-TR criteria for substance dependence to the field of eating  
25 behaviors. This self-administered scale has been used with clinical and non-clinical samples,  
26 has demonstrated adequate reliability and validity, and is considered the gold standard for  
27 assessing food addiction. Studies using this scale have shown that food addiction is highly  
28 prevalent in a subpopulation of obese patients and in patients with binge eating disorders.<sup>15,16</sup>  
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46 In an examination of obese patients with binge eating disorders, the criteria for food addiction  
47 was met by 57% of the sample, and food addiction scores were significant predictors of binge  
48 eating frequencies, even when controlling for other factors, such as eating disorder  
49 psychopathology and negative affect.<sup>17</sup> Moreover, scores on the YFAS correlated with neural  
50 activation patterns in a manner consistent with findings regarding substance dependence (e.g.,  
51 elevated activation in reward circuitry in response to food cues and reduced activation in  
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3 inhibitory regions).<sup>18</sup> These findings support the appropriateness of this scale for assessing  
4  
5 food addiction.  
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8 To our knowledge, there is not currently a French version of the Yale Food Addiction Scale,  
9  
10 and only a limited number of studies have assessed food addiction in non-US and non-  
11  
12 European locations. To date, no studies have been conducted in French-speaking countries,  
13  
14 and Meule et al.<sup>19</sup> highlighted the need for studies that assess the prevalence of food addiction  
15  
16 and the factors associated with food addiction.  
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19 The current study aimed to measure the psychometric properties of a French version of the  
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21 YFAS with a non-clinical sample by establishing its factor structure, internal consistency, and  
22  
23 convergent validity with measures of binge eating behaviors.  
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## 28 **METHODS**

### 29 **Participants and procedures**

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32 A total of 553 participants participated in this study. Participants completed a web-based  
33  
34 questionnaire, which was created using Sphinx software (Sphinx Plus 2 version 5.1.0.4). The  
35  
36 questionnaire included items regarding sociodemographic characteristics (e.g., age, sex and  
37  
38 current Body Mass Index=BMI) and the following three self-administered scales: the Yale  
39  
40 Food Addiction Scale (YFAS), the Bulimic Investigatory Test, Edinburgh (BITE), and the  
41  
42 Binge Eating Scale (BES).  
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46 We obtained permission from Ashley Gearhardt for the translation and validation of a French  
47  
48 version of the YFAS. The YFAS translation procedure used in this study was consistent with  
49  
50 existing guidelines for scale validation.<sup>20</sup> First, the YFAS was translated from English to  
51  
52 French by three translators who were qualified specialists in addiction, psychology and  
53  
54 psychiatry and who were native French speakers. This step ensured the production of a  
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56 translation that achieved consensus from all of the translators. Second, a translator whose  
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3 native language was English performed a blind-backward translation of the initially translated  
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5 version of the YFAS. Finally, a committee of three expert psychiatrists from the fields of  
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7 addictive behaviors and eating disorders compared the back-translated scale with the initially  
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9 translated version of the YFAS to produce a final French version of the YFAS. The  
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11 committee's aims were to verify the cross-cultural equivalence of the source and final  
12  
13 versions, ensure that the translation was fully comprehensible, and modify the items,  
14  
15 instructions or format if necessary. Finally, a pilot version of the scale was tested with a small  
16  
17 sample of French participants to evaluate the scale's instructions, response format, and items  
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19 for clarity. Figure 1 presents the final French version of the YFAS.  
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## 24 25 **Measures**

