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# Secondary psychological outcomes in a controlled trial of Emotional Freedom Techniques and cognitive behaviour therapy in the treatment of food cravings

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Secondary Psychological Outcomes in a Controlled Trial of Emotional Freedom Techniques  
and Cognitive Behaviour Therapy in the Treatment of Food Cravings

Abstract

**Objective:** Examining the effectiveness of psychological interventions in treating secondary psychological outcomes of obesity has become prioritized in recent times. The objective of the present study was to compare an eight-week Cognitive-Behavioural Therapy (CBT) and Emotional Freedom Techniques (EFT) intervention program, in the treatment of food cravings and secondary psychological outcomes among overweight or obese adults ( $N = 83$ ).

**Method:** A controlled non-inferiority trial was performed comparing group-delivered CBT to group-delivered EFT. Participants completed the Patient Health Questionnaire at pre- and post-intervention, and at six and 12-months follow-up. **Results:** The CBT group did not report any significant changes in anxiety scores over time, but the decrease in depression symptoms pre-to post-intervention was significant and this was maintained at 6- and 12-months. Anxiety and depression scores significantly decreased from pre- to post-intervention for the EFT group, and was maintained at 6- and 12-month follow-up. Somatoform scores significantly decreased from pre-intervention to all follow-up points for the CBT group, while the EFT group did not report any significant changes in somatoform symptoms. Results also revealed that EFT is capable of producing reductions in anxiety and depression symptoms, and may be comparable to gold standard approaches such as CBT. **Conclusion:** The current study supports the hypothesis that psychological intervention is beneficial for treating psychological comorbidities of obesity and points to the role mental health issues may play in this area.

*Keywords: EFT, CBT, obesity, depression, anxiety, somatic*

## Secondary Psychological Outcomes in a Controlled Trial of Emotional Freedom Techniques and Cognitive Behaviour Therapy in the Treatment of Food Cravings

The World Health Organisation reports that, as at 2014, approximately 13 percent of adults (i.e., aged 18 and over) around the world were clinically obese. The global burden of obesity is projected to reach approximately 573 million people worldwide (i.e., 57.8 percent) by the year 2030 (Kelly, Yang, Chen, Reynolds, & He, 2008). Given that obesity is associated with such significant health and wellbeing outcomes (e.g., coronary heart disease, ischemic stroke, and type 2 diabetes mellitus; Dixon, 2010), the aforementioned projection is particularly alarming. Additionally, the ever-increasing healthcare costs of obesity (Li et al., 2015) imply it is important that national programs for the prevention and treatment of overweight and obesity are prioritised and well developed, with due consideration given to both physiological and psychological factors.

### **Psychological Factors Implicated in Obesity**

Psychological difficulties are very common among overweight and obese populations, and are likely to influence weight loss and general health outcomes (Tsushima, Bridenstine, & Balfour, 2004). One such psychological difficulty that serves as an important variable in enhancing appetite control is food cravings, in that food cravings are associated with excess energy intake, weight gain, and overall lack of weight loss success (Steel, Kemps, & Tiggemann, 2006; Jakubowicz, Froy, Wainstein, & Boaz, 2011).

Meta-analytic studies have found that rates of depression and anxiety are three to four times higher among obese individuals compared to their leaner peers (e.g., Greenberg et al., 2005). The relationship between obesity and major depressive disorder (MDD), in particular, is typically viewed as bidirectional, with each condition increasing the risk of development of the other condition (Toups et al., 2013). Some studies indicate a direct, positive linear relationship between BMI and depression prevalence rates (Onyike, Crum, Lee, Lyketsos, &

Eaton, 2003), while other studies have shown increased rates of depression in those who are underweight or obese (Carpenter, Hasin, Allison, & Faith, 2000). Since mood disorders are associated with poor treatment outcomes and diminished compliance for other health-related conditions (Carpenter et al., 2000), it is important to consider the prevalence of MDD among obese and overweight populations in designing weight loss programs.

Research in the area of psychological factors involved in obesity has also revealed the reciprocal relationship between BMI and anxiety, whereby both obesity and anxiety states are associated with elevated cardiovascular disease (CVD) risk and pro-inflammatory phenotypes (Holwerda et al., 2016). Researchers have proposed a number of potential pathways through which obesity leads to anxiety disorders, including the weight-related discrimination and stigma that may cause distress, and the negative effect of obesity on general health and quality of life (Cairney, Corna, Veldhuizen, Kurdyak, & Streiner, 2008). Considering the chronicity of anxiety, and the reported feedback loop of obesity and anxiety (Garipey, Nitka, & Schmitz, 2010), it is crucial that studies consider the role of anxiety as a secondary psychological outcome of obesity in targeting weight loss programs.

