Validation of the Greek Version of the Body Image-Acceptance and Action Questionnaire

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Abstract

The present study aimed to examine the psychometric properties and factorial structure of the Greek version of the Body Image-Acceptance and Action Questionnaire (BI-AAQ). The BI-AAQ assesses cognitive flexibility and acceptance relative to body image. Two samples: an all female middle and high school sample (N = 85; Age M = 17.97, SD = 2.74) and a college student sample (N = 240; Age M = 21.50; SD = 2.98) in Cyprus completed a set of self-reported eating-related questionnaires. Reliability analysis showed that the Greek BI-AAQ has high internal consistency and good item-total correlations. Principal Component Analysis (Sample 1) and Confirmatory Factor Analysis (Sample 2) supported a one-factor solution, as in the case of the original BI-AAQ. Hierarchical multiple regression predicting eating disorder behaviors (as assessed by the EDE-Q) from Weight Concerns (WCS) and BI-AAQ scores after controlling for BMI, produced a significant model, which accounted for 67% of variance. The BI-AAQ remained a significant predictor of eating disorder behaviors after controlling for BMI and weight concerns scores. The Greek version of the BI-AAQ questionnaire is thus a robust and reliable instrument. It adds to previous knowledge and research on the role of psychological flexibility and acceptance of body image in eating disorder behaviours and psychological difficulties.

Keywords: body image flexibility, Body Image-Acceptance and Action Questionnaire, eating disorders

Body image dissatisfaction is the negative subjective experience of one's weight and shape (Stice & Shaw, 2002), and has been implicated in the development of eating disorders (Brannan & Petrie, 2008; Corning, Krumm, & Smitham, 2006). The discrepancy between one's estimated actual body image and the image perceived as ideal, can create high levels of body image dissatisfaction and precede dieting (Moretti & Higgins, 1990). Dieting in turn may lead to disordered eating which constitutes a main predictor in eating disorder aetiology (Stice & Shaw, 2002). Numerous variables account for the relationship between body image dissatisfaction and disordered eating, among them is the more recently explored construct of body image experiential avoidance (EA; Timko, Juarascio, Martin, Faherty, & Kalodner, 2014).

Body image EA, in contrast with body image acceptance and flexibility, consists of efforts to avoid, suppress, modify, or otherwise escape from distressing negative thoughts, feelings, or sensations about the body and actions directed at altering or removing the stimuli that invoke these aversive experiences (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996; Orsillo, Roemer, Lerner, & Tull, 2004). EA is implicated in the pathogenesis and maintenance of various forms of psychopathology (Hayes et al., 1996; Kashdan et al., 2006; Karekla &

Panayiotou, 2011), including eating disorders (Cowdrey & Park, 2012; Hill, Masuda, & Latzman, 2013; Merwin et al., 2011). EAs' mirror opposite process is psychological flexibility or acceptance of all internal experiences (thoughts, emotions, sensations etc.) and engagement in valued activities even when doing so is difficult (brings about unwanted thoughts and emotions; Gloster & Karekla, in press; Hayes, Luoma, Bond, Masuda, & Lillis, 2006).

In recent years, body image acceptance and flexibility are increasingly included in the treatment of eating disorders following the emergence of promising outcomes when targeting these parameters in treatments, such as Acceptance and Commitment Therapy (ACT; Karekla & Nicolaou, 2017; Manlick, Cochran, & Koon, 2013; Merwin & Wilson, 2009). ACT is a relatively novel, dynamic framework rooted in clinical behaviour analysis and cognitive behaviour therapy and based on Relational Frame Theory (RFT; an extension of behaviour analysis). It aims to increase psychological flexibility and workability via the active acceptance of all private events (thoughts, emotions, sensations, etc.), cultivating present moment awareness and a stable sense of self, and clarifying and acting upon personal values (Hayes, Strosahl, & Wilson, 2011; Karekla, Karademas & Gloster, 2018).

A general measure utilized to assess experiential avoidance or its inverse psychological flexibility, is the Acceptance and Action Questionnaire (AAQ; Bond et al., 2011; Hayes et al., 2006; Monestès et al., 2018). Although findings indicate that the AAQ is a valid and reliable tool (Bond et al., 2011), levels of EA across various behavioural presentations might differ, thus it has been suggested that it has more clinical utility if applied in a context-specific way (Wendell, Masuda, & Le, 2012). One such context-specific AAQ measure is the Body Image-Acceptance and Action Questionnaire (BI-AAQ; Sandoz et al., 2009, 2013). The development of this measure has significantly contributed to the examination of how body image acceptance promotes healthy changes or prevents disruptive behaviours (e.g., disordered eating) among those suffering from eating related problems.

To date, the BI-AAQ has been validated in English (Sandoz, Wilson, Merwin, & Kellum, 2013; Timko et al., 2014; Wendell et al., 2012) and translated-validated in Portuguese (Ferreira et al., 2011), Italian (Rabitti, Manduchi, Miselli, Presti, & Moderato, 2010) and Iranian (Izaadi, Karimi, & Rahmani, 2014). The BI-AAQ is rated on a 7-point Likert scale from 1 = "Never true" to 7 = "Always true" and higher scores signify greater inflexibility. It is found to be unifactorial and exhibits good internal consistency (Cronbach alpha = .93) and evidence of convergent validity with measures of general awareness and acceptance, and self-report measures of body shape and disordered eating habits (Ferreira et al., 2011; Sandoz et al., 2013; Timko et al., 2014; Wendell et al., 2012). It displays good criterion validity, with participants identified as having a tendency to disturbed eating habits displaying significantly lower flexibility on the BI-AAQ (Hill, Masuda, & Latzman, 2013; Sandoz et al., 2009).