### 26 27 *The Yale Food Addiction Scale*

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29 The YFAS is a 25-item self-report scale designed by Gearhardt et al.<sup>14</sup> to measure the  
30  
31 symptoms of food addiction that have occurred over the past 12 months. The authors  
32  
33 developed this scale to identify individuals exhibiting signs of addiction with regard to  
34  
35 specific types of foods (e.g., high fat and sugar) by extrapolating the DSM-IV-TR criteria for  
36  
37 substance dependence to the field of eating behaviors.<sup>5</sup> This scale includes mixed response  
38  
39 categories (i.e., items that are presented in either a dichotomous or Likert-type format). In  
40  
41 accordance with the diagnostic criteria for substance dependence, as stated by the DSM-IV-  
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43 TR,<sup>1</sup> this scale assesses the following seven food addiction criteria:<sup>14</sup> A) tolerance (items 20  
44  
45 and 21); B) withdrawal (items 12, 13 and 14); C) the substance is often taken in larger  
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47 amounts or over a longer period than was intended (items 1, 2 and 3); D) a persistent desire  
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49 or unsuccessful effort to cut down or control substance use (items 4, 22, 24 and 25); E)  
50  
51 spending a great deal of time in activities necessary to obtain the substance, use the  
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53 substance, or recover from its effects (items 5, 6 and 7); F) giving up social, occupational, or  
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3 recreational activities because of substance use (items 8, 9, 10 and 11); and G) continuing  
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5 substance use with the knowledge that it is causing or exacerbating a persistent or recurrent  
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7 physical or psychological problem (item 19). The YFAS has two additional items that assess  
8  
9 individuals' clinically significant impairment or distress caused by eating (items 15 and 16).  
10  
11 Items 17, 18 and 23 are primers for other questions and are not scored.  
12

13  
14 Gearhardt et al.<sup>14</sup> defined specific cut-offs such that each of the seven diagnostic criteria was  
15  
16 satisfied when one or more item representing that criterion was endorsed. The YFAS  
17  
18 provides two scoring options, which are a symptom count version and a diagnostic version.  
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20 The symptom count version reflects the number of dependence symptoms experienced in the  
21  
22 past 12 months (i.e., YFAS symptom count scores range from 0 to 7). In the diagnostic  
23  
24 version, food addiction is diagnosed when three or more symptoms were present during the  
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26 past 12 months and clinically significant impairment or distress was endorsed.  
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30 This scale has been validated in English, has exhibited adequate internal consistency ( $\alpha =$   
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32 .86), and has shown good convergent validity with measures of similar constructs and good  
33  
34 discriminant validity relative to related but dissimilar constructs.<sup>14</sup> Additionally, this scale has  
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36 been validated in German with clinical<sup>21</sup> and non-clinical samples<sup>22</sup> with similar  
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38 psychometric properties.  
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#### 41 42 43 *The Binge Eating Scale*

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45 The Binge Eating Scale (BES) is a 16-item scale designed to assess individuals' severity of  
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47 binge eating using behavioral, affective and cognitive symptoms.<sup>23</sup> The BES is a widely used  
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49 scale to assess binge eating disorder<sup>24</sup> and provides an overall score by summing each of the  
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51 items (each ranging from 0 to 3), with a higher score reflecting more severe binge eating  
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53 problems. Internal consistency in the current sample for this measure was excellent  
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55 (Cronbach's  $\alpha = 0.92$ ).  
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5 *The Bulimic Investigatory Test, Edinburgh*  
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7 The Bulimic Investigatory Test, Edinburgh (BITE) is a 33-item self-report measure  
8 developed by Henderson and Freeman to assess the severity and frequency of binge eating  
9 symptoms.<sup>25</sup> The severity of individuals' binge eating behavior is assessed according to the  
10 symptom score from this scale, which ranges from 0 to 30. According to Henderson &  
11 Freeman,<sup>25</sup> this scale has satisfactory reliability and validity when used with binge eating  
12 patients. Internal consistency in the current sample for this measure was excellent (Kuder-  
13 Richardson's internal reliability coefficient was 0.96).  
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25 **Statistical analyses and ethical considerations**  
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27 Analyses were conducted using the R statistical package version 2.15.2<sup>26</sup> with the psych  
28 package.<sup>27</sup> Statistical analyses included descriptive statistics and tests examining the  
29 psychometric properties of the scale, including its factor structure, the item statistics, internal  
30 consistency, and convergent validity.  
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36 To test the scale's factor structure, we utilized the procedure used in Gearhardt's original  
37 publication.<sup>14</sup> Therefore, we conducted a factor analysis for dichotomous data based on  
38 polychoric correlation coefficients<sup>28</sup> to explore the number of underlying factors. The initial  
39 factor analysis for the original 22 dichotomous items revealed that one item (item 24) did not  
40 strongly correlate with the remaining items of the scale, as it had a low factor loading of -  
41 0.03. In accordance with Gearhardt et al.'s previous research, we excluded this item from the  
42 analysis and performed new statistical analyses. We determined the number of factors to  
43 extract by examining the scree plot (eigenvalues and by examining Cattell's scree test<sup>29,30</sup>),  
44 and by conducting Horn's parallel analysis test.<sup>31</sup> Final factor analysis was thus based on the  
45 original 21 items that were included in the YFAS (excluding the significance questions), and  
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3 was conducted using a varimax rotation. We also tested the factor structure of the YFAS in  
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5 its diagnosis version, by conducting a factor analysis using a varimax rotation for the 8  
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7 dichotomous diagnostic criteria (seven diagnostic DSM criteria in addition to significance  
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9 questions).

