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Food Thought Suppression Inventory: Test–retest reliability and relationship to weight loss treatment outcomes

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Abstract

This study examined the test–retest reliability of the Food Thought Suppression Inventory (FTSI) and its relationship with weight loss during weight loss treatment. Participants were 89 adults with and without binge eating disorder (BED) recruited through primary care for weight loss treatment who completed the FTSI twice prior to starting treatment. Intra-class correlations for the FTSI ranged from .74–.93. Participants with BED scored significantly higher on the FTSI than those without BED at baseline only. Percent weight loss from baseline to mid-treatment was significantly negatively correlated with the FTSI at baseline and at post-treatment. Participants reaching 5% loss of original body weight by post-treatment had significantly lower FTSI scores at post assessment when compared to those who did not reach this weight loss goal. While baseline binge-eating episodes were significantly positively correlated with baseline FTSI scores, change in binge-eating episodes during treatment were not significantly related to FTSI scores. The FTSI showed satisfactory one week test–retest reliability. Higher levels of food thought suppression may impair individuals' ability to lose weight while receiving weight loss treatment.

Keywords

Binge eating disorder; Food thought suppression; Obesity; Treatment; Weight; Eating

1. Introduction

Thought suppression, or purposely attempting to avoid certain thoughts, typically has been measured with The White Bear Suppression Inventory (WBSI). This self-report measure assesses thought suppression *in general* (e.g., “I have thoughts that I try to avoid”) and corresponds well with experimental assessments of general suppression (Muris, Merckelbach, & Horselenberg, 1996; Wegner & Zanakos, 1994). Researchers recently started examining the relationship between thought suppression and eating and weight (e.g., Hooper, Sandoz, Ashton, Clarke, & McHugh, 2012). The literature, however, was limited to

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the WBSI (e.g., Soetens, Braet, Dejonckheere, & Roets, 2006). To address this limitation, researchers created the Food Thought Suppression Inventory (e.g., “I have thoughts about food that I try to avoid;” Barnes & Tantleff-Dunn, 2010b). The FTSI includes a single, reliable, and valid factor of food thought suppression and was validated within community samples of women (Barnes, Fisak, & Tantleff-Dunn, 2010), men (Barnes & White, 2010), and women with obesity and binge eating disorder (BED; Barnes, Sawaoka, White, Masheb, & Grilo, 2013b). Women tend to score higher on food thought suppression than men, as do individuals with obesity and BED compared to individuals with obesity only (Barnes, Masheb, & Grilo, 2011).

The FTSI was moderately related to the WBSI and more strongly associated with important eating-related constructs than the WBSI (e.g. Barnes & White, 2010; Barnes et al., 2010), suggesting that food thought suppression is distinct from, albeit related to, general thought suppression. The FTSI was related to increased eating disorder psychopathology (Barnes, Masheb, White, & Grilo, 2013a; Barnes et al., 2011), weight cycling (Barnes & Tantleff-Dunn, 2010a), food cravings (Van Gucht, Soetens, Raes, & Griffith, 2014) and binge-eating episodes (Barnes & Tantleff-Dunn, 2010b; Barnes et al., 2010, 2011), and higher body mass indices (Barnes & Tantleff-Dunn, 2010b; Barnes et al., 2010; Rodríguez-Martín, Gil-Pérez, & Pérez-Morales, 2015).

While the emerging literature suggests that the FTSI is valid and related to important eating- and weight-related outcomes, there are limitations, including no examination of the FTSI test–retest reliability and investigation of cross-sectional data only. Thus, the current study examined the one-week test–retest reliability of the FTSI and the relationship between the FTSI and weight loss treatment outcomes. It was hypothesized that the FTSI would demonstrate satisfactory test–retest reliability and that the measure would be related to weight loss and binge-eating episodes.

2. Materials and methods

2.1. Participants

Participants were 89 consecutively evaluated patients (age = 18) with overweight or obesity (body mass index (BMI) ≥ 25) who participated in a treatment trial for obesity (Barnes, White, Martino, & Grilo, 2014). Participants were recruited through referrals from primary care physicians and flyers placed in waiting/patient rooms for a treatment study for weight loss being performed in primary care in an urban setting. Notable exclusion criteria included BMI ≥ 55, over 65 years of age, select severe psychiatric problems (e.g., schizophrenia, bipolar disorder), pregnancy/breastfeeding, severe medical problems (e.g., cardiac disease), and uncontrolled liver disease, hypertension, thyroid disease, or diabetes.