This study aimed to translate and adapt the BI-AAQ in Greek and examine its factorial structure and psychometric properties using two samples; the first a female only one of adolescents and young adults and a second college student sample of both genders. Also, it aimed to further examine the contribution of Body Image Inflexibility in eating disorder behaviors by examining the predicting value of the BI-AAQ above and beyond the contribution of BMI and weight concerns (a well established predictor of disordered eating within the next 4 years; Killen et al., 1996). To date, very few studies have investigated the relationship of body image inflexibility with constructs related to eating pathology such as self-compassion, psychological difficulties, weight concerns, and disordered eating behaviors.

Method

Participants: Sample 1

Eighty-five female participants (M_{age} = 17.97, SD = 2.74) were selected to take part in a laboratory study and complete the present packet of questionnaires, from a larger screening pool of 1081 middle and high school (N = 741) and University (N = 340) students. Participants were eligible if they were females aged 14-24 years with a good working knowledge of the Greek language, and ineligible if they met diagnostic criteria for an ED based on the Eating Disorders Diagnostic Scale (EDDS; Stice, Telch, & Rizvi, 2000). For this sample, the average weight was 58.22kg, (SD = 9.53; range: 30.30-94.50kg), the average height was 162.37cm (SD = 6.11; range: 147-180cm) and the average BMI was 22.11 (SD = 3.76; range: 11.27-38.83).

Participants: Sample 2

This was an opportunistic sample of 240 (199 females) undergraduate Greek and Cypriot students, of both genders, from universities in Cyprus. Participants were aged 18-30 years (M = 21.50, SD = 2.98), had an average weight of 62.57kg, (range: 38-130kg), average height of 165.80cm (range: 150-190cm), and average BMI of 22.86 (SD = 0.29). Most stated that they were living in an apartment on their own (47.90%) or with a roommate (30%). The majority (77.90%) had never received psychological help and were not presently on any medication (87.90%).

Measures

For any measures not available in Greek, a standard forward/back - translation procedure was followed. After that, a pilot-study was conducted in a small group of twenty students, to examine the understanding of the questions and resolve any problems. The following measures were included in both samples, in addition to the Greek Body Image-Acceptance and Action Questionnaire (BI-AAQ):

A basic **demographic questionnaire** assessing age, years of education, place of residence (alone, with parents or friends, etc.), weight and height.

Weight Concerns Scale (Killen et al., 1994**)** is a five-item scale assessing fear of weight gain. Internal consistency coefficients are around .62. Scores over 52 are associated with increased risk for developing an eating disorder within 4 years. It is used to identify participants who are at high risk for developing an eating disorder (Killen et al., 1996). Adequate psychometric properties with α>.70 have been reported in previous studies (Killen et al, 1994; Killen et al., 1996) and satisfactory internal consistency in Greek-speaking youth samples (Koushiou & Karekla, 2016). Cronbach's alpha for this sample = .78.

Difficulties in Emotion Regulation Scale

Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004) is a 36-item questionnaire assessing emotional regulation. Items are rated on a 5-point scale from 1 = Almost Never to 5 = Almost Always. Higher total scores indicate greater difficulties with emotion regulation. The measure yields a total and six sub-scale scores: (i) Non-acceptance of emotional responses, (ii) Difficulties engaging in goal-directed behaviour, (iii) Impulse control difficulties, (iv) Lack of emotional awareness, (v) Limited access to emotion regulation strategies, and (vi) Lack of emotional clarity. The DERS has shown good test-retest reliability (ρ = .88), Cronbach's alpha

> .90 (Gratz & Roemer, 2004; Racine & Wildes, 2013) and high internal consistency with clinical (e.g., Fox, Axelrod, Paliwal, Sleeper, & Sinha, 2007; Gratz, Tull, Baruch, Bornovalova, & Lejuez, 2008) and nonclinical populations (e.g., Gratz & Roemer, 2004; Johnson et al., 2008). The Greek translation showed high internal consistency (Cronbach's alpha = .91) and items loading on the appropriate factors and explaining 67.56% of variance (Koushiou & Karekla, 2016). This sample Cronbach's alpha = .81.

Measures Included Only in Sample 1

Perceived Stress Scale — The Perceived Stress Scale (PSS-10; Cohen, Kamarck & Mermelstein, 1983; Greek adaptation: Michaelides et al., 2016) provides an indication of perceived distress during the past month. It includes 10 items rated on a 0-4 Likert scale. It has adequate psychometric properties with internal consistency values above α = .86 (Cole, 1999) and .85 for the Greek version (Michaelides et al., 2016).

Youth Inventory-4 — Youth Inventory-4 (YI-4; Gadow & Sprafkin, 1999) assesses clinical symptoms in adolescents. For the purposes of this study, only the 9-item Depression subscale was used. Items are assessed on a Likert scale from 0-absence of symptoms to 3-strong presence of symptoms. Fanti, Demetriou, & Kimonis (2013) demonstrated adequate internal consistency in Greek-Cypriot adolescents and Cronbach's alpha of .72 in this study.

Rosenberg Self-Esteem Scale — Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965) assesses global self-esteem by asking respondents to rate their agreement on a 0-3 scale (ranging from 0 = not at all true to 3 = definitely true) with 10 statements reflecting feelings about themselves. Higher scores indicate more positive self-evaluations. Its Greek validation shows internal consistency of 0.85 (Fanti & Henrich, 2015) and .84 in this study.

Appearance Schemas Inventory-Revised — Appearance Schemas Inventory-Revised (ApSI-R; Cash, Melnyk, & Hrabosky, 2004): assesses dysfunctional schemas about ones' appearance and its impact in one's life. The revised version consists of 20-items rated on a 5-point scale from strongly disagree to strongly agree and yields two subscales (Self-Evaluative Salience and Motivational Salience). Argyrides and Kkeli (2013), showed adequate psychometric properties with alpha coefficient of .93 in its Greek adaptation and .91 for this study.

