Addressing the relationship between emotional eating and weight: A series of studies designed to reduce emotional eating

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Abstract

Emotional eating is the tendency to overeat in response to negative emotions such as stress and anxiety. It has been shown to be related to weight, namely weight gain over time and difficulties with weight loss. As such, my dissertation studies the relationship between emotional eating and weight across the weight spectrum and tests the feasibility of two interventions designed to reduce emotional eating.

The first manuscript in my dissertation provides a comprehensive review of the relationship between emotional eating and weight outcomes. In doing so, it also reviews possible treatments for emotional eating in order to improve weight outcomes for individuals who engage in this behaviour. One such treatment is Acceptance and Commitment Therapy (ACT), which focuses on increasing tolerance and acceptance of negative emotions that would typically lead to overeating.

As identified in my first manuscript, emotional eating can contribute to overweight and obesity, however there are also individuals who engage in emotional eating while maintaining a healthy, "normal" weight. These individuals have not been studied to determine what allows them to maintain their weight, or what concerns they might have with their emotional eating. Thus, the second manuscript of my dissertation qualitatively examines weight maintenance in emotional eaters of normal weight, identifying both compensatory strategies used to maintain weight, as well as concerns they held with their emotional eating. Frequently cited compensatory strategies included restricting their eating outside of emotional eating episodes and engaging in exercise to compensate for emotional eating. Participants also cited concerns with their emotional eating, such as worry about potential weight gain and health consequences in the long

term. This study provides insight into the thoughts and behaviours of normal weight emotional eaters, helping to inform emotional eating treatment across the weight spectrum.

For the third manuscript in my dissertation, I elected to build upon Manuscript 1's identification of ACT as a promising treatment for emotional eating. I developed a brief ACT intervention for emotional eaters seeking to lose weight. This program was designed to be delivered by physicians in order to increase its accessibility and incorporate it into an existing weight loss treatment. My study found lack of feasibility for this mode of program delivery. Despite positive feedback from physicians and patients, patients in neither the ACT intervention nor standard care condition lost weight. Patients in both groups displayed decreases in emotional eating, which points to possible treatment infidelity by physicians. Results from Manuscript 3 suggest that brief ACT interventions for emotional eating may be better delivered by health professionals with more psychological and behaviour change expertise, such as clinical psychologists.

The fourth and final manuscript in my dissertation builds upon the non-feasibility findings of Manuscript 3 by testing the feasibility and acceptability of a one-day ACT workshop for emotional eating as delivered by a PhD candidate in Clinical Psychology. One-day ACT workshops have shown to be effective in targeting other health-related concerns such as weight, diabetes, and cardiovascular disease. The workshop was delivered in a single day (~ 6 hours) and aimed to reduce emotional eating by improving values clarification, acceptance, and mindfulness. Results suggest both feasibility and acceptability; participants described appreciating the brevity of the program and its applicability to their everyday lives. Reductions in emotional eating were found at 2-weeks and 3-months post-intervention. The results from this

study can be used to inform a larger scale randomized controlled trial (RCT) to determine the efficacy of the program in a larger sample and compared to a control group.

Altogether, my dissertation provides a comprehensive overview of the relationship between emotional eating and weight outcomes and presents the findings of initial feasibility interventions designed to help reduce this behaviour.

Resumé

L'alimentation émotionnelle est le fait de manger de façon excessive en réponse à des émotions négatives telles que le stress et l'anxiété. Il a été montré que le phénomène est associé au poids, plus particulièrement le gain de poids au fil du temps et des difficultés avec la perte de poids. Ainsi, ma dissertation étudie les relations entre l'alimentation émotionnelle et le poids sur toute son échelle, et examine la faisabilité de deux interventions conçues pour réduire l'alimentation émotionnelle.

Le premier manuscript de ma dissertation fournit un compte rendu complet sur la relation entre l'alimentation émotionnelle et les changements de poids. Ainsi, il expose les traitements possibles afin d'améliorer le contrôle du poids pour les personnes qui se livrent à ce comportement. Un de ces traitements est la thérapie d'acceptation et d'engagement (ACT), qui se focalise sur la tolérance et l'acceptation des émotions négatives qui amènent généralement vers une suralimentation.