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11 We tested the internal consistency of the scale, as in the extent to which the items in a  
12  
13 dimension were correlated with each other, using the Kuder-Richardson 20 coefficient, given  
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15 that the items were all dichotomous.<sup>32</sup> Convergent validity was assessed by examining the  
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17 associations between the YFAS scores and the measures of binge eating behaviors. First, we  
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19 described the convergent validity of the YFAS symptom count, and then we described that of  
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21 the diagnosis version. We examined the associations between the YFAS symptom count  
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23 score and both the BES total score and the BITE symptom score (Spearman's rho correlation  
24  
25 coefficients). We used non-parametric tests for these analyses; given that we rejected the  
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27 normality hypothesis for the YFAS symptom scores (a Shapiro-Wilk test was significant).  
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29 Next, we tested convergent validity for the diagnosis version. We used Mann-Whitney tests  
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31 to assess the associations between the diagnosis of food addiction and binge eating, as  
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33 assessed by the BES and BITE. All analyses were two-tailed, with *P*-values of less than .05  
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35 considered statistically significant. There were no missing data, as all of the questions  
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37 required responses to proceed to the next page of the survey. This study did not require  
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39 institutional review board approval because it was not considered biomedical research under  
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41 French law; however, it followed the tenets of the Declaration of Helsinki.  
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## 49 **RESULTS**

### 50 **Sample characteristics**

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52 Participants had a mean age of 28.9 years (SD 12.0, 95%CI, 27.9 to 29.9), a mean current  
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54 BMI of 22.5 kg/m<sup>2</sup> (SD 4.5, 95%CI, 22.2 to 22.9). Food addiction was diagnosed in 8.7% of  
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3 our sample. The median YFAS symptom count (the number of criteria satisfied for food  
4 dependence) was 1, and the mean YFAS symptom count score was 1.9 (SD 1.4, 95%CI, 1.8  
5 to 2.0). The mean BES total score was 8.2 (SD 8.9, 95%CI, 7.4 to 8.9), and the mean BITE  
6 symptom score was 7.7 (SD 6.4, 95%CI, 7.1 to 8.2).  
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### 10 11 12 13 14 **Item statistics, factor structure, and reliability**

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16 Table 1 summarizes the item statistics, including the mean, standard deviation and item-total  
17 correlation for each item.  
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20 By examining the scree plot, the factor analysis based on the original 21 items identified two  
21 factors based on their eigenvalues (factor 1: 10.96, factor 2: 1.48), suggesting a one or a two  
22 factor structure. An examination of Cattell's scree and a parallel analysis suggested the  
23 extraction of one factor (Figure 2). Following Cattell's advice,<sup>33</sup> we extracted an extra factor  
24 and studied the one and two factors solutions.  
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28  
29 A one factor structure explained 54.1% of the variance. For this one-factor structure, all of  
30 the factor loadings were greater than .57 except for item 6, which had a factor loading of  
31 0.46, and the Kuder-Richardson's internal reliability coefficient was good (KR-20 = 0.84) for  
32 these items (Table 2). An alternative two-factor structure explained an additional 9.5% of the  
33 variance (factor 1 explained 34.3% of variance; factor 2 explained 29.4% of variance). For  
34 the two-factor structure, all of the factor loadings were greater than .43 (Table 3), and the  
35 Kuder-Richardson's internal reliability coefficient was good for the first factor (KR-20 =  
36 0.81) and adequate for the second factor (KR-20 = 0.67). In this two-factor solution, the first  
37 factor consisted of items belonging primarily to DSM criteria A, criteria B, criteria C, criteria  
38 E, criteria F, and criteria G (Table 2). The second factor consisted of items belonging  
39 primarily to DSM criteria D (persistent desire or unsuccessful efforts to limit or control  
40 substance use), criteria F (giving up social, occupational, or recreational activities because of  
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3 substance use), and significant distress (Table 2). Thus, our results mainly support a one  
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5 factor structure, which explained 54.1% of the variance.  
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8 As for the factor structure of the YFAS in its diagnosis version, a parallel factor analysis  
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10 based on the eight dichotomous diagnostic criteria (seven diagnostic DSM criteria in addition  
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12 to significance questions) identified a single factor structure. In this single factor structure,  
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14 all of the criteria had factor loadings for the single factor of 0.61 or greater. The Kuder-  
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16 Richardson's internal reliability coefficient was  $KR-20 = 0.76$  when taking into account all of  
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18 the diagnostic criteria.  
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### 21 22 23 **Convergent validity**

