

Cognitive Fusion Questionnaire - Body Image: psychometric properties and its incremental power in the prediction of binge eating severity

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Abstract

Given the clinical usefulness of the CFQ-BI (Cognitive Fusion Questionnaire - Body Image; the only existing measure to assess the body image-related cognitive fusion), the present study aimed to confirm its one-factor structure, to verify its measurement invariance between clinical and non-clinical samples, to analyse its internal consistency and sensitivity to detect differences between samples, as well as to explore the incremental and convergent validities of the CFQ-BI scores in Brazilian samples. This was a cross-sectional study, which was conducted in clinical (women with overweight or obesity in treatment for weight loss) and non-clinical samples (women from the general population). The one-factor structure was confirmed showing factorial measurement invariance across clinical and non-clinical samples. The CFQ-BI scores presented an excellent internal consistency, were able to discriminate clinical and non-clinical samples, and were positively associated with binge eating severity, general cognitive fusion and psychological inflexibility. Furthermore, body image-related cognitive fusion scores (CFQ-BI) presented incremental validity over a general measure of cognitive fusion in the prediction of binge eating symptoms. This study demonstrated that CFQ-BI is a short scale with reliable and robust scores in Brazilian samples, presenting incremental and convergent validities, measurement invariance and sensitivity to detect differences between clinical and non-clinical groups of women, enabling comparative studies between them.

Keywords: obesity and weight-related issues; assessment; body image; psychometrics; CFQ-BI

Introduction

Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 2012), focuses on teaching clients to behave in a more adaptive and effective way in the presence of disturbing internal events. Indeed, it conceptualizes that psychological suffering is more related with the emotion regulation processes one uses to deal with undesired experiences than with the experiences themselves (Segal, Teasdale, & Williams, 2004). Therefore, the ACT's main aim lies on diminishing psychological inflexibility, described as the inability to openly and willingly contact with internal events and to behave in a consistent way with chosen values.

According to the ACT model, cognitive fusion - a core emotion regulation process of psychological inflexibility - is defined as the perception that thoughts are literal and true statements of reality (Gillanders et al., 2014). In this process, thoughts are thus regarded as objective and permanent internal events, rather than being considered as part of the normal mental experience (i.e., cognitive defusion). Hence, in the face of negative thoughts, the individual tends to react emotionally behaving in order to avoid or change those unwanted internal events. Thus, behaviour becomes overly regulated by internal events at the expense of contextual contingences, and one's behavioural range becomes gradually narrower, further leading to loss of contact with important life values (Hayes, Luoma, Bond, Masuda, & Lillis, 2006; Hayes et al., 2012).

In this line, individuals who present high levels of cognitive fusion, tend to reveal quality of life impairments and increased levels of psychopathology, such as

personality disorders (Bolderston, 2013), depression (Gillanders et al., 2014) and disordered eating (e.g., Hayes & Pankey, 2002; Merwin et al., 2011).

Due to the well-known relevance of physical appearance (Stice, Marti, & Durant, 2011; Buote, Wilson, Strahan, Gazzola, & Papps, 2011), recent research has explored cognitive fusion specifically associated with body image difficulties in mental health (Ferreira, Trindade, Duarte, & Pinto-Gouveia, 2014). Hence, it has been pointed out that specific-content measures might be more relevant when applied in particular contexts than the general ones (Duarte, Pinto-Gouveia, Ferreira, & Silva, 2016; Gifford et al., 2004; Gillanders et al., 2014; Wendell, Masuda, & Le, 2012; Sandoz, Wilson, Merwin, & Kellum, 2013).

Thus, considering the pertinence of specific-content measures, the Cognitive Fusion Questionnaire - Body Image (CFQ-BI; Ferreira et al., 2014b) was developed in order to assess cognitive fusion specifically associated with body image-related thoughts (being the translation and exploration of its psychometric properties to the Brazilian culture the purpose of this study, as further detailed below).