Comme identifié dans mon premier manuscript, l'alimentation émotionnelle peut contribuer à un surpoids et de l'obésité, cependant il existe aussi des individus qui se livrent à cette pratique tout en conservant un poids sain et "normal". Ces individus n'ont pas été étudiés dans le but de déterminer ce qui leur permet de maintenir leur poids, ou les inquiétudes qu'ils peuvent avoir avec leur alimentation émotionnelle. Ainsi, le second manuscript de ma dissertation examine de façon qualitative le maintien du poids chez les personnes pratiquant l'alimentation émotionnelle de poids normal, en identifiant les stratégies compensatoires utilisées pour maintenir leur poids, ainsi que leurs inquiétudes avec leur alimentation émotionnelle. Les stratégies fréquemment citées incluent la restriction de leur alimentation en-dehors des épisodes d'alimentation émotionnelle, et la pratique d'exercice physique. Les participants ont également

fait référence à leurs inquiétudes concernant leur alimentation émotionnelle, comme le soucis d'un potentiel gain de poids et les conséquences sur le long terme pour la santé. Cette étude offre un aperçu des réflexions et comportements des personnes de poids normal pratiquant l'alimentation émotionnelle, aidant à informer les traitements pour l'alimentation émotionnelle sur l'échelle du poids.

Pour le troisième manuscript de ma dissertation, j'ai choisi de continuer sur l'identification de l'ACT comme un traitement prometteur contre l'alimentation émotionnelle décrit dans le Manuscript 1. J'ai développé une intervention d'ACT courte pour les personnes pratiquant l'alimentation émotionnelle cherchant à perdre du poids. Ce programme a été créé pour être exercé par des médecins afin d'accroître son accessibilité et de l'inclure dans les traitements existants de perte de poids. Mon étude à trouvé un manque de faisabilité pour cette façon de procéder. Malgré des retours positifs des médecins et des patients, les patients n'ont pas perdu de poids, que soit avec l'intervention ACT ou suite au soins standards. Les patients des deux groupes ont montré une diminution de leur alimentation émotionnelle, ce qui suggère une possible inconstance du traitement par les médecins. Les résultats du Manuscript 3 suggèrent que les courtes interventions d'ACT pour l'alimentation émotionnelle sont peut-être mieux pratiquées par des professionnels de la santé ayant une expertise en psychologie et en changements du comportement, comme les psychologues en clinique.

Le quatrième et dernier manuscript dans ma dissertation continue sur la non-faisabilité des découvertes du Manuscript 3 en testant la faisabilité et l'admissibilité d'un atelier ACT pour l'alimentation émotionnelle d'une journée, prescrit par un candidat à un doctorat en Psychologie Clinique. Les ateliers ACT d'une journée se sont montrés efficaces en ciblant d'autres inquiétudes liées à la santé comme le poids, le diabète, et les maladies cardiovasculaires.

L’atelier a été exécuté en une seule journée (environ 6 heures) et visait à réduire l’alimentation émotionnelle en améliorant les valeurs personnelles, l’admissibilité et la pleine conscience. Les résultats suggèrent à la fois la faisabilité et l’admissibilité ; les participants ont décrit avoir apprécié que le programme soit de courte durée et la possibilité de l’appliquer dans la vie de tous les jours. Des réductions de l’alimentation émotionnelle ont été relevées 2 semaines et 3 mois après intervention. Les résultats de cette étude peuvent être utilisés pour développer un essai aléatoire controlé (RCT) de grande échelle afin de déterminer l’efficacité du programme sur un large échantillon et comparé à un groupe témoin.

Dans son ensemble, ma dissertation fournit un aperçu complet sur la relation entre l’alimentation émotionnelle et ses conséquences sur le poids, et présente les découvertes sur les interventions initiales conçues afin d’aider à réduire ce comportement.

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Contributions of Authors

I am the first author of the four studies presented in this dissertation.

For my first manuscript, I conducted a comprehensive review of the literature on emotional eating and weight outcomes. I was responsible for searching databases and reviewing the articles included in the review as well as writing the review itself. Dr. Bärbel Knäuper aided in the theoretical conceptualization and organization of the review and edited various iterations of the manuscript. Both authors read, edited, and approved the final manuscript, published in *Current Psychology*.