### **Psychological Interventions**

Weight loss programs targeting overweight and obese populations have historically been based on a behavioural framework, including strategies related to dietary restraint and physical exercise. However, follow-up studies have indicated that behavioural weight loss programs have poor long-term maintenance and sustainability (e.g., Turk et al., 2009), which is purportedly due to the lack of weighting given to psychological factors that may serve as barriers to behaviour change in weight loss.

Meta-analytic studies have shown that overweight and obese individuals benefit significantly from psychological intervention, specifically cognitive-behavioural therapy (CBT) strategies, focused on reducing food cravings and other psychological factors

implicated in weight loss (e.g., Shaw, O'Rourke, Del Mar, & Kenardy, 2005). Researchers in the field have attributed this effect to the inclusion of cognitive and affective components of weight gain and poor weight loss maintenance, which may usually serve as barriers to behaviour change in traditional weight loss programs (Cooper & Fairburn, 2001). However, other studies have revealed the ineffectiveness of these strategies (i.e., thought suppression or response prevention) for reducing food cravings in clinical samples (Kemps & Tiggemann, 2010), which has led to the consideration of other, more novel treatment approaches.

### **Emotional Freedom Techniques**

In recent times, a novel approach that has demonstrated effectiveness in treating various psychological difficulties is Emotional Freedom Techniques (EFT). EFT involves a combination of psychological techniques (e.g., cognitive and exposure strategies), with stimulation of acupuncture points. Rather than using acupuncture needles, EFT encompasses clients tapping these acupoints, usually with two fingers, on the face and upper body (as per Craig, 2010). This tapping is executed whilst the individual vocalises aspects of the target problem (e.g., craving or feared situation). The somatic element of EFT (tapping on pressure points) has been investigated in dismantling studies and a treatment effect beyond that which can be explained by EFT's cognitive and exposure elements is proposed (Church & Nelms, 2016; Reynolds, 2015; Rogers & Sears, 2015).

Trials have consistently shown that EFT is effective in treating a myriad of psychological conditions, including generalised and specific anxiety, phobias, depression, post-traumatic stress disorder (PTSD), chronic pain, and addiction (Church, 2013; Feinstein, 2012), with treatment gains maintained long-term (Church, 2011; Rowe, 2005; Wells et al., 2003). Meta analyses suggest EFT to be an empirically validated therapy for depression (large effect  $d = 1.31$ ), anxiety (large treatment effect  $d = 1.21$ ), and PTSD (very large treatment effect size  $d = 2.96$ ; Feinstein, 2012; Church, Feinstein, Palmer-Hoffman, Stein, &

Tranguch, 2014; Church, 2013; Clond, 2016; Nelms & Castel, 2016; Sebastian & Nelms, 2016).

The physiological mechanisms of action of EFT has been investigated and studies indicate it reduces levels of cortisol (stress hormone; Church, Yount & Brooks, 2012); regulates inflammation and immunity genes (Church, Yount, Rachlin, Fox and Nelms, 2016); alters the expression of a variety of genes involved in cell repair, the immune response, tumor suppression, neural plasticity, and neurological signaling (Maharaj, 2016), and regulates the autonomic nervous system as measured by EEG (Swingle, Pulos & Swingle, 2004; Lambrou, Pratt, & Chevalier, 2003).

### **Comparison of Treatment Approaches**

In recent times, researchers have sought to compare “gold standard” psychological interventions such as CBT with these more novel approaches. Benor and colleagues (2009) found that CBT and EFT interventions achieved similar reductions in test anxiety among university students, whereby EFT produced effects in only two sessions, as compared with five sessions for participants in the CBT program. Stapleton and colleagues’ (2016) study indicated EFT and CBT demonstrated comparable efficacy in reducing food cravings, one’s responsiveness to food in the environment (power of food), and dietary restraint, with Cohen’s effect size values suggesting moderate to high practical significance for both interventions. Finally, Andrade and Feinstein (2004) conducted a large-scale study comparing the efficacy of various psychological interventions in treating several psychological conditions. Results of this review indicated that patients treated with energy psychology treatments such as EFT surpassed the CBT/medication protocols in terms of participants demonstrating clinical improvements and remission of symptoms.

### **EFT, Food Cravings and Psychological Impacts**

The parent study of the current study (Stapleton et al., 2016) compared the efficacy of

CBT and EFT in the treatment of food cravings among 83 overweight and obese adults in an 8-week (16-hour) intervention. Overall, results demonstrated that EFT and CBT had comparable efficacy in reducing food cravings, the responsiveness of participants to food in the environment (power of food; POF), and dietary restraint. Results also revealed that both EFT and CBT were capable of producing treatment effects that are clinically meaningful, with reductions in food cravings, the power of food, and dietary restraint normalizing to the scores of a non-clinical community sample (Stapleton, Bannatyne, Porter, Urzi, & Sheldon, 2016). The present study sought to extend upon this by reporting the non-inferiority of treatment approaches in treating comorbid difficulties with depression, anxiety, and somatic symptoms. In recent years, there has been growing evidence for the non-inferiority of various intervention approaches in treating more common psychological conditions. Non-inferiority methods differ from traditional null hypothesis testing by assuming that “not statistically significantly different” is in fact not synonymous with conclusions of “equivalence or non-inferiority”.

