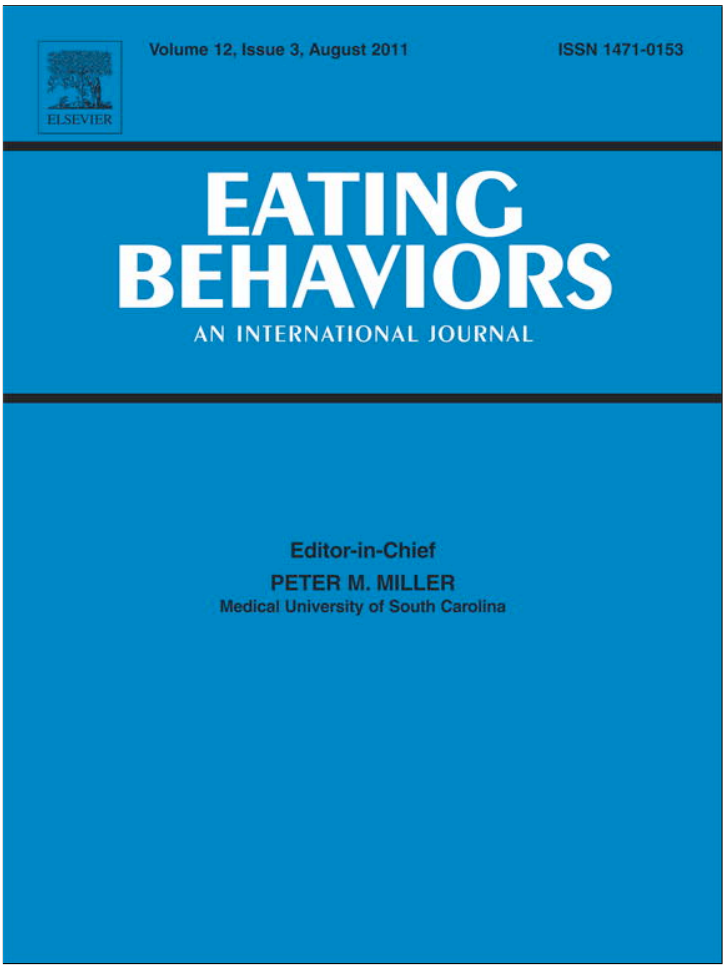

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The development and validation of the food craving acceptance and action questionnaire (FAAQ)☆

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ABSTRACT

Research has suggested that mindfulness and acceptance may be important factors in the development, maintenance and treatment of both obesity and eating disorders. However, very few scales exist that apply constructs of acceptance and mindfulness to eating behavior. A measure of acceptance about food related thoughts would be especially beneficial in investigating links between acceptance and problematic eating, and in better understanding mechanisms of action of effective treatments for obesity and eating disorders. The Food Acceptance and Awareness Questionnaire (FAAQ) was developed to measure acceptance of urges and cravings to eat or the extent to which individuals might try to control or change these thoughts. The FAAQ is a self-report questionnaire made up of ten items each rated on a seven-point Likert scale (1 = *very seldom true* to 6 = *always true*). Higher scores indicate greater acceptance of motivations to eat. The FAAQ was given to a sample of 463 undergraduate students along with several other measures of eating behavior and other psychological variables. Concurrent associations with variables theorized to be closely linked (Eating Attitudes Test, EAT; the Dutch Eating Behavior Questionnaire, DEBQ; body mass index, BMI) and not very closely linked (the Depression Anxiety Stress Scale, DASS) were evaluated in order to indicate the new scale's convergent and divergent validity. These results demonstrated highly significant correlations with these measures in the expected direction, with stronger correlations for the theoretically-consistent variables than the theoretically-inconsistent variables. Exploratory factor analyses confirmed a structural two-factor model. Factor 1 seems to measure one's ability to regulate eating despite urges and cravings, and Factor 2 seems to measure desire to maintain internal control over eating thoughts. The FAAQ was also administered to a separate sample of 29 overweight or obese women enrolled in a weight loss program, and found to be predictive of weight loss. Taken together, results suggest that the FAAQ is a psychometrically sound instrument which might be a valuable tool for assessing acceptance of food related thoughts and urges.