For my second manuscript, I designed and conducted the study, analyzed the data, and prepared the manuscript for publication. Simone Livshits, an undergraduate student, was responsible for transcribing the interviews, preliminary data analysis, and assisting in manuscript preparation. Dr. Bärbel Knäuper supervised all aspects of the study from inception to manuscript preparation. All authors read, edited, and approved the final manuscript, published in *The Journal of Eating Disorders*.

For my third manuscript, I designed and conducted the study, including the creation of a copyrighted intervention manual. I subsequently analyzed the data and prepared the manuscript for publication. Kimberly Carrière contributed to preparing the intervention manual and with administrative aspects of the study. Dr. Bärbel Knäuper supervised all aspects of the study from inception to manuscript preparation. All authors read, edited, and approved the final manuscript, which is presently under review at *Open Psychology*.

For my further and final manuscript, I designed and conducted the study, including the development of the intervention manual, as well as the delivery of the intervention itself. I analyzed both the quantitative and qualitative data collected from the study and prepared the

manuscript for publication. Sabrah Khanyari, an undergraduate Honours student, completed her thesis based on the project and assisted with transcribing the qualitative data as well as helped with the analyses and manuscript preparation. Dr. Bärbel Knäuper supervised all aspects of the study from inception to manuscript preparation. All authors read, edited, and approved the final manuscript, which is presently under review at *Eating and Weight Disorders*.

Original Contribution to Knowledge

The first manuscript in my dissertation provides a comprehensive overview of the relationship between emotional eating and weight outcomes. Until the publishing of this review, there had been no recent review or meta-analysis of this topic since Ganley's (1989) general review of emotional eating. The review thus provides researchers with an update on the state of the field, and highlights areas for future research. Importantly, the review summarizes treatment options for emotional eating, providing a guide for both researchers and clinicians of effective methods to address and reduce emotional eating.

Manuscript 2 examined emotional eating in individuals of normal weight, a population that has been neglected when examining the potential negative effects of emotional eating. This study highlighted that emotional eaters of normal weight do experience concerns and distress over this behaviour and that they would benefit from strategies to reduce their emotional eating in order to improve their eating behaviours. The study also provided insight into the methods used by these individuals to regulate their weight, such as exercise, which may have implications for encouraging weight regulation in emotional eaters with overweight or obesity.

The third manuscript in my dissertation tested the feasibility and efficacy of a brief, physician-delivered, ACT intervention for emotional eaters. Findings of non-feasibility suggest that physicians are not ideal candidates to deliver such interventions. Given the increasing push for the delivery of weight loss interventions in primary care (Canadian Task Force on Preventive Health Care, 2015), these interventions would likely be more effectively delivered by other health practitioners with greater expertise in behaviour change.

The fourth and final manuscript in my dissertation tested the feasibility and efficacy of a one-day ACT workshop for emotional eating. This study was the first intervention to target

emotional eating without promoting weight loss, rather focusing on changing eating behaviours themselves to facilitate better health. As such, the findings can be used to inform other emotional eating interventions tailored towards individuals who engage in this behaviour and experience both physical and mental health concerns as a result, without focusing on weight.

Chapter 1

Manuscript 1

Frayn, M., & Knäuper, B. (2017). Emotional eating and weight: A review. *Current Psychology*, doi:10.1007/s12144-017-9577-9.

Abstract

Emotional eating is the tendency to overeat in response to negative emotions and has shown to be associated with weight outcomes, both in respect to weight gain over time and difficulties with weight loss and weight loss maintenance. It is thus important to develop treatments to improve weight loss outcomes in emotional eaters. The purpose of this review is to explore adults' relationship between emotional eating and weight by: (1) describing self-report measures used to assess emotional eating such as the Dutch Eating Behavior Questionnaire (DEBQ), the Three Factor Eating Questionnaire (TFEQ), and the Emotional Eating Scale (EES), (2) exploring the relationship between emotional eating and weight outcomes, namely examining weight gain in longitudinal studies and difficulties with weight loss and weight loss maintenance in intervention studies, and (3) reviewing current interventions that tar- get emotional eating, using techniques such as mindfulness, Acceptance and Commitment Therapy (ACT), Cognitive Behavior Therapy (CBT), and Dialectical Behavior Therapy (DBT). A better understanding of adults' emotional eating and its impact on weight is important to develop interventions that effectively target weight loss struggles unique to emotional eaters and improve weight outcomes for this population.