CFQ-BI originally revealed to be a sound one-factor 10-item measure of the excessive entanglement with thoughts regarding physical appearance. The scale scores also demonstrated: incremental validity in comparison with an overall measure of cognitive fusion in the prediction of disordered eating symptoms; ability to distinguish individuals with and without eating psychopathology; associations with higher eating psychopathological symptoms, anxiety, depression, and lower physical and psychosocial quality of life (Ferreira et al., 2014b; Ferreira & Trindade, 2014; Ferreira, Palmeira, & Trindade, 2014; Trindade & Ferreira, 2014); and also to be a pervasive mediator between the associations of well-known risk factors (higher BMI, unfavourable social comparisons, body dissatisfaction) and disordered eating

symptomatology (Ferreira et al., 2014a; Trindade & Ferreira, 2014). These studies seem to suggest that entanglement and fusion with body image-related thoughts may constrict and narrow one's behaviour to the point of taking part in the development and maintenance of dysfunctional eating behaviours.

Nevertheless, more research is needed, as the role of body image-related cognitive fusion in eating behaviours is still underexplored. In a matter of fact, despite CFQ-BI's potential usefulness in clinical practice, there are no studies in individuals from countries other than Portugal. Also, the psychometric properties of CFQ-BI were only analysed in non-clinical Portuguese samples. Thus there is a significant lack of data regarding how this measure performs in clinical samples of women struggling with eating and/or weight difficulties. Indeed, considering that cognitive fusion is a trans-diagnostic process built on inherent abilities of human cognition and language (Barnes-Holmes, Barnes-Holmes, McHugh, & Hayes, 2004; Fletcher & Hayes, 2005), the study of its measurement invariance simultaneously in clinical and non-clinical samples seems to be of particular relevance to evaluate whether CFQ-BI is understood or interpreted in a similar way across different groups (Chen, Souza, & West, 2005).

Moreover, the association between body image-related cognitive fusion and binge eating psychopathology was never explored. This is particularly relevant as binge eating is highly prevalent in women from clinical and non-clinical populations and has a negative impact on health status and psychosocial indices (Kessler et al., 2013; Striegel-Moore et al., 2000).

Considering this background, the present study aims to: (1) Translate and cross-culturally adapt the CFQ-BI to Brazilian Portuguese; (2) Explore the psychometric properties of CFQ-BI (namely: to confirm its proposed factor structure; to explore its measurement invariance across clinical and non-clinical samples of women; to explore

its internal consistency; to verify its sensitivity to detect differences between samples; and to analyse the convergent and incremental validities of the CFQ-BI scores).

Considering the existing data about CFQ-BI psychometric properties, we hypothesise that its Brazilian version will: present a robust one-factor invariant structure across different women samples; present sensitivity to detect differences between clinical and non-clinical samples; be linked with higher psychological inflexibility, general cognitive fusion and binge eating symptoms; present incremental validity over a general measure of cognitive fusion in the prediction of binge eating severity.

Methods

Procedures

Translation and Adaptation Steps

Two independent researchers did an adaptation to Brazilian Portuguese and a back-translation to European Portuguese. Then, a committee of three juries who lived in different cultural backgrounds within Brazil – in order to ensure that the Brazilian version of the CFQ-BI would be understood by people from different Brazilian states – was composed to evaluate and decide which adaptation of each item should integrate the preliminary version of the scale. Then, this preliminary version was evaluated by the same committee which concluded that each item presented good clarity of language, practical pertinence for the target culture and theoretical relevance. Finally, a pilot study was conducted using a sample of 31 participants from the general population, which assured that the instructions and the items were clear and easily understood. Thereafter, the final version was consolidated and the official data collection initiated.

Data Collection

Before participating in this cross-sectional study, all volunteers signed a consent form and received a clarification regarding the research goals, its confidential nature and their rights as volunteers. Participation were not paid or materially recompensed since Brazil's ethical requirements for academic research does not allow it.

Data was collected during 2014 from the general population (composed by women who were approached to participate in a Porto Alegre's Bus Station and in three Brazilian citizen's bureaus) and from overweight or obese female patients under weight loss treatment in an endocrinology and obesity consultation service from a public hospital in Porto Alegre - Brazil (these participants completed the protocol while waiting for their consultations). For all participants, the order of measures presentation was the same (i.e., the measures were not randomized).