1. Introduction

The World Health Organization, 2006 reports that the number of obese individuals (BMI > 30 kg/m^2) is fast approaching two billion worldwide (2006). Obesity is associated with numerous health risks ranging from osteoarthritis to heart disease, diabetes, cancer and death (Center for Disease Control & Prevention, 2009). Unfortunately, despite our best efforts to promote weight loss, current gold standard treatments produce only moderate weight loss and the weight is typically regained (Brownell, 2010). In response to this ever-growing epidemic, numerous attempts at increasing healthy eating behaviors among the overweight and obese have increased. One potential way of increasing healthy eating behaviors amongst this population is to determine whether certain psychological variables are associated with successful weight loss and maintenance. Weight loss interventions designed to increase these psychological factors could potentially help others with their weight loss goals.

Recent research suggests that psychological flexibility, which is a concept targeted in many of the newer third generation cognitive behavioral therapies, plays an important role in eating behaviors (Byrne, Cooper, & Fairburn, 2003; Fassino et al., 2002; Rydén et al., 2003). Psychological flexibility refers to an ability to choose from a range of behavioral options based on one's personal values as opposed to being constrained by an unwillingness to experience unpleasant or distressing thoughts and feelings (Hayes, Strosahl, & Wilson, 1999). As such it depends on the related constructs of psychological acceptance (i.e., a psychological stance of openness towards the full range of experience, including difficult thoughts, emotions and physiological experiences without attempting to control, alter, suppress or avoid the experiences) and willingness (i.e., the ability to choose value or goal-consistent behaviors even when they provoke distressing thoughts and feelings). Willingness, a term used by third generation behavioral therapies such

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as Acceptance and Commitment Therapy, refers to the ability to perform a behavior even when doing so brings with it aversive internal experience (Hayes & Strosahl, 2004).

Research has demonstrated that the extent to which an individual is able to accept unpleasant thoughts and feelings without trying to diminish the internal experience either mentally (e.g., suppression and distraction) or behaviorally (e.g., by performing an action likely to produce change in the experience, such as eating a desired food) is predictive of health and psychological outcomes. Psychological acceptance (sometimes referred to as its converse, experiential avoidance) predicts treatment-related improvements in health behaviors including binge eating (Kristeller, Baer, & Quillian-Wolever, 2006), alcohol abuse (Brown, Evans, Miller, Burgess, & Mueller, 1997; Patten, Drews, Myers, Martin, & Wolter, 2002), smoking (Gifford et al., 2004) and a range of other maladaptive health behaviors (Hayes, Luoma, Bond, Masuda, & Lillis, 2006).

Although some previous research has investigated the relationships between eating behaviors and psychological flexibility, the literature is limited. Prior work has demonstrated that individuals who are successful at maintaining weight loss have more flexible strategies in terms of how they cope with food cravings; in contrast, individuals who are unable to maintain weight loss have a reduced ability to cope with stress or negative emotions, and over-rely on avoidance or control behaviors, such as eating in response to distressing affect (i.e., "emotional eating"; Byrne et al., 2003; Fassino et al., 2002; Rydén et al., 2003). There are theoretical reasons and empirical evidence that suggest that the inability to accept food cravings/urges and subsequent efforts to control or reduce these cravings is tied to overeating and weight gain. Emotional eating, which can be conceptualized as a learned response aimed at controlling undesirable internal states, has been linked to an inability to lose weight in a sample of 187 overweight adults who participated in a group weight loss treatment (Blair, Lewis, & Booth, 1990). Binge eating, and overeating more broadly, is often motivated by a desire to escape from an aversive emotional state or to decrease distressing thoughts (Heatherton & Baumeister, 1991). Experiential avoidance, or a desire to reduce or control distressing feelings and cognitions, more generally has been associated with increased difficulty in maintaining lost weight (Lillis, Hayes, Bunting, & Masuda, 2009). Therefore, strategies designed to increase acceptance of distressing thought and cognitions, and reduce problematic control or avoidance strategies, could theoretically decrease episodes of overeating.