Introduction

Emotional eating is defined as the "tendency to overeat in response to negative emotions, such as anxiety or irritability" (van Strien et al., 2007, p. 106). It is a highly prevalent concern for those who struggle with their weight; it is suggested that 60% or more of individuals who are overweight or obese are also emotional eaters (Ganley, 1989). Emotional eaters are particularly likely to consume foods high in fat, sugar, and calories in response to negative emotions (Elfhag & Rossner, 2005). These eating habits in combination with increased body weight place emotional eaters at higher risk for developing diabetes and heart disease (e.g., Melanson, 2007; Wang et al., 2010). This population also struggles with weight loss; emotional eaters are half as likely as non-emotional eaters to achieve the 10% weight loss goal of standard behavioral weight loss treatment (López-Guimerà et al., 2014). Emotional eating is important to study because of its negative effects on weight and overall health. Thus far very few interventions have incorporated the treatment of emotional eating into weight loss interventions.

The purpose of this paper is to review the relationship between emotional eating and body weight in adults and to explore the current treatment options used to address these concerns. To our knowledge, no such review exists. Other reviews have outlined theoretical perspectives on emotional eating (e.g., Canetti et al. 2002), have examined the prevalence of emotional eating in a variety of samples (e.g., Gibson, 2012), and have reviewed studies using a certain treatment approach, namely mindfulness interventions, for emotional eating (e.g., Katterman et al., 2014; O'Reilly et al., 2014). However, none of these reviews have attempted to explicate the relationship between emotional eating and weight, nor have they thoroughly evaluated treatment options for overweight or obese emotional eaters. This review seeks to fill

these gaps in the existing literature to help establish better treatment protocols for emotional eating.

Currently, research in this area is still burgeoning and there is significant heterogeneity in the measures and methodologies used to study the effects of emotional eating on weight and treatment efficacy. For these reasons, we did not conduct a systematic review or meta-analysis; this review is instead a comprehensive narrative that describes the key findings that together help to elucidate the relationship between emotional eating and weight in adults in order to obtain possible solutions for effective treatments of emotional eating.

Studies included in this review are those that have examined the relationship between emotional eating and weight in a variety of contexts, including longitudinal studies in naturalistic settings (examining normal weight, overweight, and obese individuals) and behavioral weight loss interventions (examining overweight and obese individuals). In reviewing the literature we searched the PsycINFO database using the key words "emotional eating", "emotional eaters", "weight", "weight gain", "weight loss", "weight loss intervention", "weight maintenance", "BMI", and "longitudinal." We also thoroughly examined the references cited in the studies found through the database to ensure we completed an exhaustive search of the literature. We included studies that: (1) used a self-report measure to quantitatively assess emotional eating, (2) included weight as a primary outcome variable, and (3) examined emotional eating in overweight and/or obese individuals. Studies were excluded from this review if they did not adhere to all three criteria listed above. Thus the studies described in this review highlight this relationship between emotional eating and weight. Gaining a better understanding of emotional eating has implications for the treatment of overweight and obesity, as it will allow for the refinement of behavioral weight loss programs to target emotional eating.

Studies in laboratory settings have explored the relationship between emotions and eating behavior by inducing negative moods and measuring subsequent food consumption (e.g., van Strien et al., 2013; Werthmann et al., 2014). These studies have been done in normal weight university student populations (e.g., van Strien et al., 2013; Wallis & Hetherington, 2009; Werthmann et al., 2014). Of the mood induction laboratory studies that have been conducted with overweight and obese individuals, they have focused on binge eating, rather than emotional eating (e.g., Chua, Touyz, & Hill, 2004; Laessle & Schulz, 2009). A recent meta-analysis found that the induction of a negative food state increases food consumption in binge eaters (Cardi, Leppanen, & Treasure, 2015). However, the results of these studies on binge eating are not directly applicable to emotional eating in the context of behavioral weight loss interventions targeted towards overweight and obese populations such as those we will be reviewing. Laboratory studies are also not included in this review because they examine emotional eating at a single time point, making it difficult to determine the long term relationship between emotional eating, food consumption, and weight. This review will instead focus on studies in natural settings to examine the relationship between emotional eating and weight in overweight and obese individuals, namely examining weight gain and difficulties with weight loss over time.