The aim of the present study was to extend upon Stapleton et al. (2016) by exploring the extent to which CBT- and EFT-based intervention were effective in treating secondary psychological outcomes (i.e., depressive, anxiety, and somatic symptoms) of a treatment primarily targeting food cravings. To the author’s knowledge, the current study represents the first research of EFT to examine these outcomes in a non-inferiority and clinical analysis, using the Patient Health Questionnaire.

### **Method**

Prior to the commencement of the study, appropriate ethical approval was granted, and the study was registered under the Australia New Zealand Clinical Trials Registry. This methodology was identical to the Stapleton et al. (2016) paper which reports the food craving outcomes, but is reported here in depth.



## Recruitment

A purposive sample was recruited via community announcements in print advertisement, radio, and television. To be eligible for the current study, participants were required to be over 18 years of age (for consent issues); not suffering from any severe psychological issues as indicated via administration of the Symptom Assessment-45 (SA-45; Strategic Advantages, 2000); have a BMI greater than 25; experiencing food cravings of a certain severity (described below); not receiving current treatment (psychological or medical) for food cravings or weight loss; and were willing to participate in follow-up measurements. Both males and females were eligible for the intervention. Current and immediate past sufferers of bulimia nervosa and anorexia nervosa (whether clinically diagnosed or not) were excluded based on active diagnoses revealed via administration of the SA-45. Women who were pregnant and known sufferers of diabetes (Type I and II) and hypoglycemia were also excluded due to any physiological effects that may have suppressed feelings, cravings, and sensitivity. A list of suitable practitioners within the community was provided to enable ineligible participants to seek further treatment for their food cravings should they desire (e.g. if they were not overweight).

A total of 207 potential participants responded to the initial community announcements, with 177 screened via a telephone interview for eligibility. Applicants were screened on a first come, first served basis, with the location of treatment and funding limitations restricting the number of trial positions. Of the 177 screened, 94 were excluded for not meeting specified eligibility criteria ( $n = 57$ ) and 37 declined to participate. The remaining were offered a place in the trial 83 were randomised via a computerized random-number generator system, to an eight-week EFT intervention ( $n = 51$ ) or eight-week CBT treatment ( $n = 34$ ). A statistician unconnected to the study and blind to its aims completed the computer randomisation (See Figure 1 for consort diagram). A community sample of 92

individuals was also recruited to serve as a normal weight non-clinical comparison to determine whether any treatment gains were clinically meaningful (defined as a noticeable, appreciable difference that is of value to the patient and not due to chance). The community sample did not receive an active intervention and was recruited through advertisements on social media webpages of local community groups.

INSERT FIGURE 1 HERE

### **Participants**

A power analysis using G\*Power (Faul et al., 2007) indicated a minimum of 34 participants per intervention group to detect medium effect size with 87% power ( $\alpha = .05$ ). The current sample satisfied this for the treatment phase. Demographic information for all groups can be seen in Table 1.

INSERT TABLE 1 HERE

### **Measures**

Although a battery of psychometric instruments was administered which included the Food Craving Inventory (White et al., 2002), Power of Food Scale (Lowe et al., 2009), Revised Restraint Scale (Herman & Polivy, 1980), and the SA-45, the current study focuses solely on the secondary psychological outcomes derived from the SA-45. All participants gave informed consent. Height and weight measurements were obtained to calculate BMI, which was defined as weight in kilograms divided by height in meters squared ( $\text{kg}/\text{m}^2$ ). BMI categories utilised for the present study included: underweight ( $< 18.5$ ), healthy weight (18.5 to 24.9), overweight (25.0 to 29.9), or obese ( $\geq 30.0$ ). Please refer to Stapleton et al. (2016) for the results of the primary outcome measures.

**Patient Health Questionnaire.** The Patient Health Questionnaire (PHQ; Spitzer, Kroenke, & Williams, 1999) includes five modules covering five common types of mental disorders, including depression, anxiety, somatoform, alcohol, and eating modules. It is

important to note that there is a family of PHQ measures based on the original Primary Care Evaluation of Mental Disorders (PRIME-MD) screener, which incorporate various elements of other common measures such as the SADS and GAD-7. In the current study, the PHQ was administered to assess for common comorbidities with obesity, particularly depressive, anxiety, and somatoform symptoms. For the somatoform module, participants were required indicate how bothered they had been by various physiological complaints over the preceding 4-week period, on a 3-point scale ranging from 0 = *Not bothered* to 2 = *Bothered a lot*. Sample items were “Pain in your arms, legs, or joints” and “Constipation, loose bowels, or diarrhea”. Total scores of 5, 10, and 15 represent cut-off points for low, medium, and high somatic symptom severity, respectively.