Current research has shown the promise of acceptance-based interventions at increasing physical activity (Butryn, Forman, Hoffman, Shaw, & Juarascio, 2011), managing food cravings (Forman et al., 2007), and maintaining weight loss (Forman, Butryn, Hoffman, & Herbert, 2009). Other work has shown that one of the strongest predictors of reducing binge eating in obese adults was the amount of time spent engaging in eating-related mindfulness (Kristeller et al., 2006). However, despite the reported effectiveness of acceptance-based interventions at improving eating-related and weight loss behaviors, no reliable method exists for reliably measuring levels of acceptance regarding thoughts and feelings that arise in a food rich environment. Previous research has demonstrated that measures of acceptance that are better targeted to the specific concepts of interest are more sensitive than more generalized measures such as the Acceptance and Action Questionnaire (AAQ; Gifford, Antonuccio, Kohlenberg, Hayes, & Piasecki, 2002; Piaseki; Lillis & Hayes, 2008; Sandoz, Wilson, & Merwin, in progress; Shawyer et al., 2007; Westin, Hayes, & Andersson, 2008).While general acceptance measures do exist, a food-specific measure may be more sensitive, as previous research has indicated that specific measures designed for other health-related behaviors (e.g., smoking and pain) are highly predictive of success in interventions for those behaviors. A measure of psychological flexibility that assessed acceptance and willingness to experience food-related thoughts would be especially beneficial in investigating links between acceptance and problematic eating, and in better understanding mechanisms of action of effective treatments for obesity. To address this need the Food Craving Acceptance and Action Questionnaire (FAAQ) was developed. The FAAQ was developed to measure psychological flexibility in a food-rich environment by assessing psychological acceptance of, versus a need to control, aspects of food-related experience (i.e., cravings and urges to eat). The scale was designed to measure both acceptance of distressing internal experiences and willingness to take action and eat in a healthy manner even when doing so brings with it aversive internal experience This paper will review three preliminary studies which investigate the reliability and validity of the FAAQ.

2. Method and results

2.1. Scale creation

The FAAQ is based on Chronic Pain Acceptance Questionnaire (CPAQ; McCracken, Vowles, & Eccleston, 2004), which is itself based on the Acceptance and Action Questionnaire-2 (AAQ-II; Bond et al., submitted for publication). The CPAQ is a 20-item measure assessing acceptance of chronic pain (McCracken et al., 2004) that has been well-validated (Vowles, McCracken, Mcleod, & Eccleston, 2008). Therefore, it appeared to be suitable for adaptation for use with eating urges and eating behaviors. The items to be modified were chosen by two of the authors (EMF, MLB) who had prior experience with both third generation cognitive behavioral treatments and weight loss treatment. The modified version, referred to as the Food-related Acceptance and Action Questionnaire (F-AAQ) contains 10-items (e.g., "I need to concentrate on getting rid of my urges to eat unhealthily," reversed scored) which are rated on a 6-point Likert scale (1 = very seldom true to 6 = always true). A summary score is calculated by summing the ten items. Higher scores indicate greater acceptance of motivations to eat.

2.2. Study 1

Study 1 was designed to examine convergent and divergent validity. This was accomplished by administering the FAAQ and several questionnaires that assessed variables that are theoretically similar (general psychological acceptance, food susceptibility, disordered eating, and body image dissatisfaction) and dissimilar (depression, self-esteem, and alexithymia) to the FAAQ.

2.2.1. Participants

Study 1 utilized a community (n = 240) and undergraduate student (n = 705) sample of 955 participants. Community participants were recruited via a number of on-line web sites devoted to psychological research; as such, participants were anonymous and did not receive compensation. The average BMI of community participants was 24.28 (SD = 6.03) and the average age was 26.88 (SD = 10.39). The mean age of the student sample was 19.38 ($SD = 4.32$), with a mean BMI in the normal weight range ($M = 25.09$, $SD = 2.99$). The total sample was 56.40% female and primarily Caucasian (78.80%, African American: 8.60%, Hispanic: 3.00%, Asian: 6.50%, Other: 3.1%).

2.2.2. Measures

2.2.2.1. Acceptance and action questionnaire-II (AAQ-II, Bond et al., submitted for publication). The AAQ-II is a 10-item measure designed to assess psychological flexibility and acceptance of internal experiences. Higher scores for the total scale indicate a greater degree of psychological flexibility. Cronbach's alpha in this sample was 0.84.

2.2.2.2. Body shape questionnaire (Cooper, Taylor, Cooper, & Fairburn, 1987). The BSQ is a 34-item questionnaire that measures the extent to

which individuals are preoccupied with, or self-conscious about, their weight and appearance. Individuals who receive a score above 129 are likely to have clinically significant body image dissatisfaction, although the scale is often used as a continuum. The measure has acceptable validity and reliability (Cronbach's alpha = 0.96).