Measures Included Only in Sample 2

Acceptance and Action Questionnaire-II — The Greek Acceptance and Action Questionnaire-II (AAQ-II; Karekla & Michaelides, 2017; English version: Bond et al., 2011) is a measure of experiential avoidance, with good reliability, internal consistency and conceptual validity (Bond et al., 2011). Its psychometric properties across five European countries and languages (including Greek) indicates good internal consistency (α >.80 in all cases and .84 for Greek) and good test-retest reliability (overall *r* = .84; Monestès et al., 2018). Karekla and Panayiotou (2011) showed that the AAQ-II explained unique variance in psychological distress and quality of life above and beyond various coping styles (e.g., active coping, emotional support).

Eating Disorder Examination Questionnaire — The Eating Disorder Examination Questionnaire (EDE-Q; Fairburn & Beglin, 1994) is a self-report version of the EDE interview, assessing the frequency of key behavioural features of eating disorders (i.e., measures the number of times and days a behaviour has occurred in a 4-weeks period). Four subscales (Restraint, Weight Concern, Shape Concern and Eating Concerns) and a global

score is derived. Juarascio and colleagues (2013) reported the following Cronbach's alphas: Global = .91, Restraint = .82, Eating Concern = .70, Shape Concern = .90 and Weight Concern = .86. Its Greek version presents adequate internal consistency, with Cronbach's alphas: Global = .78, Restraint = .74, Eating Concern = .91, Shape Concern = .91, and Weight Concern = .91 (Giovazolias, Tsaousis, & Vallianatou, 2013). Global score Cronbach's alpha was .75 for this study.

Self-Compassion Scale — Self-Compassion Scale (SCS; Neff, 2003; Greek version: Iosif et al., 2018) is a 26-item measure consisting of six subscales: Self-kindness (improving kindness and understanding oneself), Common Humanity (ability to feel all experiences as part of the broader human condition), Mindfulness (ability to be aware painful experiences, without being absorbed by them), Self-judgment (being hard or critical of oneself), Isolation (regarding oneself as separate and isolated from others), and Over-identification (tendency to over-identify with painful experiences). Items are rated on a Likert scale ranging from 1 = Almost Never to 5 = Almost Always. Higher scores reflect greater self-compassion (Neff, 2003). Iosif et al. (2018) found the SCS to present with good psychometric properties among a sample of Greek-Cypriot youth. Cronbach's alpha in this study was .84.

Depression Anxiety Stress Scales — Depression Anxiety Stress Scales (DASS; Brown, Chorpita, Korotitsch, & Barlow, 1997) is the short form of the DASS-42 (Lovibond & Lovibond, 1995), a measure of depression, anxiety, and stress; or psychological distress in more general. The DASS-21 shows good internal consistency with Cronbach alpha of .88 for depression, .82 for anxiety, .90 for stress, and .93 for the entire scale (Koushiou & Karekla, 2016).

Procedures

Volunteers offered to participate in the study after an oral invitation given during class or a written invitation by email and/or Facebook. Informed consent was received from all participants and their parents (if they were under 18 years old). All participants completed the battery of questionnaires anonymously through survey monkey.

Data analysis

Version 20.0 of SPSS (Statistical Software for Social Sciences) was used for most data analysis. Descriptive and correlational analysis of raw scores from the BI-AAQ and the other instruments was conducted, followed by an item-level and a reliability analysis. To examine the factorial structure of the BI-AAQ, an Exploratory Factor Analysis was conducted using Sample 1, following the same procedure as authors of the original version (Sandoz et al., 2009). Then, a Confirmatory Factor Analysis was employed to test for the unidimensional structure of the BI-AAQ on Sample 2. The covariance matrix was entered in AMOS 20 (Arbuckle, 2011) and maximum likelihood estimation was used to assess the fit. The χ^2 statistic as a measure of the overall model fit is sensitive to sample size and may overestimate the lack of model fit (Bollen, 1989), so the following goodness-of-fit indices were additionally examined: the Root Mean Square Error of Approximation (RMSEA), the Comparative Fit Index (CFI), the standardized mean square residual (SRMR). CFI values above .95 and RMSEA and SRMR values less than .08 were used as evidence of good fit.

Results

Central Tendency, Dispersion and Distribution of BI-AAQ Scores

The distribution of scores was examined for central tendency and spread.

Sample 1: The BI-AAQ scores ranged from 12-75 (M = 35.92, SD = 17.29). The distribution was slightly positively skewed (SK = .38), with kurtosis = -.95.

Sample 2: The BI-AAQ scores ranged from 12 to 83 (M = 31.98, SD = 17.91). The distribution was positively skewed (SK = .85), with a kurtosis = -.08. This indicates a trend toward body image inflexibility.

Internal Consistency of the Greek BI-AAQ

The reliability analysis showed that the Greek BI-AAQ has high internal consistency, with a Cronbach's alpha of .95 for both samples, which decreases if any item is deleted; except for item 6 for which alpha remained the same (.95) for Sample 1. All item-total correlations were over .68 (except for item 6 that was lower (.37) but still adequate) for Sample 1 and over .57 for Sample 2.

Associations Between the Greek BI-AAQ and Other Measures Related to Eating Disorders and Psychological Functioning

The partial correlations between BI-AAQ and the other measures were examined, in order to investigate the relationship of body image acceptance and flexibility with general psychological flexibility and acceptance, eating disorders' behaviours and general psychopathology indices. Body Image Acceptance was significantly correlated to BMI in both samples (Sample 1: r = .41, p < .001; Sample 2: r = .42, p < .001), where higher inflexibility was associated with higher BMI. Therefore, decided to proceed with controlling for BMI in Sample 2 subsequent analysis.

As presented in Table 1, the BI-AAQ showed significant associations with all constructs assessed; higher inflexibility was associated with greater depression, anxiety, and stress (YI-4, PSS in Sample 1 and DASS in Sample 2), eating disorders symptomatology (WCS and Sample 1 ApSI-R), eating disorder behaviours (Sample 2 EDE-Q), greater difficulties in emotion regulation (DERS) and more experiential avoidance (Sample 2 AAQ-II). Finally, the BI-AAQ was found to negatively correlate with Sample 1 RSES and Sample 2 SCS, suggesting that higher body image inflexibility is related to lower self-esteem and self-compassion.