The inclusion criteria were: a) female; b) age between 18–60; c) ≥ 5 years of education - in order to diminish comprehension difficulties while responding the research protocol. Additionally, a Body Mass Index (BMI) ≥ 25 (kg/m²) was considered as an additional inclusion criteria in the clinical sample.

Participants

Sample 1: This sample was composed of two different groups of women (a sample from the general population, $n = 226$; and a clinical sample of women with overweight or obesity seeking weight loss, $n = 204$). Table 1 presents the description of sociodemographic characteristics for the total sample and for these aforementioned groups.

----- Insert Table 1 here -----

Sample 2: This sample included 260 participants from the general population. The mean age of the total sample was 30.67 years ($SD = 10.91$), with an average BMI of 24.85 ($SD = 4.58$) and a mean of 12.81 ($SD = 3.92$) years of education. Concerning marital status, 63.8% ($n = 166$) was single, 29.2% ($n = 76$) married/cohabiting, 5.4% ($n = 14$) divorced and 1.5% ($n = 4$) widowed. Additionally, regarding occupational status, the majority of the participants were unemployed (59.6%, $n = 155$), while 38.8% ($n = 101$) were employed and 1.5% ($n = 4$) retired.

Sample 3: This sample included 91 overweight or obese women in treatment for weight loss (from the clinical group of Sample 1). The mean age of this sample was 40.26 years ($SD = 11.84$), with an average BMI of 31.86 ($SD = 4.85$) and a mean of 14.29 ($SD = 3.36$) years of education. In what concerns marital status, 53.8% ($n = 49$) was married/cohabiting, 38.5% ($n = 35$) single, 6.6% ($n = 6$) divorced and 1.1% ($n = 1$) widowed. Additionally, regarding occupational status, the majority of the participants were employed (57.1%, $n = 52$), while 31.9% ($n = 29$) were unemployed and 11% ($n = 10$) retired.

Measures

Cognitive Fusion Questionnaire (CFQ-7; Gillanders et al., 2014): This measure aims to evaluate cognitive fusion, i.e., the extent to which a person tends to get entangled with their internal experiences (e.g., thoughts, emotions or memories). Respondents should indicate how the situation described in each item applies to them (e.g. “My thoughts cause me distress and emotional pain”, “I get upset with myself for having certain thoughts”), using a 7-point Likert scale (1 = Never true; 7 = Always true). The total score is calculated by the sum of the 7 items – where higher scores reveals higher levels of cognitive fusion. Internal consistencies between $\alpha = .88$ and $\alpha =$

.93 were found in the original study (considering different samples). In the Brazilian validation, the CFQ-7 presented $\alpha = .93$ (Lucena-Santos, Pinto-Gouveia, & Oliveira, 2015). In the present study, this scale presented $\alpha = .95$ and $\alpha = .93$ in non-clinical and clinical samples, respectively.

Acceptance and Action Questionnaire-II (AAQ-II; Bond et al., 2011): This is a self-report instrument composed by 7 items and designed to evaluate psychological inflexibility. The items assess the tendency to make negative evaluations of internal experiences (e.g. “I’m afraid of my feelings”). The respondent uses a 7-point Likert scale (1 = Never true; 7 = Always true) to indicate how each item applies to them. The original version of the AAQ-II had an internal consistency of .84 while the Brazilian version showed a Cronbach’s Alpha of .87 (Barbosa, 2013). In the present study, this scale presented $\alpha = .93$ and $\alpha = .88$ in non-clinical and clinical samples, respectively.

Binge Eating Scale (BES; Gormally, Black, Daston, & Rardin, 1982): This is a self-report measure composed by 62 statements arranged in 16 items, used to evaluate binge eating severity. Each item contains three or four statements and the participants have to decide which one better applies to them. After the scale is completed, a score from 0 to 3 is assigned for each item. Then, a total score can be calculated, with higher scores indicating the presence of more binge eating symptoms. Gormally and colleagues (1982) concluded that the original version had a high internal consistency and the Brazilian version presented a Cronbach’s Alpha of .89 (Freitas, Lopes, Appolinario, & Sichieri 2002). In the present study, this scale presented a Cronbach’s Alpha of .90 both in non-clinical and clinical samples.