2.2.2.3. Depression anxiety stress scale (DASS; Lovibond & Lovibond, 1995). The DASS is a widely used self-report instrument designed to measure depression, anxiety and tension/stress. The 21-item version was used for this study. Each of the three DASS scales contains 7 items, divided into subscales of 2–5 items with similar content. Participants use a 4-point scale to rate the extent to which they have experienced each state over the past week. Scores for depression, anxiety and stress are calculated by summing the scores for the relevant items. The scale had good internal reliability in this sample (Cronbach's alpha = 0.97).

2.2.2.4. Dutch eating behaviors questionnaire (DEBQ; Van Strien, Frijters, Bergers, & Defares, 1986). The DEBQ assesses emotional eating (overeating in respond to emotions, 13 items, Cronbach's $\alpha = 0.95$), external eating (eating in response to food-related stimuli, regardless of the internal state of hunger and satiety, 10 items, Cronbach's $\alpha = 0.88$), and restrained eating (attempts to refrain from eating, 10 items, Cronbach's $\alpha = 0.93$).

2.2.2.5. Eating attitudes test (EAT-26; Garner, Olmsted, Bohr, & Garfinkel, 1982). This 26-item scale is commonly used to help diagnose eating disorders and provides a reliable measure of the frequency of disordered eating behaviors. Participants who receive a score of 20 or greater are advised to seek professional treatment. The EAT-26 has three subscales: Dieting ($\alpha = 0.98$), Bulimia and Food Preoccupation ($\alpha = 0.97$), and Oral Control ($\alpha = 0.98$). The total scale had high internal validity (Cronbach's $\alpha = 0.99$).

2.2.2.6. Power of food scale (PFS; Lowe et al., 2009). The PFS is a 15-item measure designed to assess a predisposition toward being highly responsive to a food plentiful environment in the absence of actual food consumption. Higher scores on this scale indicate a higher level of responsiveness to the food environment. Cronbach's α in this sample was 0.93.

2.2.2.7. Rosenberg self-esteem scale (RSE; Rosenberg, 1965). The RSE is a 10-item scale designed to assess global self-esteem. The scale ranges from 0 to 30. Scores between 15 and 25 are within normal range; scores below 15 suggest low self-esteem. Cronbach's α in this sample was 0.71.

2.2.2.8. Toronto alexithymia scale-20 (TAS, Bagby, Parker, & Taylor, 1994-II). The TAS-20 is a 20-item measured designed to assess Alexithymia. It has 3 factors including: difficulty identifying feelings and distinguishing them from bodily sensations, difficulty describing feelings to others, and externally oriented thinking. The TAS-20 uses cutoff scoring, with scores equal to or less than 51 suggesting non-alexithymia, scores equal to or greater than 61 suggesting alexithymia and cores of 52 to 60 suggesting possible alexithymia. The total score had an internal reliability of 0.84.

2.2.3. Procedure

As part of a larger study, participants were administered a battery of measures including those described above. Approximately 54.7% of 519 community members who began the questionnaires completed them. Of the 284 completers, 44 were removed due to being under 18, not providing weight or height, or for obvious response sets (e.g., always checking the first option on all questionnaires). Students were provided with extra credit for completion of the measures. As such, all students in eligible classes had the opportunity to choose from any number of studies. Of those who signed up to participate in this study, all students completed the measures.

2.2.4. Results

The mean score on the FAAQ was 42.42 (SD = 8.5, range: 14–67). Internal consistency was found to be satisfactory, with a Cronbach's alpha score of .68. In order to assess how the FAAQ related to other variables that were theoretically similar, a series of correlation analyses were conducted. Significant moderate correlations were found with all of the theoretically similar measures of eating behavior and acceptance as well as BMI. See Table 1 for a correlation matrix of these results. In order to assess divergent validity, correlations between the FAAQ and theoretically-dissimilar measures were examined. See Table 1 for this correlation matrix. Overall, the correlations between the FAAQ and the theoretically dissimilar variables were either not significant or were weaker than for the theoretically similar measures: mean $r_{inconsistent} = .14$, mean $r_{consistent} = .28$, Fishers $Z = 3.24$, $p < .001$). In addition to the FAAQ total scores, the subscale scores of the FAAQ (identified below in Study 2; Acceptance and Willingness), were compared to the theoretically similar and dissimilar variables. These results can also be seen in Table 1. The correlations between the FAAQ subscale Willingness and the theoretically dissimilar variables were either not significant or were weaker than for the theoretically similar measures ($r_{inconsistent} = .16$, mean $r_{consistent} = .31$, Fishers $Z = 3.47$, $p < .001$). This was not true for the FAAQ subscale Acceptance ($r_{inconsistent} = .04$, mean $r_{consistent} = .09$, Fishers $Z = 1.1$, $p = .27$).