Sample 1

Principal Component Analysis of the Greek BI-AAQ

Unrotated principal component analysis was used to run a factor analysis. The Kaiser Meyer-Olkin test (.91) was above the recommended .6 (Kaiser, 1970; Kaiser & Rice, 1974), which indicates that the sampling is adequate. Bartlett's Sphericity test was significant, $\chi^2(66)$ = 827.11, p < .001, meaning that the correlation matrix diverged significantly from an identity matrix in which the items would be uncorrelated. We used Kaiser-Guttman criteria, and also the Catell's scree test, that indicated the decision of retaining a single factor, as theoretically expected (Sandoz et al., 2009). Every item presented communality values superior to .6, except for item 6,

Table 1

Partial Correlations Between BI-AAQ and Validation Measures for Each Sample

Measures	BI-AAQ	
	Sample 1	Sample 2
AAQ-II		.55**
EDE-Q		.75**
SCS		-.20**
DASS-Dep		.37**
DASS-Stress		.42**
DASS-Anx		.40**
WCS	.79**	.60**
DERS	.55**	.49**
PSS	.42**	
YI-4 Dep	.51**	
RSES	-.40**	
ApSI-R	.73**	

Note. For Sample 2 partial correlations are presented after controlling for BMI. AAQ-II = Acceptance and Action Questionnaire-II; EDE-Q = Eating Disorder Examination Questionnaire; WCS = Weight Concerns Scale; SCS=Self-Compassion Scale; DASS = Depression Anxiety Stress Scales; DERS = Difficulties in Emotion Regulation Scale; PSS = Perceived Stress Scale; YI-4 = Youth Inventory-4; RSES = Rosenberg Self-Esteem Scale; ApSI-R = Appearance Schemas Inventory-Revised.
**$p < .01$.

which had a value of .17 suggesting a satisfactory amount of shared variance for each item with other items. Examination of item 6 (If I start to feel fat, I try to think about something else) showed low correlations with the other items (range .20-.49) and corrected item total correlation of .37. Removing item 6 did not substantially contribute to Chronbach's alpha (difference of only .001). All items presented high factor loadings, around .80, varying from .41 (Item 6) to .89 (Item 10). The one-dimensional structure explained 64.10% of the variance.

Sample 2

Gender Differences in Body Image Inflexibility

There was a statistically significant difference between genders on the BI-AAQ total score (t = 2.39, p = .03) with females (*M* = 33.46, *SD* = 18.30) presenting higher scores on body image inflexibility than males (*M* = 24.74, *SD* = 13.84).

Confirmatory Factor Analysis of the Greek BI-AAQ

To confirm the previous proposed BI-AAQ one-factor structure, we conducted a Confirmatory Factor Analysis, using Sample 2 (see Figure 1). The chi-square goodness-of-fit was significant ($\chi^2(54) = 210.557$, $p < .001$). The CFI (.91), the TLI (.87) and the PCFI (.63) all met the criteria standards for adequacy of fit. The standardized regression weights ranged from .24 (item 6) to .75 (item10), and all the path values were statistically significant ($p < .001$). No post-hoc modifications were necessary based on the analysis.
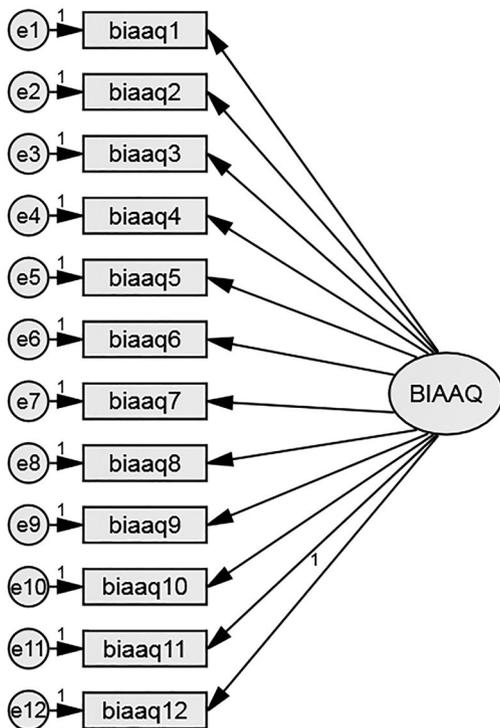
Figure 1. Graphic representation of the Greek BI-AAQ factorial structure.

Hierarchical multiple regression using BMI, Weight Concerns (WCS) and Greek BI-AAQ to predict Eating Disorder Behaviors (EDE-Q)

In order to examine the importance of Body Image Inflexibility for eating disorders, we conducted hierarchical multiple regression analyses predicting eating disorder behaviors (as assessed by the EDE-Q) from Weight Concerns (WCS) and BI-AAQ scores after controlling for BMI, with BI-AAQ added last (see Table 2). The predictor variables produced a significant model, which accounted for 67% of the variance in eating disorder behaviors. The BI-AAQ remained a significant predictor of eating disorder behaviors after controlling for BMI and weight concerns scores. Each variable had a significant and independent contribution on the prediction of eating disorder behaviors.

Discussion

The purpose of this study was to adapt and validate the Greek version of the Body Image-Acceptance and Action Questionnaire (BI-AAQ: Sandoz et al., 2009), an instrument developed to assess the ability to accept and experience perceptions, thoughts, beliefs, and feelings relative to one's body without attempting to change their intensity, frequency, or form. It is expected, that the availability of this instrument in Greek will allow for further research into the area of body image psychological flexibility and eating disorders in general, while it will enrich the Greek counselling psychology practice with new assessment measures. Additionally, it aimed to further elucidate the contribution of body image inflexibility in eating disorder behaviors by examining its predictive value in predicting such behaviors over and above BMI and weight concern contributions.