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25 First, we assessed convergent validity by examining the correlations between the YFAS  
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27 symptom count scores and the measures of binge eating behaviors (i.e., the BES total and  
28  
29 BITE symptom scores). The YFAS symptom score was significantly correlated with the  
30  
31 BITE symptom score (Spearman's  $\rho = 0.59$ ;  $P < 0.001$ ) and the BES total score  
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33 (Spearman's  $\rho = 0.58$ ;  $P < 0.001$ ).  
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37 Second, we evaluated the associations between the diagnosis of a food addiction and binge  
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39 eating scores. The diagnosis of a food addiction was associated with higher binge eating  
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41 scores, as assessed by the BITE symptom score ( $20.5 \pm 5.1$  vs.  $6.5 \pm 5.0$ ;  $P < .001$ ) and the  
42  
43 BES total score ( $26.0 \pm 10.2$  vs.  $6.5 \pm 6.6$ ;  $P < .001$ ).  
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45

### 46 47 **DISCUSSION**

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49 The present study aimed to measure the psychometric properties of a French version of the  
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51 YFAS and to establish its reliability and validity with a non-clinical sample. We  
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53 demonstrated that this scale had a one-factorial structure, good internal consistency and high  
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3 convergent validity with one measure of binge eating, both in its diagnosis and symptom  
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5 count versions.  
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8 We found that the previously proposed one-factor structure for this scale was the best  
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10 factorial structure and explained a high proportion of the variance for the French version of  
11  
12 this scale, which is consistent with Gearhardt et al. original results.<sup>14</sup> This one factor structure  
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14 was obtained after excluding item 24, which assessed the existence of failed attempts to limit  
15  
16 the consumption of high fat/sugar foods. This item is categorized within the fourth DSM-IV-  
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18 TR addiction criterion, known as “persistent desire or repeated unsuccessful attempts to quit”  
19  
20 (items 4, 22, 24 and 25). The low factor loadings and high standard deviations for items 22  
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22 and 24 have been discussed by Meule et al.<sup>21</sup>, suggesting that these items do not sufficiently  
23  
24 differentiate between food-addicted and non-addicted individuals. These two items (22 and  
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26 24) refer to the persistent desire to control food that may be experienced by obese, binge  
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28 eating-disordered, food-addicted, bulimic or anorexic patients. Therefore, item 24 could be  
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30 eliminated from the scale or rephrased given its low psychometric qualities, and replaced by a  
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32 more specific item for food addiction. Additional items assessing “persistent desire or  
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34 repeated unsuccessful attempts to control food” would be necessary to better differentiate  
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36 between control due to food addiction and control due to fear of weight gain, as this latter  
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38 dimension is frequently evident in anorexia nervosa and a subtype of bulimia nervosa  
39  
40 patients.  
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45 We confirmed the adequate reliability of this scale, both in its diagnosis and symptom count  
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47 versions. The high factor loadings evident in the factor analysis for the dichotomous criteria  
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49 support the use of the seven DSM-IV-TR criteria for substance dependence in the fields of  
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51 eating behaviors and food addiction. Our results support the adequate reliability of the food  
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53 addiction concept, as assessed by the DSM-IV-TR addiction criteria. In this study, we found  
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55 a prevalence rate for food addiction (8.7%) that was comparable to the rates reported for the  
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3 US (11.4%) and Germany (8.8%).<sup>14,19</sup> Additionally, the median number of food addiction  
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5 criteria found in this sample was 1, which was comparable to the US and German versions.  
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7 These results suggest that the French version of the YFAS has similar psychometric  
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9 properties to the previously validated US and German versions. These results support the use  
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11 of the YFAS as an interesting tool for assessing food addiction in the overall population.  
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14 We demonstrated that the French version of the YFAS has highly convergent validity with  
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16 measures of binge eating. This result is consistent with previous research showing a strong  
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18 association between food addiction and binge eating.<sup>34</sup>  
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20  
21 In addition, our results suggest that a two-factor structure of the scale slightly improved the  
22  
23 explained variance. Interestingly, this two-factor solution may help differentiate between the  
24  
25 following two subtypes of food-addicted patients: patients with high and low insight  
26  
27 regarding addiction symptoms. Factor 1 includes the DSM criteria that assess addiction  
28  
29 symptoms independent of the patients' level of insight regarding their addiction (criteria A,  
30  
31 B, C, F, and G), whereas factor 2 includes the DSM criteria that assess this level of insight  
32  
33 (criteria D: persistent desire or unsuccessful efforts to limit or control substance use; criteria  
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35 F: giving up social, occupational, or recreational activities because of substance use; and  
36  
37 significant distress). The dimension of high or low insight may be important for both clinical  
38  
39 practice and research because it implies different therapeutic strategies. Approaches that  
40  
41 develop adequate management strategies for patients depending on their level of insight into  
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43 their addiction may be optimal. Future research should better assess this dimension of insight  
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45 among food-addicted patients.  
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49  
50 Among the potential limitations of our study, we studied the YFAS only in a non-clinical  
51  
52 population. Future studies should assess reliability and validity of the YFAS with clinical  
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54 samples, including patients with binge eating disorder, bulimia nervosa and anorexia nervosa,  
55  
56 as well as the test-retest validity of this scale. Future studies should also assess food addiction  
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3 using both semi-structured interviews and self-administered scales to establish the sensitivity  
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5 and specificity of the YFAS.  
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## 8 9 **CONCLUSIONS**