To identify the factor structure, exploratory factor analyses were performed for the 955 participants who completed study one. The exploratory factor analysis conducted for study one extracted factors with generalized least squares estimation. Because the factors in this questionnaire were likely to be correlated with each other, an oblique rotation was applied to the solution rather than an orthogonal rotation. The viability of solutions containing between one and five factors were examined based on the number of eigenvalues greater than 1, scree plots, and Kaiser's criterion. A one-factor solution was rejected because it yielded a significantly poorer representation of the data than a two-factor solution. Likewise, three, four, and five factor solutions were rejected due to eigenvalues of significantly less than

Table 1
Bivariate correlations between FAAQ and psychological variables.

	FAAQ total		Acceptance		Willingness	
	r	*p*	*r*	*p*	*r*	*p*
Similar						
EATtotal	−.22	<.001	.14	<.001	.32	<.001
EATdiet	−.26	<.001	.17	<.001	.38	<.001
EATbul	−.27	<.001	.01	.91	.26	<.001
EAToral	.05	.13	.30	<.001	.19	<.05
BSQ	−.42	<.001	.15	<.01	.51	<.001
PFStotal	−.37	<.001	−.04	.25	.37	<.001
PFSfoodavailability	−.26	<.001	.06	.33	.29	<.001
PFSfoodpresence	−.39	<.001	.01	.97	.36	<.001
PFSfoodtaste	−.19	<.01	.07	.32	.27	<.001
DEBQemotional	−.34	<.001	.03	.30	.38	<.001
DEBQexternalization	−.27	<.001	−.01	.96	.30	<.001
DEBQrestraint	−.21	<.001	.32	<.001	.33	<.001
AAQ-II total	.33	<.001	.04	.45	−.27	<.001
BMI	−.22	<.001	−.04	.40	.20	.24
Dissimilar						
Rosenberg	.11	.002	.08	<.01	−.04	.24
TASdescribe	−.09	.053	−.09	.06	.09	<.05
TASid	−.22	<.001	−.01	.97	.11	<.05
TASthink	−.16	.003	−.03	.51	.18	<.001
DASStotal	−.25	<.001	.03	.49	.28	<.001
DASSdepression	−.23	<.001	−.02	.50	.22	<.001
DASSanxiety	−.15	<.001	−.04	.25	.13	<.001
DASSstress	−.16	<.001	.02	.61	.22	<.001

1.0. The final two-factor model accounted for 62.48% of the variance, and all eigenvalues were greater than 1.0. Factor 1, which contains 6 items, seems to measure one's willingness to regulate eating, despite urges, cravings, or distressing emotions associated with eating in a healthy manner (see Table 2; α: 0.84). Factor 1 was therefore labeled "Willingness" in that it measures an individual's willingness to regulate eating behavior despite cravings. Willingness was chosen as the name for Factor 1 to correspond with the usage of the term willingness in the Acceptance and Commitment therapy literature (Hayes & Strosahl, 2004). Factor 2, labeled Acceptance, (4 items) appears to measure how accepting an individual is towards his or her distressing food-related thoughts (α: .84). The two factors were significantly correlated, although the strength of the correlation was only in the medium range ($r = .33$, $p < .001$). The presence of these two factors suggests that the measure assesses both acceptance and willingness, which are the two factors that comprise psychological flexibility. Therefore, the FAAQ appears to be an adequate measure of psychological flexibility about eating-related experiences and behaviors.

2.3. Study 2

Study 2 was designed to examine test–retest reliability and internal consistency. This was accomplished by administering the FAAQ at two time points. At time point 1, the FAAQ was administered online. At time two, the FAAQ was administered in person.

2.3.1. Participants

Study two used a separate sample of 40 undergraduate women recruited through undergraduate psychology classes. The mean age of this sample was 20.26 ($SD = 3.01$), with a mean BMI in the normal weight range ($M = 22.38$, $SD = 3.00$). The sample was 62% Caucasian, 16% Asian, 4% African American, 2% Latino, and 16% Other.