Conceptualizations for eating in response to positive emotions will not be reviewed because there is evidence that it is a different construct than eating in response to negative emotions. For example, eating in response to positive emotions has shown to be negatively correlated with eating in response to negative emotions (e.g., Nolan, Halperin, & Geliebter, 2010; van Strien et al., 2016). There is also currently no conclusive evidence that eating in response to positive emotions is associated with being overweight or obese (e.g., van Strien et al., 2016; van Strien et al., 2013), whereas eating in response to negative emotions is negatively

associated with weight outcomes (e.g., Delahanty et al., 2013; Koenders & van Strien, 2011; Teixeira et al., 2010). Additionally, it has been observed that eating in response to positive emotions is associated with partaking in social situations (Patel & Schlundt, 2001). Because food is often consumed socially in positive emotional contexts such as celebrations, it is difficult to determine whether emotional eating truly occurs in response to internal positive emotions or if increased consumption is more attributable to the external social context. This review therefore focuses on eating in response to negative emotions and the impact it has on weight outcomes.

This review is structured along three aims. First, we will describe the various ways in which emotional eating is assessed in research concerned with weight outcomes. Second, we will review the literature to see how emotional eating is related to weight and to weight loss success in intervention contexts. Using this information, the third aim is to explore and discuss ideal methods for targeting and treating emotional eating in weight loss interventions.

Aim 1: Self-Report Measures of Emotional Eating

Several self-report measures exist to assess emotional eating and the related construct of internal disinhibition, as introduced below. The Dutch Eating Behavior Questionnaire (DEBQ; van Strien et al., 1986), the Three Factor Eating Questionnaire (TFEQ; Stunkard & Messick, 1985), and the Emotional Eating Scale (EES) are the three most frequently used, based on a cited reference search conducted using the Scopus database. The measures have been cited 1248, 2418, and 287 times, respectively. Other measures of emotional eating are outlined in *Table* 1.

The Dutch Eating Behavior Questionnaire (DEBQ)

The Dutch Eating Behavior Questionnaire (DEBQ; van Strien et al., 1986) is a 33-item self-report measure that assesses different aspects of eating behavior on three subscales: (1) restrained eating, (2) emotional eating, and (3) external eating. In completing the DEBQ,

participants are asked to rate their responses on a 5-point ordered rating scale from never (1) to very often (5). Responses are then summed separately for each subscale and divided by the total number of items on that subscale to derive a mean subscale score. Based on van Strien and colleagues' (1986) initial validation study, the mean emotional eating subscale score averaged across normal weight and obese individuals was 1.92 (*SD* = 0.68). For obese individuals, this mean was slightly higher, *M* = 2.11 (*SD* = 0.73) than for their normal-weight counterparts, *M* = 1.89 (*SD* = 0.67). The DEBQ has been shown to have high internal consistency and factorial validity (e.g., Barrada, van Strien, & Cebolla, 2016; van Strien, 2015; van Strien et al., 1986).

DEBQ emotional eating assesses an individual's desire to eat under negative emotional conditions like stress, anxiety, and depression. The DEBQ thus focuses on eating in response to negative, but not positive emotions. Examples of items on the emotional eating subscale include item 18, "Do you have a desire to eat when you are anxious, worried, or tense?" and item 23, "Do you have a desire to eat when you are bored or restless?" Van Strien et al. initially derived the emotional eating subscale items from the Eating Patterns Questionnaire (EPQ; Wollersheim, 1970) based on face validity (van Strien et al., 1986). However, in validating the DEBQ, van Strien et al. revised and created new emotional eating subscale items as well as restrained and external eating subscale items to ensure good dimensional validity for each of the three subscales (van Strien et al., 1986).

A cut-off score of 3.25 on the DEBQ emotional eating subscale is often used to classify emotional eaters in research contexts. The cut-off score is based on normative data from a Dutch sample (van Strien, Herman, Anschutz, Engels, & de Weerth, 2012). The score represents scores in the 80th percentile for this Dutch sample (van Strien et al., 2012). Scores above the 80th percentile have also been used as the cut-off for categorizing emotional eaters in other studies

(e.g., Bohon, Stice, & Spoor, 2009). In Aim 2, we review studies that examine emotional eating in overweight and/or obese individuals with weight as a primary outcome variable. Applying this criterion, all remaining studies examined emotional eating on a continuum rather than using a specific cut-off (e.g., Dohle, Hartmann, & Keller, 2014; Koenders & van Strien, 2011; Sung, Lee, & Song, 2009; van Strien, Herman, & Verheijden, 2012).