10  
11 In conclusion, we demonstrated that this French version of the YFAS is a psychometrically  
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13 sound tool that can be used in future food addiction studies to assess patients who experience  
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15 addiction-related symptoms in their eating behaviors. One future aim is to use this scale with  
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17 a clinical sample to better understand the psychopathologic and psychiatric factors associated  
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19 with food addiction. Another interesting future aim is to study individuals' insights into their  
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21 addictions in these populations. A deeper understanding of these issues will provide a crucial  
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23 preliminary step that will aid in the development of effective psychotherapeutic and  
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25 psychopharmacological strategies for food-addicted patients.  
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## TABLES

Table 1. Item statistics for the Yale Food Addiction Scale

	Mean	SD	Item-total correlation
<i>Criteria A: Tolerance</i>			
Item 20.	.09	.28	.42
Item 21.	.19	.39	.40
<i>Criteria B: Withdrawal</i>			
Item 12.	.02	.13	.53
Item 13.	.07	.25	.52
Item 14.	.08	.27	.57
<i>Criteria C: Substance often taken in larger amounts or over a longer period than was intended</i>			
Item 1.	.09	.28	.58
Item 2.	.12	.32	.51
Item 3.	.04	.20	.62
<i>Criteria D: Persistent desire or unsuccessful effort to cut down or control substance use</i>			
Item 4.	.12	.32	.51
Item 22.	.59	.49	.34
Item 24.	.57	.50	-.02
Item 25.	.25	.44	.50
<i>Criteria E: Spending a great deal of time in activities necessary to obtain the substances, use the substance or recover from its effects.</i>			
Item 5.	.13	.33	.48
Item 6.	.06	.23	.29
Item 7.	.05	.22	.48
<i>Criteria F: Giving up social, occupational, or recreational activities because of substance use</i>			
Item 8.	.05	.22	.66
Item 9.	.04	.19	.72
Item 10.	.04	.20	.55
Item 11.	.04	.20	.47
<i>Criteria G: Continuing substance use despite physical or psychological problem</i>			
Item 19.	.20	.40	.49
<i>Significant distress</i>			
Item 15.	.10	.30	.68
Item 16.	.03	.17	.66