Cognitive Fusion Questionnaire - Body Image (CFQ-BI; Ferreira et al., 2014b): The CFQ-BI is a 10-item self-report scale designed to assess body image-related cognitive fusion. The respondent uses a 7-points Likert scale (1 = Never true; 7 =

Always true) to decide how each item applies to them (e.g. “I get so caught up in my thoughts about my physical appearance that I am unable to do the things that I most want to”). The original version showed an excellent internal consistency with a Cronbach’s Alpha of .96. In the present study, this scale presented a Cronbach’s Alpha of .95 both in non-clinical and clinical samples.

Analytical Strategies

Descriptive statistics were conducted in the SPSS statistics software, while the Confirmatory Factor Analysis (CFA- Maximum Likelihood as the estimation method) and the Multigroup Analysis were performed using AMOS software. Normality assumption was evaluated by uni and multivariate Skewness (*Sk*) and Kurtosis (*Ku*) indices, where values of $Sk > |3|$ and $Ku > |10|$ indicates severe violations of normality (Kline, 2010). Cases containing missing values were excluded, since missing values were random and represented less than 5% of the total sample (Tabachnick & Fidell, 2007). Thus, the analyses were only performed with participants who completed the entire protocol.

Regarding the global adjustment of CFA, as proposed by Kline (2010), a combination of goodness-of-fit indexes was used. First we used the Normed Chi-square (χ^2/df), where values <5 indicates good model fit (Marôco, 2010; Schumacker, & Lomax, 2004). Nevertheless, despite its popularity, this index is not the most appropriate for large samples (i.e., $n \geq 200$, see Schumacker, & Lomax, 2010) due its sensitivity to sample size (the larger the sample, the larger the χ^2/df), which increases the probability of Type 1 error.

Additionally, as recommended, the following indexes were used: TLI, CFI, IFI, RNI, and GFI. It is considered that all the aforementioned indices represent a very good

model fit when $\geq .95$ (Hu, & Bentler, 1999). Nevertheless, TLI and GFI (Schumacker & Lomax, 2010; Miles & Shevlin, 1998), may also indicate an adequate or good fit when $\geq .90$. Additionally, the SRMR which indicates a good model fit when $< .06$ (Hu, & Bentler, 1999), was also used. Finally, the local adjustment was assessed by the individual reliabilities ($\lambda \geq .50$) and the standardized factor weights ($R^2 \geq .25$) of the items (Marôco, 2010).

Internal consistency was assessed through Cronbach's alpha (adequate reliability $> .70$; Kline, 2000). Confidence Intervals for the calculated Cronbach's Alphas were computed using the Feldt's method (Feldt, Woodruff, & Salih, 1987). In order to verify the ability of the CFQ-BI scores to discriminate clinical and non-clinical samples, we performed a Student's t Test (p value $< .05$). Cohen's d was calculated in order to verify effect size: small (0.2 - 0.49), medium (0.5 - 0.79), or large ($\geq .80$) (Cohen, 1988).

Incremental validity was evaluated by linear regression analyses in which the BES was considered as the criterion variable. The CFQ-7 was included as a predictor at step one. Thereafter, the CFQ-BI was added at step two. Finally, convergent validity was assessed by Pearson's correlations between the CFQ-BI, AAQ-II, CFQ-7 and BES. Thus, in order to adjusting the p -values to consider multiple correlations (i.e., to keep the global probability of Type 1 error at α level), we have adopted the Bonferroni single step adjustment approach (Bonferroni, 1936). Thus, as we have six correlations in each sample and also considering $\alpha = .05$ as the desired overall significance level, the corrected p -values associated with the correlation coefficients would be $\alpha^* \leq .008$ in order to declare significance.