2.3.2. Procedure

Participants completed an online FAAQ, and then completed the FAAQ for second time, online, 3–7 days later. An Intra Class Correlation (ICC) was used to assess test–retest reliability.

2.3.3. Results

Internal consistency was found to be high, with a Cronbach's alpha score of .93, and test–retest reliability was shown to be acceptable ($ICC = .72$, CI = .531–.841). Test–retest reliability was also acceptable for both subscales (Acceptance: ICC = .738, CI = .558–.852; Willingness: ICC = .786, CI = .632–.880). BMI was again correlated with FAAQ scores ($r = -.31$, $p < .05$).

Table 2
Questions in Factor 1 and Factor 2.

FAAQ items	FAAQ factors	
	Factor 1: Willingness	Factor 2: Acceptance
1. I continue to eat a healthy diet, even when I have the desire to overeat or make poor eating choices.	.77	.05
2. It's OK to experience cravings and urges to overeat, because I don't have to listen to them.	.79	.00
3. It's necessary for me to control my food urges in order to control my eating.	.59	.25
5. I don't have to overeat, even when I feel like I want to overeat.	.73	.17
8. Despite my cravings for unhealthy foods, I continue to eat healthily.	.74	.13
10. Even if I have the desire to eat something unhealthy, I can still eat healthily.	.82	.13
4. I need to concentrate on getting rid of my urges to eat unhealthily.	−.03	.79
6. Controlling my urges to eat unhealthily is just as important as controlling my eating.	.34	.74
7. My thoughts and feelings about food must change before I can make changes in my eating.	.03	.85
9. Before I can make any important dietary changes, I have to get some control over my food urges.	−.04	.87

2.4. Study 3

Study 3 was designed to assess how responses on the FAAQ might change during a 12 week weight loss treatment and whether the FAAQ could prospectively predict weight loss. The FAAQ was given at pre- and post-treatment, and its relation to weight loss was examined.

2.4.1. Participants

The final study used a sample of 29 overweight women who participated in an acceptance-based behavioral weight loss program. The age of the participants ranged from 23 to 58 ($M = 43.66$, $SD = 9.79$), and 51.70% were Caucasian (48.30% African American). BMI ranged from 25.61 to 48.69, with a mean of 35.77 ($SD = 5.44$). Among treatment completers ($n = 19$; 34% attrition), weight loss averaged 6.6% of body weight at post-treatment See Forman et al. (2009) for more information on the participants in this study.

2.4.2. Procedures

The FAAQ was administered at both the pre- and post-treatment assessments along with several other questionnaires. BMI was also assessed at both assessment points.

2.4.3. Results

Cronbach's alpha for the total FAAQ scale at pre-treatment was .66 (Acceptance = .60, Willingness = .82). As reported in Forman et al. (2009), the mean FAAQ score at baseline was 28.13 ($SD = 8.00$). By the end of treatment, the mean FAAQ score had increased to 34.47 ($SD = 7.71$). This represented a significant increase in psychological flexibility ($t(17) = -4.05$, $p = .02$). A residualized change score was calculated by regressing the baseline score on the post-intervention score. A regression analysis was then used to assess the relationship between change in FAAQ total scores and weight loss at post-treatment. Weight at pre-treatment was controlled for in the equation. The residualized change scores on the FAAQ was found to be predictive of weight loss ($\beta = 1.05$, $t(17) = -4.19$, $p = .04$), with those who showed greater increases in FAAQ scores experiencing the most weight loss. We performed the same regression analyses with the two subscales of the FAAQ. The acceptance subscale was not significantly related to weight loss ($\beta = .06$, $t(17) = 0.73$, $p = .48$). The willingness scale was significantly related to weight loss ($\beta = -6.06$, $t(17) = -3.25$, $p < .01$), suggesting that willingness to regulate eating despite distressing cravings or emotions is more predictive of weight loss than acceptance per se.

3. Discussion

Previous research has indicated that although acceptance and willingness may be important factors in eating behavior, there is currently no well-validated measure of this construct in the context of responses to food. The current studies sought to investigate the reliability and validity of the Food Craving Acceptance and Action Questionnaire, which was designed to measure psychological flexibility in a food rich environment, by assessing acceptance of distressing food related thoughts or cravings and willingness to engage in healthy eating despite these experiences.