**Table 2. Factor loadings for the one and two-factor structures of the Yale Food Addiction Scale (factor analysis)**

	One- factor structure Factor 1 loading	Two-factor structure	
		Factor 1 loading	Factor 2 loading
<i>Criteria A: Tolerance</i>			
Item 20.	.61	<b>.49<sup>1</sup></b>	.36
Item 21.	.57	<b>.43<sup>1</sup></b>	.36
<i>Criteria B: Withdrawal</i>			
Item 12.	.82	<b>.66<sup>1</sup></b>	.49
Item 13.	.74	<b>.70<sup>1</sup></b>	.33
Item 14.	.78	<b>.72<sup>1</sup></b>	.36
<i>Criteria C: Substance often taken in larger amounts or over a longer period than was intended</i>			
Item 1.	.78	<b>.80<sup>1</sup></b>	.27
Item 2.	.69	<b>.77<sup>1</sup></b>	.17
Item 3.	.85	<b>.77<sup>1</sup></b>	.41
<i>Criteria D: Persistent desire or unsuccessful effort to cut down or control substance use</i>			
Item 4.	.70	<b>.53<sup>1</sup></b>	.46
Item 22.	.58	.18	<b>.66<sup>2</sup></b>
Item 24. <sup>3</sup>	-	-	-
Item 25.	.71	.31	<b>.71<sup>2</sup></b>
<i>Criteria E: Spending a great deal of time in activities necessary to obtain the substances, use the substance or recover from its effects.</i>			
Item 5.	.67	<b>.54<sup>1</sup></b>	.40
Item 6.	.46	<b>.76<sup>1</sup></b>	-.16
Item 7.	.70	<b>.73<sup>1</sup></b>	.23
<i>Criteria F: Giving up social, occupational, or recreational activities because of substance use</i>			
Item 8.	.87	<b>.65<sup>1</sup></b>	.57
Item 9.	.93	<b>.69<sup>1</sup></b>	.62
Item 10.	.76	.21	<b>.90<sup>2</sup></b>
Item 11.	.64	-	<b>.92<sup>2</sup></b>
<i>Criteria G: Continuing substance use despite physical or psychological problem</i>			
Item 19.	.67	<b>.54<sup>1</sup></b>	.41
<i>Significant distress</i>			
Item 15.	.86	.49	<b>.74<sup>2</sup></b>
Item 16.	.90	.47	<b>.82<sup>2</sup></b>

<sup>1</sup> indicates items associated with the first factor of the two-factor structure.

<sup>2</sup> indicates items associated with the second factor of the two-factor structure.

<sup>3</sup> Item 24 was not included in the analysis because of its low factor loading.

## FIGURES

**Figure 1. French version of the Yale Food Addiction Scale**

**Consignes pour remplir l'échelle:** Ce questionnaire porte sur vos habitudes alimentaires de l'année passée. Les gens ont parfois du mal à maîtriser leur consommation de certains aliments telles que:

- Les aliments sucrés comme la crème glacée, le chocolat, les beignets, les paquets de biscuits, les gâteaux et les bonbons.
- Les féculents comme le pain blanc, les petits pains, les pâtes et le riz.
- Les aliments salés comme les chips, les bretzels et les biscuits.
- Les aliments gras comme le steak, le bacon, les hamburgers, les cheeseburgers, les pizzas et les frites.
- Les boissons sucrées comme le soda.

Pour les questions suivantes qui portent sur « CERTAINS ALIMENTS », pensez à tout aliment équivalent à ceux qui sont énumérés ci-dessus ou d'autres aliments avec lesquels vous avez eu des difficultés au cours de l'année passée.