Table 2

Hierarchical Multiple Regression Using BMI, Weight Concerns (WCS) and Greek Body Image Acceptance to Predict Eating Disorder Behaviors (EDE-Q)

Model	Predictors	β	t	p	R	R²	F	p
Step 1					.36	.13	15.56	.000
	BMI	.36	3.94	.000				
Step 2					.74	.54	63.85	.000
	BMI	.12	1.68	.01				
	Weight Concerns	.69	9.91	.000				
Step 3					.82	.67	73.05	.000
	BMI	-.03	-.52	.60				
	Weight Concerns	.40	5.48	.000				
	Body Image Acceptance	.51	6.50	.000				

Two samples were used for the purposes of this study. The first was an all female sample of adolescents and young adults (wider age range), whereas the second sample was comprised of university students of both genders. The Exploratory Factor Analysis (Sample 1) of the BI-AAQ indicated a one-factor structure of 12 items, similar to the original English version (Sandoz et al., 2009) and other language versions (e.g. Portuguese; Ferreira et al., 2011). This factor explained 64.10% of the variance. The factorial structure of the BI-AAQ was further confirmed (Sample 2) by a Confirmatory Factor Analysis. As expected, all goodness-of-fit indices were overall adequate (Byrne, 2013).

The BI-AAQ showed internal consistency in both samples, with high Cronbachs' alpha values (.95). Item-total correlation values were also high, except for item 6 (as also reported by Sandoz et al., 2009) in Sample 1, However, when deleting this item, it was found that it did not contribute to increases in alpha values. Examining the content of the items in Greek, it appears that all items except item6 refer to body weight whereas item 6 uses the word "fat" instead. It may be that this slight difference in wording of item 6 contributes to the lower consistency of this item with the rest of the items in the smaller Sample 1 study.

The Greek BI-AAQ also demonstrated good convergent and divergent validity, similarly to the results reported by Sandoz et al. (2009) and other language validations. Body image inflexibility was associated with psychopathology indices (e.g., depression, stress, anxiety and eating disorders symptomatology and behaviours), difficulties in emotion regulation and with other inflexibility measures (e.g., AAQ-II). Inflexibility was associated with lower self-esteem and self-compassion. Further, body image inflexibility was a significant predictor of eating disorder behaviors, over and above BMI and weight concerns. This is important for the construct of body image inflexibility as weight concerns is a robust predictor for the later development of disordered eating. Particularly, adolescents high on the Weight Concerns Scale are significantly more likely to develop eating problems before the end of high school (Killen et al., 1996). More longitudinal research is needed in the case of body image inflexibility to examine the trajectory individuals might take in terms of eating related and other psychopathology. Future studies need to further examine the possible pathogenic role of body image inflexibility, and specifically whether it mediates the relation between weight concerns and eating disorder behaviors and symptomatology.

Even though weight concerns and eating disorders tend to be mostly associated with young females, we included males in Sample 2 so as to examine any differences between the genders on body image acceptance and

flexibility. As expected, males showed higher body image flexibility than females similar to findings of previous studies (Ferreira et al., 2011; Sandoz et al., 2009). Future studies should utilize invariance testing to examine whether males and females understand the concept of body image flexibility the same way and respond to the measure items in a similar manner. Also, future studies of invariance should utilize varied samples in relation to genders (e.g., adolescent boys and clinical samples of both genders). Examining body image inflexibility, in the future, across the continuum of eating disorders (from non-clinical to sub-clinical to clinical presentations) would also aid in further elucidating the nature of body image inflexibility and its relation with other constructs shown to significantly contribute to the development of eating disorders.

Further, this study is limited by its self-report cross-sectional nature and absence of measures to evaluate discriminant validity. Future studies should aim to find ways to corroborate self-report assessments with other modalities of assessing body image acceptance and behaviors of interest. Despite these shortcoming, strengths of this study include the use of other flexibility specific measures (e.g., AAQ) and constructs (e.g., self-compassion) in examining the validity of the BI-AAQ. It also utilized two somewhat different samples of individuals in the age ranges when eating disorder pathology typically appears. Further, it utilized different measures of similar constructs (e.g., PSS and YI-4 in Sample 1 and DASS in Sample 2 for assessing depression, stress and anxiety; and WCS in both samples, ApSI-R in Sample 1 and EDE-Q in Sample 2 for assessing eating disorder symptoms and behaviors) and a similar pattern of relations was corroborated throughout these different constructs. Overall, the results of this study illustrate that the Greek version of the BI-AAQ questionnaire is a robust and reliable instrument and adds to the previous knowledge and research on the role of psychological flexibility and acceptance of body image in eating disorder behaviours and psychological difficulties.

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Competing Interests

The authors have declared that no competing interests exist.

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References

Arbuckle, J. L. (2011). IBM SPSS Amos 20.0 [Computer software]. New York, NY, USA: IBM.

Argyrides, M., & Kkeli, N. (2013). Multidimensional Body-Self Relations Questionnaire-Appearance Scales: Psychometric properties of the Greek version. *Psychological Reports, 113*(3), 885-897. https://doi.org/10.2466/03.07.PR0.113x29z6

Bollen, K. A. (1989). A new incremental fit index for general structural equation models. *Sociological Methods & Research, 17*(3), 303-316. https://doi.org/10.1177/0049124189017003004

Bond, F. W., Hayes, S. C., Baer, R., Carpenter, K., Guenole, N., Orcutt, H., . . . Zettle, R. (2011). Preliminary psychometric properties of the Acceptance and Action Questionnaire II: A revised measure of psychological flexibility and experiential avoidance. *Behavior Therapy, 42*, 676-688. https://doi.org/10.1016/j.beth.2011.03.007

Brannan, M. E., & Petrie, T. A. (2008). Moderators of the body dissatisfaction-eating disorder symptomatology relationship: Replication and extension. *Journal of Counseling Psychology, 55*(2), 263-275. https://doi.org/10.1037/0022-0167.55.2.263

Brown, T. A., Chorpita, B. F., Korotitsch, W., & Barlow, D. H. (1997). Psychometric properties of the Depression Anxiety Stress Scales (DASS) in clinical samples. *Behaviour Research and Therapy, 35*, 79-89. https://doi.org/10.1016/S0005-7967(96)00068-X

Byrne, B. M. (2013). *Structural equation modeling with Mplus: Basic concepts, applications, and programming*. New York, NY, USA: Routledge.