Overall, participants had a mean age of 47.9 years ($SD = 10.5$, range 22–65), a mean BMI of 35.3 kg/m² ($SD = 7.0$), 76.4% ($n = 68$) were female, and 25.8% ($n = 23$) met *Diagnostic and Statistical Manual for Mental Disorders-5th edition (DSM-5)* BED criteria. The sample was relatively diverse, with 65.2% of participants identifying as White, not Hispanic ($n = 58$), 4.5% as White, Hispanic ($n = 4$), 20.2% as African American ($n = 18$), 5.6% as More Than One Race, not Hispanic ($n = 5$), and 4.5% as More Than One Race, Hispanic ($n = 4$).

2.2. Procedures

The study had full IRB review and approval and all participants provided written informed consent. Participants completed the FTSI twice prior to starting treatment (approximately one week between administrations), at the post treatment assessment, and at the 3-month follow-up assessment. The other self-report measures were completed at similar time points with the exception of the one week test–retest. Participants were screened by master or doctoral level psychology clinicians trained in eating and weight disorders. BED diagnosis was based on the Structured Clinical Interview for DSM-IV Axis I Disorders edited for *DSM-5* criteria (First, Gibbon, Gibbon, & Williams, 1996). Participants were randomly assigned to one of three conditions and randomization was stratified by the presence or absence of *DSM-5* BED diagnosis. These treatment conditions included Motivational Interviewing and Internet Condition, Nutrition Psychoeducation and Internet Condition, or Usual Care (See Barnes et al., 2014). Height was measured at baseline-only using a wall measure, weight was measured using a large capacity digital scale.

2.3. Measures

The *Eating Disorder Examination* (EDE; Fairburn, Wilson, & Schleimer, 1993) is a semi-structured investigator-based interview for assessing eating disorders. The EDE assesses the frequency of *objective binge episodes* (OBEs, defined as unusually large quantities of food with a sense of loss of control).

Food Thought Suppression Inventory (FTSI) is a self-report measure (Barnes et al., 2010). Previous factor analyses on nonclinical samples suggested a 15- and 14-item questionnaire, regardless of BMI, for community women and men, respectively (Barnes & White, 2010; Barnes et al., 2010). One factor analysis suggested an 11-item questionnaire for a small sample of women with obesity and BED (Barnes et al., 2013b). As this sample includes individuals with and without BED, the 15- and 11-item measures were used for the test–retest analyses. Scores can range from 15 to 75 (15-item) or 11–55 (11-item), with higher scores reflecting higher levels of food thought suppression.

3. Results

3.1. Test re-test reliability

Table 1 shows means and standard deviations for the 1 week test re-test reliability for the 11- and 15-item versions of the FTSI overall and specifically by BED status. Intra-class correlations were strong, ranging from .74–.93, despite overall scores being significantly different in some cases. Since the majority of patients did not have binge eating disorder (NBO), the following analyses utilized the 15-item FTSI.

3.2. Sex and binge eating status

The 2 (BED or NBO) $\times$ 2 (men or women) ANOVA for baseline FTSI scores interaction was not significant, $p = .830$. The main effect for sex was not significant, $p = .249$, but the main effect for binge eating status was significant, $F(1,85) = 5.33$, $p = .023$, partial $\eta^2 = .059$. BED patients ($M = 33.57$, $SD = 18.72$) scored significantly higher on the FTSI at baseline

than NBO patients ($M = 25.62$, $SD = 10.75$). The 2×2 ANOVAs were not significant for post or 3-month follow-up assessment FTSI scores.

3.3. Food thought suppression and weight/binge eating outcomes

Percent weight loss from baseline to mid-treatment (6 weeks) was significantly correlated with the FTSI at baseline, $r(89) = -.218$, $p = .040$, and at post-treatment, $r(84) = -.245$, $p = .025$, but not at 3-month follow-up. Percent weight loss from baseline to post was not significantly correlated with the FTSI as baseline, post-treatment, or at the 3-month follow-up assessment. Percent weight loss from baseline to 3-month follow-up assessment was significantly correlated with FTSI scores at post, $r(84) = -.271$, $p = .013$, but not at baseline or 3-month follow-up.

Participants reaching 5% loss of original body weight by post-treatment ($n = 11$, $M = 18.45$, $SD = 5.00$), had significantly lower FTSI scores at post assessment when compared to those who did not reach this goal ($n = 73$, $M = 25.77$, $SD = 13.30$), $t(36.8) = 3.37$, $p = .002$. There were no significant FTSI differences at baseline or 3-month follow-up assessment.