The Three Factor Eating Questionnaire (TFEQ)

Emotional eating can also be conceptualized as a form of disinhibition, where individuals feel compelled to eat in response to emotional cues and lack control over inhibiting this (Stunkard & Messick, 1985). This disinhibition concept has been operationalized by Stunkard and Messick (1985) in their Three-Factor Eating Questionnaire (TFEQ). The authors later referred to the TFEQ as the "Eating Inventory" (EI; Stunkard & Messick, 1988) and the publisher Pearson Education distributes it under this name. For consistency, we will refer to it as the TFEQ as is most commonly done in the literature. Similar to the DEBQ, the TFEQ is comprised of three subscales: (1) restraint, (2) disinhibition, and (3) hunger. The TFEQ was developed to expand upon Herman and colleagues' restraint theory and its corresponding Restraint Scale (1975, 1980). Because the TFEQ was developed with a focus on restrained eating, the two remaining subscales are comprised of items that did not load onto the restraint factor. The disinhibition scale reflects loss of control over eating behaviors in response to either internal or external cues (Stunkard & Messick, 1985).

Since the initial development of the TFEQ, studies have re-examined the factor structure of the measure, specifically in relation to the disinhibition scale. Many have found that disinhibition is comprised of an emotional component. Notably, Bond, McDowdell, and Wilkinson (2001) found that disinhibition could be further reduced to emotional disinhibition,

which was comprised of three TFEQ items (eating when lonely, blue, or anxious). Emotional disinhibition was found to have good test-retest reliability (r = .70).

More recent research administering the TFEQ has utilized factor analysis to introduce the construct of "internal disinhibition", which is more all encompassing than either emotional eating or emotional disinhibition (Niemeier et al., 2007). It has broadened the definition of disinhibition to include eating in response to internal cues other than emotions such as thoughts or cognitions. For example, the internal disinhibition subscale includes TFEQ items such as item 45, "Do you eat sensibly in front of others and splurge alone?" and item 49, "Do you go on eating binges even though you are not hungry?" both of which appear to target eating in response to internal states other than emotions such as impulsivity or hunger. More research is required to determine the differences in how internal disinhibition or emotional eating/disinhibition contribute to eating behaviors.

It is important to emphasize that the TFEQ measures the construct of internal disinhibition and that this is not the same construct as emotional eating. We are including it in this review because, as will be seen in Aims 2 and 3, some researchers have used the TFEQ internal disinhibition measure inadequately as a measure of emotional eating. This has been done frequently enough that neglecting to review the TFEQ would exclude potentially useful information and empirical evidence about the relationship between internal disinhibition (and its related partner, emotional eating) and weight outcomes.

The Emotional Eating Scale (EES)

Another measure of emotional eating is the Emotional Eating Scale (EES; Arnow, Kenardy, & Agras, 1995), which asks participants to identify the extent to which 25 emotions stimulate a desire to eat from no desire (1), to an overwhelming urge (5). Emotions listed include

irritation, fury, worry, uneasiness, sadness, helplessness, and others. Item scores are grouped into three emotional eating subscales: anger/frustration, anxiety, and depression. Arnow and colleagues (1995) argued that the DEBQ considers too narrow a range of negative emotions, excluding many that may trigger emotional eating. Because of this, the EES examines 25 negative emotions, almost double the number of items on the DEBQ emotional eating subscale. The EES was initially validated using a population of obese females undergoing treatment for binge eating and weight loss. It has shown good construct, criterion, and discriminant validity in this population (Arnow et al., 1995). Waller and Osman (1998) found that the EES also has high internal consistency and overall good validity in normal weight women who have no eating disorders.