Results

Confirmatory Factor Analysis

Initially, a model was specified with all 10 items belonging to a single factor (using the total sample of Sample 1). No severe violations of the normal distribution were found, according to the visual inspection of histograms and to the observed values of Skewness and Kurtosis ($Sk \leq 1.24$ and $Ku \leq 0.49$). Additionally, there was not any indication of outliers.

All items presented high values of factor weights and individual reliabilities ($\lambda \geq .73$ and $R^2 \geq .53$, respectively), which indicates a good local adjustment. However, the global adjustment was unacceptable ($\chi^2(35) = 469.69$; $\chi^2/df = 13.420$, $p < .001$; CFI = .89; TLI = .86; IFI = .89; RNI = .89; GFI = .78; SRMR = .05).

After having examined the modification indices (grounded in theoretical considerations) we have added correlations between the error terms of five pairs of items (1/3, 2/4, 4/5, 7/10 and 9/10), which would improve the model fit. The modified model showed good local adjustment - high levels of factor weights and individual reliabilities ($\lambda \geq .70$ and $R^2 \geq .49$). Regarding the global adjustment the χ^2/df value was $>.5$ ($\chi^2(30) = 227.122$; $\chi^2/df = 7.571$, $p < .001$), which is typically found in large sample sizes. However, all the other estimated indices showed values that indicate a good model fit (CFI = .95; TLI = .93; IFI = .95; RNI = .95; GFI = .90; SRMR = .042), allowing us to conclude that the modified model has a good global adjustment.

In addition, the modified model presented a better fit than the original one ($\Delta\chi^2_{(5)} = 242.57$; $p < .05$; chi-square difference test) and considerably lower levels of MECVI (0.697) than the original (1.191), indicating a better validity in the studied population (Marôco, 2010).

Multigroup Analysis

A multigroup analysis of the modified model was also performed with Sample 1 in order to test the CFQ-BI's measurement invariance across two different groups. No differences were observed in regard to factor weights ($\Delta X^2_{(9)} = 11.388$; $p = .250$), which showed structural model invariance across samples.

Internal Consistency

The Cronbach's Alphas of CFQ-BI were $\alpha = .95$ (95% CI: .94 -.96) for all samples (total, general and clinical samples - Sample 1). Items' properties (means, standard deviations, corrected item-total correlations and Cronbach's Alpha if item deleted) are presented in Table 2. As can be seen, all items are contributing for the observed internal consistency.

----- Insert Table 2 here -----

Sensitivity to detect differences between samples

In order to verify the ability of the CFQ-BI scores to detect differences between clinical and non-clinical samples, a Student's *t*-Test was performed to compare the means across these two groups (Sample 1). Clinical and non-clinical samples presented means of 35.16 ($SD = 14.27$) and of 24.66 ($SD = 14.99$) respectively. The groups presented significant differences ($t_{(428)} = 7.417$; $p < .001$, $d = .72$) with a medium effect size (Cohen, 1988).

Convergent Validity

The correlations between the CFQ-BI, general cognitive fusion, psychological inflexibility, and binge eating severity showed that the CFQ-BI was significantly associated with those variables (see Table 3), as previously hypothesized.

----- Insert Table 3 here -----

Incremental Validity

Incremental validity of the CFQ-BI scores over a general measure of cognitive fusion (CFQ-7) was tested through linear regression models, in which the BES was considered as the criterion variable (Sample 2). Thus, at step one the CFQ-7 was included as predictor explaining 22.9% of the BES' variance ($\beta = .48$; $F_{(1, 257)} = 76.45$; $p < .001$). Thereafter (step two), the CFQ-BI was added. Results indicated that this model was also significant, accounting for 35.0% of the BES' variance ($F_{(2, 256)} = 70.34$; $p < .001$). Nonetheless, the CFQ-BI was the best predictor ($\beta = .46$; $p < .001$) followed by CFQ-7 ($\beta = .18$; $p = .005$). The R square change was 0.125 ($p < 0.001$), indicating a significant improvement of the model in the second step.