Cash, T. F., Melnyk, S. E., & Hrabosky, J. I. (2004). The assessment of body image investment: An extensive revision of the Appearance Schemas Inventory. *International Journal of Eating Disorders, 35*(3), 305-316. https://doi.org/10.1002/eat.10264

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior, 24*(4), 385-396. https://doi.org/10.2307/2136404

Cole, S. R. (1999). Assessment of differential item functioning in the Perceived Stress Scale-10. *Journal of Epidemiology and Community Health, 53*(5), 319-320. https://doi.org/10.1136/jech.53.5.319

Corning, A. F., Krumm, A. J., & Smitham, L. A. (2006). Differential social comparison processes in women with and without eating disorder symptoms. *Journal of Counseling Psychology, 53*(3), 338-349. https://doi.org/10.1037/0022-0167.53.3.338

Cowdrey, F. A., & Park, R. J. (2012). The role of experiential avoidance, rumination and mindfulness in eating disorders. *Eating Behaviors, 13*(2), 100-105. https://doi.org/10.1016/j.eatbeh.2012.01.001

Fairburn, C. G., & Beglin, S. J. (1994). Assessment of eating disorders: Interview or self-report questionnaire? *International Journal of Eating Disorders, 16*, 363-370.

Fanti, K. A., Demetriou, C. A., & Kimonis, E. R. (2013). Variants of callous-unemotional conduct problems in a community sample of adolescents. *Journal of Youth and Adolescence, 42*(7), 964-979. https://doi.org/10.1007/s10964-013-9958-9

Fanti, K. A., & Henrich, C. C. (2015). Effects of self-esteem and narcissism on bullying and victimization during early adolescence. *The Journal of Early Adolescence, 35*(1), 5-29. https://doi.org/10.1177/0272431613519498

Ferreira, C., Pinto-Couveia, J., & Duarte, C. (2011). The validation of the Body Image Acceptance and Action Questionnaire: Exploring the moderator effect of acceptance on disordered eating. *International Journal of Psychology & Psychological Therapy, 11*, 327-345.

Fox, H. C., Axelrod, S. R., Paliwal, P., Sleeper, J., & Sinha, R. (2007). Difficulties in emotion regulation and impulse control during cocaine abstinence. *Drug and Alcohol Dependence, 89*(2-3), 298-301. https://doi.org/10.1016/j.drugalcdep.2006.12.026

Gadow, K. D., & Sprafkin, J. (1999). *Youth's inventory-4 manual.* Stony Brook, NY, USA: Checkmate Plus.

PsychOpen GOLD

Giovazolias, T., Tsaousis, I., & Vallianatou, C. (2013). The factor structure and psychometric properties of the Greek version of the Eating Disorders Examination Questionnaire (EDE-Q). *European Journal of Psychological Assessment*, 29, 189-196. https://doi.org/10.1027/1015-5759/a000138

Gloster, A. T., & Karekla, M. (In press). A multi-level, multi-method approach to testing and refining intervention targets. In S. Hayes & S. G. Hoffman (Eds.), *Moving ahead with a more process-based categorization of psychological problems and their treatment in the post-DSM era*. Oakland, CA, USA: New Harbinger.

Gratz, K. L., & Roemer, L. (2004). Multidimensional assessment of emotion regulation and dysregulation: Development, factor structure, and initial validation of the difficulties in emotion regulation scale. *Journal of Psychopathology and Behavioral Assessment, 26*(1), 41-54. https://doi.org/10.1023/B:JOBA.0000007455.08539.94

Gratz, K. L., Tull, M. T., Baruch, D. E., Bornovalova, M. A., & Lejuez, C. W. (2008). Factors associated with co-occurring borderline personality disorder among inner-city substance users: The roles of childhood maltreatment, negative affect intensity/reactivity, and emotion dysregulation. *Comprehensive Psychiatry, 49*(6), 603-615. https://doi.org/10.1016/j.comppsych.2008.04.005

Hayes, S. C., Luoma, J., Bond, F., Masuda, A., & Lillis, J. (2006). Acceptance and Commitment Therapy: Model, processes, and outcomes. *Behaviour Research and Therapy, 44*, 1-25. https://doi.org/10.1016/j.brat.2005.06.006

Hayes, S. C., Strosahl, K. D., & Wilson, K. G. (2011). *Acceptance and commitment therapy: The process and practice of mindful change*. New York, NY, USA: Guilford Press.

Hayes, S. C., Wilson, K. G., Gifford, E. V., Follette, V. M., & Strosahl, K. (1996). Experiential avoidance and behavioral disorders: A functional dimensional approach to diagnosis and treatment. *Journal of Consulting and Clinical Psychology, 64*(6), 1152-1168. https://doi.org/10.1037/0022-006X.64.6.1152

Hill, M. L., Masuda, A., & Latzman, R. D. (2013). Body image flexibility as a protective factor against disordered eating behaviour for women with lower body mass index. *Eating Behaviors, 14*, 336-341. https://doi.org/10.1016/j.eatbeh.2013.06.003

Iosif, D., Ioannou, M., Theofanous, A., Nicolaou, P., & Karekla, M. (2018, July). Psychometric properties of the Self-Compassion Scale in a sample of Greek-Cypriot Youth. Paper presented at the World Congress of Cognitive Behavioral Psychology, Montreal, Canada.