Preliminary analyses suggest that the FAAQ measure has acceptable reliability and validity. Amongst a sample of 955 undergraduates and community members, the measure had satisfactory internal consistency, but amongst a separate sample of 40 undergraduates the measure had excellent internal consistency, possibly due to the more homogenous nature of the second sample, which consisted entirely of undergraduate women. The measure also showed adequate test–retest

reliability amongst the smaller sample of undergraduates. The construct validity of the measure was supported by its moderately strong association with several theoretically similar measures and its significantly weaker associations with theoretically dissimilar measures. The relatively strong correlation with the PFS supports the specificity of the FAAQ, as the PFS is designed to measure the extent to which individuals are strongly affected by the food environment and whether they are able to resists urges to consume highly palatable foods.

Amongst the larger sample of undergraduates, a Factor Analysis supported a 2-factor structure, with Factor 1 measuring willingness and Factor 2 measuring acceptance. Both Factors has acceptable internal consistency, which was typically higher than the internal consistency for the total scale. This might suggest that the scale measures two distinct constructs, and that the use of the subscales, rather than the total scale may provide more information. Factor 1 can be conceptualized as measuring the extent to which one is able to choose value or goal-consistent behaviors for weight management and healthy eating even when they provoke distressing thoughts and feelings such as cravings, feelings of hunger, etc. Factor 2 appears to measure the degree to which an individual is open to experiencing cravings, emotions and physiological experiences associated with food and eating without attempting to control, alter, suppress or avoid the experiences. Although both subscales appear to assess distinct constructs, it seems like the Willingness subscale is more related to theoretically similar constructs, and therefore might have better construct validity. The Willingness subscale was also more predictive of weight loss, suggesting that this scale might be driving most of the total scales predictive power. However, the two subscales together appear to assess psychological flexibility, that is, the extent to which an individual chooses behavioral options that are consistent with their values of healthy eating and weight control, even if they are experiencing distressing thoughts, hunger, or cravings. Future research is needed to validate these subscales and to replicate findings of convergent and divergent validity with broader measures of eating behavior and other non-eating related variables. Additionally, future research is needed to demonstrate whether these sub-factors can be used independently, and how they individually predict eating behavior.

Given that the measure had acceptable reliability and validity in a non-clinical population, it was important to test this measure amongst a sample where acceptance of and willingness to experience food-related thoughts and feelings might be especially important. Therefore, the predictive validity of the FAAQ was assessed by administering the measure to a sample of overweight women in an open trial of acceptance-based behavioral treatment for weight loss. As expected, psychological flexibility did increase substantially over the course of the intervention, and this increase was predictive of weight loss. These findings further support how important the constructs of psychological flexibility, acceptance, and willingness are in determining eating behavior and therefore supports the measurement of these constructs in weight loss trials.

Overall, the current studies indicate that the FAAQ is a valid and reliable measure. However, there are several limitations to the current studies and further investigation is needed before this measure can be confidently used to assess the constructs of acceptance and willingness. For instance, although undergraduate, community, and clinical samples were utilized, only the undergraduate/community sample was large enough to investigate reliability and validity. Future work must test the FAAQ in other populations, especially in overweight or obese samples. In addition, further tests of reliability and validity would be beneficial to ensure that the psychometric properties of this measure are well established and the current findings are replicable.

Taken together, previous work and current findings suggest that the creation of the FAAQ is an important step in better understanding how acceptance of distressing thoughts and feelings regarding food can contribute to eating behaviors and weight. Prior research has begun to investigate how psychological flexibility in general can contribute to weight and eating behavior, but a specialized measure such as the FAAQ may provide a greater understanding of the relationship between acceptance of distressing food cravings and food consumption. This measure could be utilized to predict whether certain individuals will be able to lose or maintain a healthy weight, and can be used to track changes in acceptance of food related thoughts and cravings during weight loss trials. Future research with this measure may provide a greater understanding of problematic eating and mechanisms of action for effective treatments of obesity.

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Contributors

Evan Forman, Meghan Butryn, and C. Alix Timko designed the study and wrote the protocol. Christina Goodwin conducted literature searches and provided summaries of previous research studies. Adrienne Juarascio conducted the statistical analysis and wrote the first draft of the manuscript and all authors contributed to and have approved the final manuscript.

Conflict of interest

All authors declare that they have no conflicts of interest.

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