Discussion

Given the recent accounts concerning the association between body image-related cognitive fusion and psychopathological symptoms, its transdiagnostic role and potential usefulness in the eating behaviours context, together with the existence of a recent measure specifically designed to evaluate this process, the present study aimed to: (1) Translate and cross-culturally adapt the CFQ-BI to Brazilian Portuguese; (2) Explore the psychometric properties of CFQ-BI (namely: to confirm its proposed factor structure; to explore its measurement invariance across clinical and non-clinical samples of women; to explore its internal consistency; to verify its sensitivity to detect differences between samples; and to analyse the convergent and incremental validities of the CFQ-BI scores).

As expected, the Confirmatory Factor Analysis confirmed the one factor structure of the CFQ-BI, which corroborates the findings from the original CFQ-BI's validation study (Ferreira et al., 2014b). The final model presented good fit indices as well as a good local adjustment, confirming the suitability of the CFQ-BI structure (Marôco, 2010; Hu, & Bentler, 1999; Schumacker, & Lomax, 2010).

Moreover, the multi-group analysis results corroborated our previous hypothesis that the CFQ-BI would reveal structural model invariance. Thus, it was verified the scale's structure remains stable across qualitatively different groups of women (i.e., a general population sample and a clinical sample composed of overweight and obese women currently in treatment for weight loss).

It is worth mentioning that the average BMI found in our general population sample is slightly greater than 25 (25.48, $SD= 4.71$) which would indicate an overall overweight classification (Finucane et al., 2011). About this topic, it is important to highlight that general population samples frequently comprises different levels of BMI (e.g., Ferreira, Trindade, & Martinho, 2016). In fact, in Western population-based studies the average BMI is about 24-27, and ~50% or more of the general adult population could be considered overweight considering BMI values (see Nuttall, 2015, for a critical review), which is in accordance with our BMI findings in such sample. Moreover, it is noteworthy that overweight/obese individuals who are treatment-seeking have significant lower health-related quality of life when compared with non-treatment-seeking overweight/obese individuals with similar BMI (Kolotkin, Crosby, & Williams, 2002). Also, previous literature have indicated substantial distinctive features between overweight/obese people from general population and those under formal weight loss treatments (e.g., Barry, & Raiff, 2013; Sullivan, Cloninger, Przybeck, & Klein, 2007), including differences in personality traits, and also in the levels of psychological

disturbance and quality of life impairments (treatment-seeking group presenting the most noxious scores).

Thus, given the potential clinical applicability of the CFQ-BI, the current study also contributed to further investigations aiming to explore the underlying mechanisms that might contribute to the aforementioned weight-related distinctive outcomes between different groups of women with excessive weight. As far as we know, this was the first empirical investigation to explore the CFQ-BI's measurement invariance, providing a robust measure to safely conduct comparative studies across those groups.

Additionally, as anticipated, the CFQ-BI's Brazilian version revealed a Cronbach's Alpha of .95 (Kline, 2000), with all 10 items contributing to its excellent internal consistency. These findings are in accordance with the original validation study, which presented $\alpha = .96$ (Ferreira et al, 2014b). Furthermore, CFQ-BI showed sensitivity to detect differences between clinical and non-clinical samples. The original study has already confirmed this sensitivity, although it was conducted only in non-clinical samples in which the EDE-Q's (i.e., Eating Disorder Examination – Questionnaire) cut-off score of >4 (Carter, Stewart, & Fairburn, 2001; Mond, Hay, Rodgers, & Owen, 2006) was used in order to assort participants into clinical and non-clinical groups. Thus, the current study also adds to previous knowledge by showing CFQ-BI's sensitivity to identify differences between non-clinical and clinical samples (comprised by patients directly recruited in clinical settings)