For the depression module, participants were required to indicate often they had been bothered by various depressive symptoms over the preceding 2-week period, on a 4-point scale ranging from 0 = *Not at all* to 3 = *Nearly every day*. Sample items were “Little interest or pleasure in doing things” and “Trouble concentrating on things, such as reading the newspaper or watching television”. Total scores of 5, 10, 15, and 20 represent cut-off points for mild, moderate, moderately severe, and severe depression, respectively.

For the anxiety module, participants were required to indicate how often they had been bothered by various anxiety symptoms over the preceding 4-week period, on a 3-point scale ranging from 0 = *Not at all* to 2 = *More than half the days*. Sample items were “Feeling restless so that it is hard to sit still” and “Trouble falling asleep or staying asleep”. Total scores of 5, 10, and 15 represent cut-off points for mild, moderate, and severe anxiety, respectively. The internal consistency and construct validity of each subscale of the full PHQ has been determined in previous studies (e.g., Spitzer et al., 2000). Systematic reviews have demonstrated that the full PHQ is highly sensitive to change, in terms of monitoring treatment outcomes (Kroenke, Spitzer, Williams, & Lowe, 2010).

### **Treatment Conditions**

Treatment protocols and fidelity plans for EFT and CBT were formed prior to the trial commencing. The principal investigator briefed practitioners and each practitioner reviewed the relevant treatment protocols. A treatment fidelity plan was formed prior to the study beginning and intervention checklist were used for adherence. Both interventions were offered in groups of 10 to 15 participants between 2011 and 2014, and were facilitated by trained practitioners (two for each group) at a local psychology clinic. The interventions consisted of eight, weekly sessions (two hours duration each), delivered during the hours of 6.00pm to 8.00pm. This was designed to accommodate employment and family commitments characteristic of the age demographic to prevent attrition. A similar session structure was utilised for both interventions, with home activities included in both approaches (See Table 2). Although the weekly session topic for both groups was identical, it is important to note that the two groups differed in the sense that content was presented in relation to the intervention technique. For example, stress-related content presented in Week 5 was addressed by tapping on stress-related cognitions for the EFT group, and by implementing a cognitive restructuring technique for stress-related cognitive distortions for the CBT group.

INSERT TABLE 2 HERE

**Clinical EFT Treatment.** For the EFT group, the practitioners were certified and experienced in EFT. Treatment was based on standardised protocols (See Craig & Fowlie, 1995). Acupressure points on the eyebrow, side of eye, under eye, under nose, chin, collarbone, under arm, and the top of the head were used. Treatment sessions involved direct exposure to craved foods. EFT techniques were utilised by participants focusing on a specific craving and associated emotion, rating the intensity of the craving using subjective units of distress (SUDs), initiating a set-up statement, and then completing the tapping process on the

specific acupoints. The setup phrase focused on the individual's difficulties and was expressed aloud in the group, adding a voiced statement of self-acceptance.

For example, if chocolate craving is experienced, a setup phrase could be "*Even though I'm having a strong craving for chocolate, I deeply and completely accept myself*". This set up phrase is typically stated and repeated three times while tapping the "karate chop" point below the little finger on either hand (Craig, 2010). The tapping sequence is then initiated with cognitive, affective, and sensory information elicited from the individual voiced aloud while each acupoint is tapped approximately seven times each. After each tapping cycle, participants rate their SUDs and the process is repeated until the discomfort score is zero. New setup statements may be performed if pertinent information is elicited in initial rounds of tapping (e.g., "*Even though I feel deprived when I don't have chocolate, I choose to be fit and healthy*"). Full instructions and safeguards are described in Flint, Lammers and Mitnick (2005). Participants were encouraged to self-administer EFT outside of treatment sessions in response to cravings.

**CBT Treatment.** For the CBT group, the practitioners were trained psychologists, and treatment was based on standardised protocols (See Fairburn, Marcus, & Wilson, 1993) and guided by the National Medical Health and Research Council (2013) recent clinical practice guidelines. The CBT intervention aimed to modify eating, thinking, and activity levels by teaching group members cognitive (e.g., restructuring of urge-related thoughts and/or core beliefs) and behavioural strategies (e.g., increasing awareness through food diaries, relaxation skills, distress tolerance, problem solving, and self-esteem exercises). Similar to the EFT intervention, the CBT intervention also involved direct exposure to craved foods to elicit associated emotions and cognitions, in addition to homework tasks (e.g., thought records).

The major difference between the two treatments is the addition of the somatic tapping process in the EFT treatment. EFT's use of acupressure points is the primary distinguishing factor from treatments such as CBT. Pressure on acupoints has been found to be as efficacious as acupuncture (Cherkin et al., 2009).