**Au cours des 12 derniers mois :**

	Jamais	Une fois par mois	2 à 4 fois par mois	2 à 4 fois par semaine	Plus de 4 fois par semaine ou tous les jours
1. Je pense que lorsque je commence à manger certains aliments, je finis par manger beaucoup plus que prévu.	<input type="checkbox"/> <sub>0</sub>	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>
2. Je constate que je continue à manger certains aliments même lorsque je n'ai plus faim.	<input type="checkbox"/> <sub>0</sub>	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>
3. Je mange jusqu'à me sentir « mal » physiquement.	<input type="checkbox"/> <sub>0</sub>	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>
4. Le fait d'arrêter de manger certains types d'aliments ou de les réduire, est quelque chose qui me préoccupe.	<input type="checkbox"/> <sub>0</sub>	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>
5. Je passe beaucoup de temps à me sentir endormi(e) ou fatigué(e) après avoir trop mangé.	<input type="checkbox"/> <sub>0</sub>	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>
6. Je me retrouve fréquemment en train de manger certains aliments tout au long de la journée.	<input type="checkbox"/> <sub>0</sub>	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>
7. Lorsque certains aliments ne sont pas disponibles, je vais aller les acheter. Par exemple, je ne vais pas hésiter à me rendre dans un magasin pour en acheter alors que j'ai d'autres aliments à la maison.	<input type="checkbox"/> <sub>0</sub>	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>
8. Il m'est arrivé de consommer certains aliments si souvent ou en si grandes quantités que je mangeais au lieu de travailler, au lieu de passer du temps avec ma famille ou mes amis, ou de réaliser des activités importantes ou des activités de loisirs que j'apprécie habituellement.	<input type="checkbox"/> <sub>0</sub>	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>
9. Il m'est arrivé de consommer certains aliments si souvent ou en si grandes quantités que je passais mon temps à avoir des pensées négatives sur ma consommation excessive, au lieu de passer du temps avec ma famille ou mes amis, ou de réaliser des activités importantes ou des activités de loisir que j'apprécie habituellement.	<input type="checkbox"/> <sub>0</sub>	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>
10. Il m'est arrivé d'éviter certaines situations professionnelles ou relationnelles au cours desquelles certains aliments étaient disponibles car j'avais peur d'en manger en excès.	<input type="checkbox"/> <sub>0</sub>	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>
11. Il m'est arrivé d'éviter certaines situations professionnelles ou relationnelles, car je ne me sentais pas capable d'y consommer certains aliments.	<input type="checkbox"/> <sub>0</sub>	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>
12. J'ai eu des symptômes de sevrage (agitation, anxiété ou autres symptômes physiques) quand j'ai diminué ou arrêté de consommer certains aliments (Merci de ne pas inclure ceux provoqués par l'arrêt de boissons contenant de la caféine comme certains sodas, le café, le thé, les boissons énergisantes, etc...).	<input type="checkbox"/> <sub>0</sub>	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>

	Jamais	Une fois par mois	2 à 4 fois par mois	2 à 4 fois par semaine	Plus de 4 fois par semaine ou tous les jours
13. J'ai consommé certains aliments pour éviter de me sentir anxieux, agité ou de développer d'autres symptômes physiques (Merci de ne pas inclure ceux provoqués par l'arrêt de boissons contenant de la caféine comme certains sodas, le café, le thé, les boissons énergisantes, etc.).	<input type="checkbox"/> <sub>0</sub>	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>
14. J'ai constaté que j'avais un besoin plus important ou une envie irrésistible de manger certains aliments lorsque j'en diminuais la consommation ou lorsque j'arrêtais d'en manger.	<input type="checkbox"/> <sub>0</sub>	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>
15. Mon comportement vis-à-vis la nourriture et de l'alimentation est source d'une souffrance marquée.	<input type="checkbox"/> <sub>0</sub>	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>
16. Je rencontre des difficultés importantes pour mener à bien mes activités (pour les tâches quotidiennes, le travail / l'école, les activités sociales, les activités familiales, problèmes de santé) à cause de la nourriture et de l'alimentation.	<input type="checkbox"/> <sub>0</sub>	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>

**Au cours de ces 12 derniers mois :**

	Non	Oui
17. Ma consommation de nourriture a provoqué d'importants problèmes psychologiques comme de la dépression, de l'anxiété, un dégoût de moi-même ou de la culpabilité.	<input type="checkbox"/> <sub>0</sub>	<input type="checkbox"/> <sub>1</sub>
18. Ma consommation de nourriture a provoqué ou aggravé d'importants problèmes physiques.	<input type="checkbox"/> <sub>0</sub>	<input type="checkbox"/> <sub>1</sub>
19. J'ai continué à consommer les mêmes types d'aliments ou la même quantité de nourriture malgré l'existence de problèmes physiques et/ou psychologiques.	<input type="checkbox"/> <sub>0</sub>	<input type="checkbox"/> <sub>1</sub>
20. Au fil du temps, j'ai constaté que j'avais besoin de manger de plus en plus pour obtenir le même effet, qu'il s'agisse de la diminution d'émotions négatives ou d'un plus grand plaisir.	<input type="checkbox"/> <sub>0</sub>	<input type="checkbox"/> <sub>1</sub>
21. J'ai l'impression que le fait de manger la même quantité de nourriture ne diminue pas mes émotions négatives ou n'augmente pas le plaisir que je peux ressentir comme par le passé.	<input type="checkbox"/> <sub>0</sub>	<input type="checkbox"/> <sub>1</sub>
22. Je veux réduire ou arrêter de manger certains types d'aliments.	<input type="checkbox"/> <sub>0</sub>	<input type="checkbox"/> <sub>1</sub>
23. J'ai essayé de réduire ou d'arrêter de manger certains types d'aliments.	<input type="checkbox"/> <sub>0</sub>	<input type="checkbox"/> <sub>1</sub>
24. J'ai réussi à arrêter ou à ne pas manger ce genre d'aliments.	<input type="checkbox"/> <sub>0</sub>	<input type="checkbox"/> <sub>1</sub>