Results from correlation analyses showed positive associations between body image-related cognitive fusion, general cognitive fusion and psychological inflexibility, corroborating prior findings (e.g., Ferreira et al., 2014b; Trindade & Ferreira, 2014), as well as our previous hypothesis. These current findings are also in accordance with the ACT theoretical model, since the excessive entanglement with thoughts' content is

considered a core process of psychological inflexibility (Hayes et al., 2012). It is worth mentioning that the correlations found between the general measures (i.e. CFQ-7 and AAQ-II) in the general population ($r = .84$) were significantly higher ($z\text{-score} = 4.40$; $p < 0.001$) than the same correlations in the clinical sample ($r = .59$). This possibly highlights the importance of the development and use of specific-content measures for specific populations, as has been pointed out by previous researchers (Gillanders et al., 2014; Wendell et al., 2012; Sandoz et al., 2013; Duarte et al., 2016). Besides, this paper also extends literature demonstrating that body image-related cognitive fusion is highly associated with binge eating psychopathology. This data seems to suggest that women who get fused and caught up in the content of their thoughts regarding body image tend to present increased binge eating symptoms.

Furthermore, the incremental validity analysis results showed that both the CFQ-BI and a general measure of cognitive fusion (CFQ-7) were significant predictors of binge eating severity, accounting for unique aspects. However, probably due to its body image-related specific nature, the CFQ-BI emerged as the best model predictor. Such results are not only in consonance with our initial assumptions, but also with previous studies which demonstrated that maladaptive emotion regulation processes associated with body image were linked to eating behaviour problems (Duarte, Pinto-Gouveia, & Ferreira, 2015; Ferreira et al., 2014a; Ferreira et al., 2014b).

Nevertheless, it is important to acknowledge some limitations of this study, such as its cross-sectional design that does not allow any causality inference. Also, the use of convenience samples may compromise the generalizability of these findings to the respective populations. Thus, future studies should consider a longitudinal design including temporal reliability analyses and further investigation regarding causal relationships between the studied variables.

In addition, our samples were composed only by female adult participants. Therefore, the Brazilian version of the CFQ-BI should also be analysed in males and adolescent girls - given their well known risk to develop excessive and pervasive body image-related worries. Also, it is pivotal to further explore interactions between the CFQ-BI's Brazilian version, general psychopathology and other relevant ACT processes (such as mindfulness and committed action) in Brazil - once this country only very recently began to empirically investigate the ACT model.

Moreover, the CFQ-BI's psychometric properties should also be analysed in patients diagnosed with eating pathologies, such as Bulimia Nervosa and Anorexia Nervosa, as well as Binge Eating Disorder (once all these disorders have the common component of body image impairment). Finally, as previously pointed out, the CFQ-BI has only been applied in Portuguese and Brazilian samples and therefore this measure should be explored in other languages (e.g. English).

Nonetheless, this study showed that the CFQ-BI is a short scale with reliable and robust scores, presenting incremental and convergent validities, as well as sensitivity to detect differences between samples. Additionally, the CFQ-BI also presents measurement invariance, enabling comparative studies between women from the general population and overweight or obese women seeking weight loss.

Overall, this instrument seems to be crucial to assess the role of body image-related cognitive fusion in the development and maintenance of eating psychopathology and also to track changes in therapeutic interventions. It may be useful for future interventions in this area to address cognitive fusion specifically related to body image in order to attenuate body image impairments and general eating-related problems. In conclusion, this study provides data confirming the good psychometric properties of the

CFQ-BI's Brazilian version, enabling its use in clinical practice and body image-related research in a country with a 200 million population.

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Table 1

Sociodemographic characteristics of Sample 1.

	Total Sample (<i>N</i> = 430)			Sample from the General Population (<i>n</i> = 226)			Clinical Sample (<i>n</i> = 204)		
	<i>M</i> (<i>SD</i>)	<i>Min</i>	<i>Max</i>	<i>M</i> (<i>SD</i>)	<i>Min</i>	<i>Max</i>	<i>M</i> (<i>SD</i>)	<i>Min</i>	<i>Max</i>
Age	36.14 (12.03)	18	60	32.05 (10.57)	18	58	40.67 (11.95)	18	60
Years of Education	13.19 (3.53)	5	25	12.35 (3.38)	5	25	14.37 (3.42)	8	25
BMI	28.80 (6.14)	17	54	25.48 (4.71)	17	42	32.47 (5.42)	25	54
	<i>n</i>	%		<i>n</i>	%		<i>n</i>	%	
Marital status									
Married/cohabiting	187	43.5		80	35.4		107	52.5	
Divorced	34	7.9		13	5.8		21	10.3	
Widowed	6	1.4		4	1.8		2	1	
Single	203	47.2		129	57.1		74	36.3	
Occupational status									
Retired	16	3.7		3	1.3		13	6.4	
Employed	220	51.2		99	43.8		121	59.3	
Unemployed	194	45.1		124	54.9		70	34.3	

Table 2

Means, standard deviations, corrected item-total correlation and Cronbach's Alpha (α) if item deleted for CFQ-BI Items ($N = 430$).