### **Design and Analysis**

A controlled non-inferiority trial was performed comparing group-delivered CBT to group-delivered EFT. To address the research question, quantitative statistical methods were used. A series of chi-square analyses were performed to determine whether the groups differed based on demographic variables. A mixed (between-within subjects) 2 x 4 multivariate analysis of variance (MANOVA) was conducted to determine whether the two interventions (EFT vs CBT) had an effect on the dependent variables (e.g., anxious, depressive, and somatic symptomatology) combined, over time (pre-intervention vs immediately post-intervention vs 6-month follow-up vs 12 month follow-up). To establish the clinical impact of the treatments, an additional 3 x 4 between-subjects MANOVA was conducted to determine the differences between the two intervention groups and a non-clinical community sample. The main objective of this secondary analysis was to determine whether any reductions in scores over time were comparable to a non-clinical sample. Similar to Stapleton et al. (in press), only participants who completed all measurement time points were included in the final analysis.

### **Results**

The data were analysed using SPSS (Version 23). An alpha level of .05 was utilised to determine the statistical significance of all results. Based on efficacy approaches when analysing clinical trials, an "as treated" approach was taken by incorporating only participants who attended six or more sessions (i.e., at least 80% of the treatment; Armijo-

Olivo, Warren, & Magee, 2015). There was an average attendance rate of 6.54 sessions for the total sample.

### **Sample Characteristics**

In terms of treatment assignment and follow-up, 47 participants completed the EFT intervention, while 34 were completed the CBT intervention. At the 6- and 12-month - follow-up periods, 37 (78%) and 32 (68%) EFT participants completed the follow-up questionnaires, respectively. For CBT, 29 (85%) and 24 (71%) completed the follow-up questionnaires, respectively. As such, the final analysis included 32 EFT participants and 24 CBT participants.

Results of chi-square analyses revealed no significant differences between groups in relation to gender  $\chi^2(1) = .24, p = .622$ ; relationship status  $\chi^2(5) = 6.37, p = .272$ ; age  $\chi^2(8) = 6.80, p = .250$ ; education level  $\chi^2(6) = 14.13, p = .118$ ; income  $\chi^2(10) = 7.81, p = .648$ ; or craving type  $\chi^2(4) = 3.56, p = .468$ . As can be seen in Table 3, at pre-intervention both intervention groups had mean BMI scores in the “obese” range. Moreover, participants in the EFT group had mean anxiety and depression scores in the mild range, and mean somatic scores in the low range, at pre-intervention. However, participants in the CBT group had mean anxiety scores in the normal range, and mean depression and somatic scores in the moderate ranges, at pre-intervention. At 12-month follow-up, both intervention groups had mean anxiety scores in the normal range, depression scores in the mild range, and somatic scores in the low range.

INSERT TABLE 3 HERE

### **Non-Inferiority Analyses: CBT vs EFT**

With the use of Wilk’s criterion, a significant multivariate main effect was found for Group  $F(3, 52) = 3.57, p = .020$ , partial  $\eta^2 = .17$ , and Time  $F(9, 46) = 4.78, p < .001$ , partial  $\eta^2 = .48$ . A significant interaction between Time and Group was also revealed  $F(9, 46) =$

2.73,  $p = .012$ , partial  $\eta^2 = .35$ , therefore further analyses focused primarily on interaction effects. Where Mauchly's Test of Sphericity had been violated (i.e., somatic symptomatology scores), Huynh Feldt was utilised at the univariate level.

**Anxious symptomatology.** Univariate analyses revealed a significant interaction effect on anxiety symptom scores  $F(3, 162) = 2.98$ ,  $p = .003$ , partial  $\eta^2 = .05$ . Simple effects analyses for Group revealed there were no significant differences between groups at pre-intervention ( $p = .218$ ). At post-intervention the CBT group had significantly lower anxiety symptom scores ( $p = .001$ ); however, by the 6-month follow-up, no significant differences in anxiety symptom scores were observed between groups ( $p = .410$ ), with this maintained at the 12-month follow-up ( $p = .760$ ).

Simple effects analyses for Time revealed significant differences in anxiety symptom scores across time were elicited for the EFT group  $F(2.36, 73.25) = 9.50$ ,  $p < .001$ ,  $\eta^2 = .24$ . Pairwise comparisons with Sidak adjustment revealed anxious symptomatology did not decrease significantly from pre-intervention to post-intervention for EFT participants ( $p = .135$ ); however, there was a significant reduction from pre-intervention to the 6- and 12-month follow-up ( $p = .020$  and  $p = .002$ , respectively). Notably, there was a significant decrease in anxious symptomatology from post-intervention to the 6- and 12-month follow-up ( $p = .001$  and  $p < .001$ , respectively); however, no additional decrease was observed between the 6- and 12-month follow-ups ( $p = .409$ ). For the CBT group, no significant changes in anxious symptomatology were observed over time  $F(3, 69) = 1.17$ ,  $p = .326$ ,  $\eta^2 = .05$ .