Izaadi, A., Karimi, J., & Rahmani, M. (2014). Psychometric analysis of Persian version of Body Image Flexibility Questionnaire (BI-AAQ) among university students. *Journal of Hayat, 19*(3), 56-69.

Johnson, K. A., Zvolensky, M. J., Marshall, E. C., Gonzalez, A., Abrams, K., & Vujanovic, A. A. (2008). Linkages between cigarette smoking outcome expectancies and negative emotional vulnerability. *Addictive Behaviors, 33*, 1416-1424. https://doi.org/10.1016/j.addbeh.2008.05.001

Juarascio, A., Shaw, J. A., Forman, E. M., Timko, C. A., Herbert, J. D., Butryn, M. L., . . . Lowe, M. R. (2013). Acceptance and Commitment Therapy as a novel treatment for eating disorders: An initial test of efficacy and mediation. *Behavior Modification, 37*(4), 459-489. https://doi.org/10.1177/0145445513478633

Kaiser, H. F. (1970). A second generation little jiffy. *Psychometrika, 35*(4), 401-415. https://doi.org/10.1007/BF02291817

Kaiser, H. F., & Rice, J. (1974). Little Jiffy, Mark IV. *Educational and Psychological Measurement, 34*(1), 111-117. https://doi.org/10.1177/001316447403400115

Karekla, M., Karademas, E., & Gloster, A. (2018). The Common Sense Model of self-regulation and Acceptance and Commitment Therapy: Integrating strategies to guide interventions for chronic illness. *Health Psychology Review*. https://doi.org/10.1080/17437199.2018.1437550

Karekla, M., & Michaelides, M. P. (2017). Validation and invariance testing of the Greek adaptation of the Acceptance and Action Questionnaire-II across clinical vs. nonclinical samples and sexes. *Journal of Contextual Behavioral Science, 6*(1), 119-124. https://doi.org/10.1016/j.jcbs.2016.11.006

Karekla, M., & Nicolaou, P. (2017, August). AcceptME: Evaluation of a digital gamified prevention program based on Acceptance and Commitment Therapy. In H. de Vries (Chair), *Tailored eHealth methods: Innovations and cost-effectiveness*. Paper presented at the European Health Psychology Society conference, Padova, Italy.

Karekla, M., & Panayiotou, G. (2011). Coping and experiential avoidance: Unique or overlapping constructs? *Journal of Behavior Therapy and Experimental Psychiatry, 42*(2), 163-170. https://doi.org/10.1016/j.jbtep.2010.10.002

Kashdan, T. B., Barrios, V., Forsyth, J. P., & Steger, M. F. (2006). Experiential avoidance as a generalized psychological vulnerability: Comparisons with coping and emotion regulation strategies. *Behaviour Research and Therapy, 44*(9), 1301-1320. https://doi.org/10.1016/j.brat.2005.10.003

Killen, J. D., Taylor, C. B., Hayward, C., Haydel, K. F., Wilson, D. M., Hammer, L., & Strachowski, D. (1996). Weight concerns influence the development of eating disorders: A 4-year prospective study. *Journal of Consulting and Clinical Psychology, 64*(5), 936-940. https://doi.org/10.1037/0022-006X.64.5.936

Killen, J. D., Taylor, C. B., Hayward, C., Wilson, D. M., Haydel, F., Hammer, L. D., . . . Kraemer, H. (1994). Pursuit of thinness and onset of eating disorder symptoms in a community sample of adolescent girls: A three-year prospective analysis. *International Journal of Eating Disorders, 16*, 227-238. https://doi.org/10.1002/1098-108X(199411)16:3<227::AID-EAT2260160303>3.0.CO;2-L

Koushiou, M., & Karekla, M. (2016). Eating disorder risk: The role of sensitivity to negative affect and body-image inflexibility (Doctoral dissertation, University of Cyprus, Nicosia, Cyprus). Retrieved from https://gnosis.library.ucy.ac.cy/handle/7/39530

Lovibond, P. F., & Lovibond, S. H. (1995). The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. *Behaviour Research and Therapy, 33*(3), 335-343. https://doi.org/10.1016/0005-7967(94)00075-U

Manlick, C. F., Cochran, S. V., & Koon, J. (2013). Acceptance and Commitment Therapy for eating disorders: Rationale and literature review. *Journal of Contemporary Psychotherapy, 43*(2), 115-122. https://doi.org/10.1007/s10879-012-9223-7

Merwin, R. M., Timko, C. A., Moskovich, A. A., Ingle, K. K., Bulik, C. M., & Zucker, N. L. (2011). Psychological inflexibility and symptom expression in anorexia nervosa. *Eating Disorders, 19*(1), 62-82. https://doi.org/10.1080/10640266.2011.533606

Merwin, R. M., & Wilson, K. G. (2009). Understanding and treating eating disorders: An ACT perspective. In J. T. Blackledge, J. Ciarrochi, & F. Deane (Eds.), *Acceptance and commitment therapy: Contemporary theory, research, and practice* (pp. 87-117). Bowen Hills, Queensland, Australia: Australian Academic Press.

PsychOpen GOLD

Michaelides, M., Christodoulou, A., Kkeli, N., Karekla, M., & Panayiotou, G. (2016). Factorial Structure of the Perceived Stress Scale and implications for scoring. *European Review of Applied Psychology, 66*(6), 309-316. https://doi.org/10.1016/j.erap.2016.07.002

Monestès, J. L., Karekla, M., Jacobs, N., Michaelides, M., Hooper, N., Kleen, M., . . . Hayes, S. C. (2018). Experiential avoidance as a common process in European Cultures. *European Journal of Psychological Assessment, 34*(4), 247-257. https://doi.org/10.1027/1015-5759/a000327

Moretti, M. M., & Higgins, E. T. (1990). Relating self-discrepancy to self-esteem: The contribution of discrepancy beyond actual-self ratings. *Journal of Experimental Social Psychology, 26*(2), 108-123. https://doi.org/10.1016/0022-1031(90)90071-S

Neff, K. D. (2003). The development and validation of a scale to measure self-compassion. *Self and Identity, 2*, 223-250. https://doi.org/10.1080/15298860309027

Orsillo, S. M., Roemer, L., Lerner, J. B., & Tull, M. T. (2004). Acceptance, mindfulness, and Cognitive-Behavioral Therapy: Comparisons, contrasts, and application to anxiety. In S. C. Hayes, V. M. Follette, & M. M. Linehan (Eds.), *Mindfulness and acceptance: Expanding the cognitive-behavioral tradition* (pp. 66-95). New York, NY, USA: Guilford Press.