	<i>M</i>	<i>SD</i>	Corrected item- total correlation	α if item deleted
1. <i>Os pensamentos relacionados à imagem que tenho do meu corpo me deixam desconfortável e/ou me causam sofrimento emocional</i> (My thoughts relating to my body image cause me distress or emotional pain.)	3.64	2.01	.79	.95
2. <i>Tenho uma tendência a ficar envolvido/'ligado' aos pensamentos e imagem que tenho do meu corpo.</i> (I tend to get very entangled in my thoughts concerning my body or body image.)	3.33	1.90	.82	.95
3. <i>Sinto-me desconfortável quando tenho pensamentos negativos sobre o meu corpo ou aparência física.</i> (I feel upset when I have negative thoughts about my body (or physical appearance)).	4.04	1.95	.72	.95
4. <i>Fico muito concentrado nos meus pensamentos desconfortáveis sobre a imagem que tenho do meu corpo.</i> (I get very focused on distressing thoughts about my body image.)	3.06	1.87	.85	.95
5. <i>Mesmo sabendo que seria melhor "deixar para lá" os meus pensamentos sobre as formas do meu corpo, fazer isto é uma "luta" para mim.</i> (It's such a struggle to let go of upsetting thoughts about my body shape even when I know that letting go would be helpful.)	3.16	1.99	.83	.95

6. <i>Fico distraído do que estou fazendo por causa dos pensamentos sobre a imagem que tenho do meu corpo.</i> (My thoughts regarding my body image distract me from what I'm actually doing.)	2.42	1.65	.82	.95
7. <i>Chego ao ponto de não conseguir fazer as coisas que eu mais desejo, de tanto que me deixo "levar" pelos meus pensamentos sobre a minha aparência física.</i> (I get so caught up in my thoughts about my physical appearance that I am unable to do the things that I most want to.)	2.37	1.79	.79	.95
8. <i>Eu observo tanto minha aparência física ou a forma do meu corpo, que esta análise deixa de me trazer benefícios.</i> (I over-analyze my physical appearance or my body shape to the point where it's unhelpful to me.)	2.53	1.81	.75	.95
9. <i>Eu vivo "lutando" com os meus pensamentos sobre o meu corpo ou aparência física.</i> (I struggle with my thoughts related to my body or physical appearance.)	2.65	1.83	.86	.95
10. <i>Quando tenho um pensamento desconfortável sobre a minha aparência física (ou formas do meu corpo), tenho dificuldade de me concentrar em qualquer outra coisa.</i> (Once I've thought about my body or body shape in an upsetting way it's difficult for me to focus on anything else.)	2.43	1.68	.80	.95
Total	29.64	15.54	—	-----

Note: *M* = Mean; *SD* = Standard Deviation; α = Cronbach's Alpha

Table 3

Correlation between CFQ-BI and the other variables in study in Sample 2 (n = 260) and in **Sample 3 (n=91; in bold)**.

Variable	CFQ-BI	CFQ-7	AAQ-II	BES
CFQ-BI	1	.64***	.47***	.63***
CFQ-7	.64***	1	.59***	.51***
AAQ-II	.62***	.84***	1	.47***
BES	.59***	.49***	.47***	1

Note: *** $p < .001$; CFQ-BI = Cognitive Fusion Questionnaire - Body Image; CFQ-7 = Cognitive Fusion Questionnaire - short version; AAQ-II = Acceptance and Action Questionnaire - short version; BES = Binge Eating Scale.