**Depressive symptomatology.** Univariate analyses revealed a significant interaction effect on depressive symptomatology  $F(3, 162) = 3.87$ ,  $p = .010$ , partial  $\eta^2 = .07$ . Simple effects analyses for Group revealed the CBT group had significantly higher depressive symptom scores than the EFT group at pre-intervention ( $p = .012$ ). However, there were no



significant differences between the EFT and CBT groups at post-intervention ( $p = .097$ ), or at the 6- and 12-month follow-ups ( $p = .423$  and  $p = .633$ , respectively).

Simple effects analyses for Time revealed significant differences in depressive symptomatology for the EFT group over time  $F(3, 93) = 3.19, p = .027, \eta^2 = .09$ . Pairwise comparisons with Sidak adjustment revealed depressive symptomatology in the EFT group decreased significantly from pre-intervention to post-intervention ( $p = .017$ ), with this reduction maintained at the 6- and 12-month follow-ups ( $p = .016$ , and  $p = .116$ , respectively). For the CBT group, significant differences in depressive symptomatology were also seen  $F(3, 69) = 17.43, p < .001, \eta^2 = .43$ . Pairwise comparisons with Sidak adjustment revealed depressive symptomatology in the CBT group also decreased significantly from pre- to post-intervention ( $p = .001$ ), with this reduction maintained at the 6- and 12-month follow-ups ( $p < .001$  and  $p < .001$ , respectively). No additional decreases in depressive symptomatology were observed between post-intervention and the 6-month follow-up ( $p = .246$ ), or between the 6- and 12-month follow-ups ( $p = .124$ ).

**Somatic symptomatology.** Univariate analyses revealed a significant interaction effect on somatic symptomatology  $F(2.73, 147.18) = 3.46, p = .022$ , partial  $\eta^2 = .06$ . Simple effects analyses for Group revealed the CBT group had significantly higher somatic symptomatology scores than the EFT group at pre-intervention ( $p = .001$ ). However, there were no significant differences in somatic symptoms between the EFT and CBT groups at post-intervention ( $p = .182$ ), or at the 6- and 12-month follow-ups ( $p = .908$  and  $p = .997$ , respectively).

Simple effects analyses for Time revealed no significant differences in somatic symptomatology for the EFT group over time  $F(2.45, 75.91) = 1.62, p = .198, \eta^2 = .05$ . For the CBT group, significant changes in somatic symptomatology were observed  $F(3, 69) = 5.15, p = .003, \eta^2 = .18$ . Pairwise comparisons with Sidak adjustment revealed somatic

symptomatology in the CBT group decreased significantly from pre- to post-intervention ( $p = .002$ ), with this reduction maintained at the 6- and 12-month follow-ups ( $p = .028$ , and  $p = .006$ , respectively). No additional decreases in somatic symptomatology were observed between post-intervention and the 6-month follow-up ( $p = .868$ ) or between the 6- and 12-month follow-ups ( $p = .497$ ).

### **Clinical Efficacy Analyses: CBT vs EFT vs Non-Clinical Community Sample**

With the use of Wilk's criterion, a significant multivariate main effect was found for Group  $F(24, 268) = 8.83$ ,  $p = < .001$ , partial  $\eta^2 = .44$ , indicating there was a statistically significant difference between groups on the dependent variables combined. As such univariate analyses for each dependent variable were explored with post-hoc Tukey's analyses. See to Table 5 for a summary of between-subjects (CBT vs EFT vs Community) univariate analyses for each dependent variable.

INSERT TABLE 5 HERE

**Anxious symptomatology.** At pre-intervention, significant differences in anxious symptomatology was observed between groups, with post-hoc Tukey's analyses indicating the EFT had significantly greater anxiety symptom scores than the community sample ( $p = .001$ ). No significant differences were observed between the CBT group and non-clinical community sample ( $p = .151$ ), or the active interventions ( $p = .436$ ). A similar pattern of results was also observed at post-intervention, with the EFT group continuing to have high anxious symptom scores than the community sample ( $p = < .001$ ), in addition to greater scores than the CBT group ( $p = < .001$ ). No significant differences were observed between the CBT group and non-clinical community sample ( $p = .861$ ). By the 6-month follow-up, no significant differences were found between groups, indicating both intervention groups had comparable anxious symptomatology scores to the non-clinical community sample. This was also maintained at the 12-month follow-up.

**Depressive symptomatology.** At pre-intervention, significant differences in depressive symptom scores were observed between groups. Post-hoc Tukey's analyses revealed both the EFT and CBT group had significantly greater depressive symptomatology than the community sample ( $p = .001$  and  $p < .001$ , respectively); however, the CBT group also had significantly higher depressive symptoms scores compared to the EFT group at pre-intervention ( $p = .028$ ). Significant differences between groups were also observed at post-intervention, with both the EFT and CBT group obtaining greater depressive symptom scores than the community sample ( $p = .016$  and  $p = .004$ , respectively); however, there were no significant differences in depressive symptom scores between the two active interventions ( $p = .263$ ). Significant differences between the groups were also observed at the 6-month follow-up, with only the CBT group obtaining significantly higher depressive symptom scores compared to the non-clinical community sample ( $p = .045$ ). At this time point, the EFT group appeared to have comparable depressive symptom scores to the community sample ( $p = .138$ ), yet there was no significant difference in scores between the active intervention groups ( $p = .872$ ). At the 12-month follow-up, no significant differences between groups were observed; indicating the depressive symptomatology of both intervention groups had reduced to a level comparable to the non-clinical community sample.