Rabitti, E., Manduchi, K., Miselli, G., Presti, G., & Moderato, P. (2010, June). The validation of the Italian version of the Body Image Acceptance and Action Questionnaire. *Paper presented at the annual meeting for the Association for Contextual Behavioral Science*. Reno, NV, USA.

Racine, S. E., & Wildes, J. E. (2013). Emotion dysregulation and symptoms of anorexia nervosa: The unique roles of lack of emotional awareness and impulse control difficulties when upset. *International Journal of Eating Disorders, 46*(7), 713-720. https://doi.org/10.1002/eat.22145

Rosenberg, M. (1965). Rosenberg self-esteem scale (RSES). In *Society and the adolescent self-image* (pp. 16-38). Princeton, NJ, USA: Princeton University Press.

Sandoz, E. K., Wilson, K. G., & Kellum, K. K. (2009, May). The effects of ACT for body image disturbance on eating behavior and valued living. *Paper presented at the meeting for the Association for Behavior Analysis International*. Phoenix, AZ, USA.

Sandoz, E. K., Wilson, K. G., Merwin, R. M., & Kellum, K. K. (2013). Assessment of Body Image Flexibility: The Body Image – Acceptance and Action Questionnaire. *Journal of Contextual Behavioral Science, 2*, 39-48. https://doi.org/10.1016/j.jcbs.2013.03.002

Stice, E., & Shaw, H. E. (2002). Role of body dissatisfaction in the onset and maintenance of eating pathology: A synthesis of research findings. *Journal of Psychosomatic Research, 53*(5), 985-993. https://doi.org/10.1016/S0022-3999(02)00488-9

Stice, E., Telch, C. F., & Rizvi, S. L. (2000). Development and validation of the eating disorder diagnostic scale: A brief self-report measure of anorexia, bulimia, and binge-eating disorder. *Psychological Assessment, 12*(2), 123-131. https://doi.org/10.1037/1040-3590.12.2.123

Timko, C. A., Juarascio, A. S., Martin, L. M., Faherty, A., & Kalodner, C. (2014). Body image avoidance: An under-explored yet important factor in the relationship between body image dissatisfaction and disordered eating. *Journal of Contextual Behavioral Science, 3*, 203-211. https://doi.org/10.1016/j.jcbs.2014.01.002

Wendell, J. W., Masuda, A., & Le, J. K. (2012). The role of Body Image Flexibility in the relationship between disordered
eating cognitions and disordered eating symptoms among non-clinical college students. *Eating Behaviors, 13*, 240-245.
https://doi.org/10.1016/j.eatbeh.2012.03.006

Appendix

Greek Version of the BI-AAQ

Πιο κάτω θα βρείτε μια λίστα δηλώσεων. Παρακαλώ αξιολογήστε σε ποιο βαθμό η κάθε δήλωση ισχύει για εσάς.							
	Ποτέ δεν Ισχύει	Πολύ Σπάνια Ισχύει	Σπάνια Ισχύει	Μερικές φορές Ισχύει	Ισχύει συχνά	Ισχύει σχεδόν πάντοτε	Ισχύει πάντοτε
1. Το να ανησυχώ για το βάρος μου με δυσκολεύει να ζήσω μια αξιόλογη ζωή	1	2	3	4	5	6	7
2. Νοιάζομαι υπερβολικά για το βάρος μου και το σχήμα του σώματος μου.	1	2	3	4	5	6	7
3. Κλείνομαι στον εαυτό μου όταν αισθάνομαι άσχημα για το σχήμα του σώματος μου ή το βάρος μου	1	2	3	4	5	6	7
4. Οι σκέψεις και τα συναισθήματά μου για το βάρος μου και το σχήμα του σώματος μου πρέπει να αλλάξουν πριν κάνω σημαντικά βήματα στη ζωή μου	1	2	3	4	5	6	7
5. Ξοδεύω πάρα πολύ από το χρόνο μου ανησυχώντας για το σώμα μου	1	2	3	4	5	6	7
6. Αν αρχίσω να αισθάνομαι χοντρός/η προσπαθώ να σκεφτώ κάτι άλλο	1	2	3	4	5	6	7
7. Πριν να ξεκινήσω να κάνω κάποια σοβαρά πλάνα για την ζωή μου, θα πρέπει να αισθάνονται καλύτερα με το σώμα μου.	1	2	3	4	5	6	7
8. Θα έχω καλύτερο έλεγχο της ζωή μου, αν μπορώ να ελέγξω τις αρνητικές σκέψεις για το σώμα μου	1	2	3	4	5	6	7
9. Για να ελέγχω τη ζωή μου, πρέπει να ελέγχω το βάρος μου	1	2	3	4	5	6	7
10. Το να αισθάνομαι χοντρός/η μου προκαλεί προβλήματα στη ζωή μου	1	2	3	4	5	6	7
11. Όταν ξεκινήσω να σκέπτομαι το μέγεθος και το σχήμα του σώματός μου, μου είναι δύσκολο να κάνω οτιδήποτε άλλο	1	2	3	4	5	6	7
12. Οι σχέσεις μου θα ήταν καλύτερες αν το σωματικό βάρος μου ή/ και το σχήμα του σώματος μου δεν με ενοχλούσε	1	2	3	4	5	6	7

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