**Au cours de ces 12 derniers mois :**

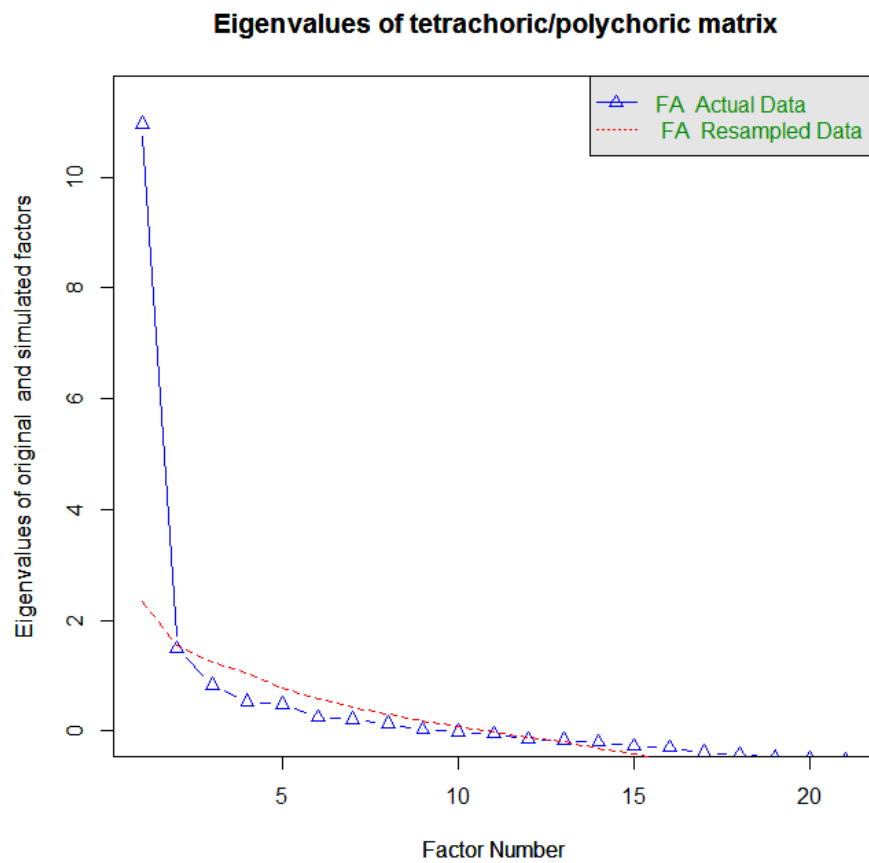
	Une fois	2 fois	3 fois	4 fois	5 fois ou plus
25. Au cours de la dernière année, combien de fois en tout avez-vous essayé de réduire ou d'arrêter de manger certains aliments ?	<input type="checkbox"/> <sub>0</sub>	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>

26. Merci d'encercler TOUS les aliments avec lesquels vous avez actuellement des difficultés.

Crème glacée	Chocolat	Pommes	Beignets
Brocoli	Paquets de biscuits	Gâteaux	Pain blanc
Les petits pains	Laitue	Pâtes	Fraises
Riz	Crackers	Bretzels	Frites
Carottes	Steak	Bananes	Bacon
Hamburgers	Pizzas	Soda	Esquimau
Bonbons	Chips	Cheeseburgers	Aucun de ces aliments

27. Merci de lister ici quels sont les autres aliments avec lesquels vous avez des difficultés (merci de ne mentionner que les aliments n'étant pas déjà dans la liste ci-dessus) .....

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3 **Figure 2. Scree plot and eigenvalues of the French version of the Yale Food Addiction**  
4 **Scale**  
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35 FA: Factor analysis  
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**ABBREVIATIONS LIST:**

- BES: Binge Eating Scale.
  
- BITE: Bulimic Investigatory Test, Edinburgh.
  
- BMI: Body Mass Index.
  
- FA: Factor Analysis.
  
- KR-20: Kuder-Richardson’s internal reliability coefficient.
  
- YFAS: Yale Food Addiction Scale.