**Somatic symptomatology.** At pre-intervention, significant differences in somatic symptom scores were observed between groups, with post-hoc Tukey's analyses revealing the EFT and CBT group had significantly greater somatic symptomatology compared to the non-clinical community sample ( $p = .002$  and  $p < .001$ , respectively). Additionally, the CBT group had significantly greater somatic symptomatology compared to the EFT group at pre-intervention ( $p = .006$ ). Significant differences were also found between groups at post-intervention; however, only the CBT group obtained significantly higher somatic symptom scores compared to the non-clinical community sample ( $p = .006$ ). At this time point, the

EFT group appeared to have comparable somatic symptom scores to the community sample ( $p = .294$ ), yet there was also no significant difference in somatic symptomatology between the active intervention groups ( $p = .285$ ). By the 6-month follow-up, no significant differences in somatic symptoms score were observed between groups, indicating the somatic symptomatology of both intervention groups had reduced to a level comparable to the non-clinical community sample. This was also maintained at the 12-month follow-up.

**BMI and Weight.** Both groups lost weight during the trial. The EFT group lost an average of 3.15 kilograms pre to post, 4.28 kilograms pre to 6-months, and 3.32 kilograms pre to 12-months. The CBT group was slower initially, losing 0.90 kilograms on average pre to post, 2.90 kilograms pre to 6-months, and 5.10 kilograms pre to 12-months. However at all time points, there was no significant difference between the two treatment groups indicating they both were able to achieve weight loss.

At pre-intervention, significant differences in BMI scores were observed between groups, with post-hoc Tukey's analyses revealing the EFT and CBT group had significantly greater BMI scores than the community sample ( $p < .001$  and  $p < .001$ , respectively). At post-intervention, significant differences were also found between groups, with the EFT and CBT groups obtained significantly higher BMI scores than the community sample ( $p < .001$  and  $p < .001$ , respectively). Similar results were also observed at the 6-month ( $p < .001$  and  $p < .001$ , respectively) and 12-month ( $p < .001$  and  $p < .001$ , respectively) follow up periods, indicating the BMI of both intervention groups did not reduce to a level comparable to the non-clinical community sample at any time point during the study. For the EFT group, there were no significant decreases from pre to post, however there was a significant decrease from pre to 6-month follow-up ( $p = .009$ ). For the CBT group there were no significant decreases from pre to post, however, significant decreases occurred from pre to 6-month follow-up ( $p = .009$ ) and pre to 12-month follow-up ( $p = .032$ ).

## Discussion

The present study aimed to extend upon Stapleton et al. (2016) by comparing the effectiveness of CBT and EFT treating depressive, anxiety, and somatic symptoms, in an 8-week intervention primarily targeting food cravings. The study sought to contribute to the emerging body of literature concerned with the efficacy of psychological interventions for treatment of obesity-related difficulties, by examining non-inferiority and utilizing the PHQ measure.

### Comparison of Efficacy

Although there were no significant differences between intervention groups pre-intervention with respect to anxiety scores, the CBT group participants had significantly lower anxiety scores at post-intervention. However, this effect was not maintained at 6- and 12-month follow-up points. Moreover, the EFT group reported significant decreases in scores from pre-intervention to 6- and 12-month follow-up, which is consistent with research demonstrating the delayed effect of EFT-based intervention in promoting improvements in psychological difficulties (e.g., Stapleton et al., 2011). However, the CBT group did not report significant decreases in their anxiety scores from pre-intervention to any follow-up measurement point, which is largely inconsistent with previous studies concerned with the efficacy of CBT (e.g., Olatunji, Cisler, & Deacon, 2010). Overall, these findings refute the null hypothesis of non-inferiority.

While CBT group participants had significantly higher depressive symptoms prior to the beginning of the intervention period, the intervention groups were not statistically significant in terms of depression scores at post-intervention or follow-up points. Moreover, the EFT group reported significant decreases in depression scores from pre-intervention to post-intervention and follow-up points, which is consistent with research demonstrating the effectiveness of EFT in treating MDD and related symptomatology (Church, De Asis, &

Brooks, 2012). However, the CBT group did not report significant decreases in their depression scores from pre-intervention to any follow-up measurement point, which is largely inconsistent with previous studies concerned with the efficacy of CBT. This may have been due to the length of treatment as reviews of CBT treatment for weight issues suggest 16 sessions is typical and this trial only offered eight (Shaw, O'Rourke, Del Mar, & Kenardy, 2005). However, these findings refute the null hypothesis of non-inferiority.