Participants achieving 5% loss of original body weight by 3-month follow-up assessment ($n = 17$, post assessment: $M = 18.41$, $SD = 4.43$), had significantly lower FTSI scores at post-treatment, $t(77.3) = 4.04$, $p < .0005$, and 3-month follow-up assessment, $t(42.1) = 2.25$, $p = .030$, when compared to those who did not reach this goal ($n = 67$, post assessment: $M = 26.43$, $SD = 13.66$). There were no significant FTSI differences at baseline assessment.

While baseline binge-eating episodes in the 28 days prior to intake were significantly correlated with baseline FTSI scores, $r(89) = .226$, $p = .034$, change in binge-eating episodes from baseline to post and baseline to 3-month follow-up assessments was not significantly related to FTSI scores.

4. Conclusions

This study examined the test–retest reliability and predictive validity of the Food Thought Suppression Inventory (FTSI). The FTSI had satisfactory test–retest reliability in treatment-seeking participants who were overweight or obese, both with and without BED. At baseline, there were no sex differences in FTSI scores and participants with BED scored significantly higher on food thought suppression than participants without BED. Binge-eating frequency was associated positively with baseline food thought suppression, however, change in binge-eating frequency during treatment was unrelated to food thought suppression. Weight loss was associated with less reported food thought suppression.

The FTSI test–retest reliability findings indicated participants responded consistently when completing the measure one week between administrations (prior to initiating treatment). Thus, food thought suppression may be a relatively consistent coping trait analogous to thought suppression, more broadly (Höping & de Jong-Meyer, 2003; Muris et al., 1996). Similar FTSI scores between the sexes replicated a comparison of treatment-seeking individuals with obesity and BED (Barnes et al., 2013a) but this difference is not documented in studies of community participants (Barnes & Tantleff-Dunn, 2010b; Barnes et al., 2011), perhaps reflecting ceiling effects in treatment-seeking samples.

Like previous studies, we found that food thought suppression correlated positively with binge-eating frequency (Barnes & Tantleff-Dunn, 2010b; Barnes & White, 2010) and participants diagnosed with BED reported higher levels of food thought suppression compared to participants without BED (Barnes et al., 2011). Changes in binge-eating frequency over treatment, however, were unrelated to the FTSL. It is important to note, that patients received primarily low-intensity behaviorally-focused weight loss treatments, without any specific focus on binge eating (Barnes et al., 2014).

Weight loss was inversely related to food thought suppression, despite not providing participants with alternative coping methods for unwanted food-related thoughts (e.g., mindfulness). Less pretreatment food thought suppression was related to more weight loss by both the midpoint and end of treatment. Less reliance on food thought suppression at post treatment was related to more weight loss by the 3-month follow-up assessment. Similarly, participants who lost 5% or more of their body weight by post or 3-month follow-up assessment reported significantly lower levels of food thought suppression compared to those who did not meet this weight loss goal. Such findings suggest that food thought suppression may be an important yet overlooked variable in weight loss trials.

Limitations should be considered when interpreting our findings. We investigated a primarily female, treatment-seeking sample, limiting generalizations to men and other non-treatment-seeking populations. The sample size was relatively small and the weight loss intervention brief, limiting the conclusions that can be drawn from the current results.

In summary, the Food Thought Suppression Inventory showed satisfactory one-week test-retest reliability in individuals, with and without BED, seeking weight loss treatment. The results also provide preliminary evidence that higher levels of food thought suppression may impair individuals' ability to lose weight both during and after weight loss treatment. It will be important for future research to utilize the Food Thought Suppression Inventory within weight loss interventions to increase our understanding of the mechanisms related to weight change or binge eating.

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Table 1

One week test re-test reliability of the 11- and 15-item Food Thought Suppression Inventory by binge eating status.

	BED	NBO	Overall
15-item FTSI (ICC)	.92	.74	.84
Baseline (<i>M</i> / <i>SD</i>)	33.57 (18.72)	25.27 (10.71)	27.46 (13.69)
1-week (<i>M</i> / <i>SD</i>)	35.17 (17.25)	27.88 (13.18)	29.80 (14.62) *
11-item FTSI (ICC)	.93	.74	.85
Baseline (<i>M</i> / <i>SD</i>)	24.30 (14.97)	17.48 (7.97)	19.29 (10.63)
1-week (<i>M</i> / <i>SD</i>)	24.83 (12.53)	19.82 (9.82) *	21.15 (10.75) *

BED = Patients with binge eating disorder. NBO = Patients without binge eating disorder. FTSI = Food Thought Suppression Inventory. ICC = Intra-class correlations. *M* = Mean. *SD* = Standard deviation.

* Baseline significantly different than 1-week, $p < .05$.