Finally, the CBT group participants had significantly higher somatoform symptoms at pre-intervention, although intervention groups were not statistically significant at post-intervention or follow-up points for somatoform scores. Across time, the CBT group reported significantly decreased somatoform scores from pre- to post-intervention and follow-up points, while the EFT group did not report significant decreases. In general, this finding is consistent with research indicating the effectiveness of CBT on somatoform complaints and emotionally based physiological symptoms (Kroenke & Swindle, 2000), while inconsistent with recent studies revealing EFT as an effective approach for somatization related difficulties among clinical populations (Church, Geronilla, & Dinter, 2009; Church & Palmer-Hoffman, 2014).

Overall, results relating to non-inferiority analyses demonstrate that there are statistically significant differences between treatment approaches, in promoting improvements in depressive, anxiety, and somatic symptoms among overweight and obese populations. Possible reasons for this finding are the qualitative differences between groups at pre-intervention, in terms of mean depression, anxiety, and somatoform scores (refer to Table 3), which reveal clinically valid disparities in intervention group samples prior to the beginning of treatment. Another potential reasoning for the incomparable improvements in symptoms between treatment approaches, is the specificity of intervention strategies in targeting food cravings. Participants were not taught to generalize treatment strategies to

other emotional difficulties, such as anxiety or depression, and thus were not directly encouraged to apply these therapeutic techniques to these specific secondary psychological outcomes measured in the current study.

### **Clinical Impact**

Interestingly, analyses of clinical efficacy revealed that EFT group participants reported significantly higher anxiety scores than both the CBT group participants and community sample at both pre- and post-intervention, with no statistically significant difference between the CBT and community samples. As expected, depression scores for significantly higher in the EFT and CBT group participants compared to the community sample at pre- and post-intervention. Finally, somatoform scores were significantly higher for the EFT and CBT groups at pre-intervention, than the community sample. At post-intervention, only the CBT group participants reported significantly higher scores than the community. At 6- and 12-month follow-up, both intervention groups had comparable anxiety, depression, and somatoform scores, to the non-clinical community sample. These findings are largely consistent with research that shows the efficacy of CBT and EFT in promoting such significant improvements in depression, anxiety, and associated psychological difficulties (Andrade & Feinstein, 2004; Benor et al., 2009; Shaw et al., 2005). Moreover, results indicated the clinical significance of psychological intervention in producing clinically meaningful results.

Significant BMI reductions were observed from pre to 6-month follow-up for CBT and EFT; however, only CBT had a significantly lower BMI from baseline to the 12-month follow-up. This finding suggests that, although both groups reported significant weight loss from pre-intervention to 6-month follow-up, only the CBT group reported a significant loss from pre to 12 months. Further, this result may imply that CBT-based intervention is more effective in achieving significant weight loss over longer time periods, in comparison to EFT.

However, previous studies of EFT have shown weight loss to be significant (e.g. Stapleton et al., 2011), therefore further study of adjunct psychological techniques in weight management interventions is recommended.

### **Limitations and Future Directions**

The majority of research participants in the current study were female and from the same community, which limits the generalizability of findings to other demographics. Despite researchers having procedures in place to ensure follow-up, there was evidently difficulties with attrition across both groups at follow-up points, which may dilute the results in terms of non-responders potentially experiencing benefits from therapeutic intervention. As is common in social science and human behavior studies (Tasca et al., 2016), it is possible that social desirability, placebo effect, therapist effects, or perceived pressure to report improvements, influenced results despite social validity scales being implemented. Future studies should seek to compare the efficacy of EFT and CBT approaches delivered at both an individual and group format, which may highlight the effect of group dynamics and influences that may be present in the current study. Finally, given many psychological elements in weight issues could be influenced by the family system (e.g. being married to someone who is a 'feeder'), and also symptoms from other conditions (such as Type II Diabetes) often predispose an individual to anxiety and depression, these warrant investigation in future trials.

### **Concluding Remarks**

The current study represents the first research examining and comparing the effectiveness and inferiority of EFT and CBT in targeting secondary psychological outcomes in a group of obese adults attending treatment for food cravings. Overall, findings indicated that group EFT- and CBT-based intervention are differentially effective in treating depressive, anxiety, and somatic symptoms among obese populations. Findings further



support the suggestion that psychological intervention is beneficial for treatment of the psychological and affective components of obesity, and can potentially lead to long-term maintenance of treatment gains. Replication and longitudinal studies should seek to evaluate EFT and CBT in a larger, gender-balanced sample, ideally from multiple locations. Future studies in this area would serve to examine the non-inferiority and clinical validity of various psychological treatment approaches, and thus increase access to evidence-based treatments for obesity, food cravings, and associated emotional difficulties, without sacrificing efficacy.

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