Aim 1 Conclusions

Several measures exist to assess self-reported emotional eating and the related constructs of emotional and internal disinhibition, three of the most frequently cited being the DEBQ, TFEQ, and the EES. Emotional eating, as assessed by the measures described in Aim 1, has shown to have good construct validity. For example, eating in response to negative emotions as assessed by the Emotional Appetite Questionnaire (EAQ; see *Table* 1 for a description of the measure) has been shown to have good convergent validity with the DEBQ emotional eating subscale, whereas eating in response to EAQ positive emotions has been shown to have divergent validity with DEBQ emotional eating (e.g., Nolan, Halperin, & Geliebter, 2010). This suggests that overeating in response to negative emotions, as defined by van Strien et al. (2007), is a separate construct from eating in response to positive emotions. The assessment of emotional eating has also been shown to have convergent validity with disordered eating behaviors such as binge eating (e.g., Arnow, Kenardy, & Agras, 1995; Duarte & Pinto-Gouveia, 2015) while

displaying divergent validity with other constructs such as cognitive restraint and mindfulness (e.g., Arnow, Kenardy, & Agras, 1995; Duarte & Pinto-Gouveia, 2015). To our knowledge, convergent validity between emotional eating and internal disinhibition has not been examined. However, Hyland, Irvine, Thacker, Dann, and Dennis (1989) compared the factor structures of the TFEQ and DEBQ and found that the three TFEQ items assessing eating when anxious, blue, or lonely were highly correlated with the DEBQ emotional eating subscale. It would be beneficial to analyze whether or not there is convergent validity between emotional eating and internal disinhibition given that they are often used interchangeably in studies targeting weight loss for those who struggle with eating in response to negative emotions.

Aim 2: Emotional Eating and Weight

Recently there has been an increased interest in examining the relationship between emotional eating and weight outcomes such as weight gain, weight loss, and weight loss maintenance. Research in this area can be divided into two categories: (1) longitudinal studies in which the DEBQ was administered to look at changes in weight, specifically weight gain over time, and (2) weight loss intervention studies in which mainly the TFEQ was administered to examine the effect of internal disinhibition on weight loss and weight loss maintenance.

Longitudinal Studies

Emotional eating and weight gain. Several longitudinal studies have assessed associations between DEBQ emotional eating, BMI, and weight gain. Koenders and van Strien (2011) studied a large sample of employees over two years. Approximately half of the sample gained weight while the other half either lost or maintained weight. Higher levels of emotional eating predicted greater weight gain ($B = 0.18$, $SE = 0.06$). Other lifestyle factors including

smoking, dietary habits, or alcohol consumption were not significantly associated with weight gain, suggesting that emotional eating may have an independent effect on weight gain.

Van Strien, Herman, and Verheijden (2012) conducted a prospective 2-year follow-up study of individuals identified as being highly susceptible to weight gain based on their overeating. They found that emotional eating was positively correlated with both change in BMI over two years (r = .11) and overeating (r = .29). Emotional eating was also found to moderate the relationship between overeating and weight gain over time (B = 0.48, SE = 0.17) such that overeating combined with emotional eating was related to weight gain.

Dohle, Hartmann, and Keller (2014) studied a Swiss sample of participants enrolled in an eating and activity behavior survey and found that emotional eating was linked to heightened BMI over one year (β = .28). They also found that increased levels of physical activity helped to reduce the negative impact of emotional eating on BMI, such that higher levels of emotional eating and physical activity were associated with lower BMI than higher levels of emotional eating and lower physical activity (β = -.07). Higher emotional eating and physical activity was also associated with more fruit and vegetable consumption than higher emotional eating and lower physical activity (β = .06). Higher levels of emotional eating were linked to increased consumption of high fat, high sugar foods (β = .06) but there were no differences between high active and low active individuals in their consumption of these foods. This suggests that highly active emotional eaters may still consume "unhealthy" foods when emotional but this may be offset by physical activity and heightened consumption of "healthier" foods such as fruits and vegetables.

Longitudinal studies that used the DEBQ to examine eating behaviors have consistently found that emotional eating contributes to weight outcomes more so than external eating. Van

Strien, Herman, and Verheijden (2009) found that both restraint and emotional eating moderated the relationship between overconsumption of food and being overweight. The presence of emotional but not external eating increased the likelihood that overeating led to being overweight (B = 0.08, SE = 0.03). Similarly, the Healthy Twin Study in Korea found that over time emotional eating but not external eating was positively associated with both weight gain (B = 0.83, SE = 0.28) and current BMI (B = 0.35, SE = 0.10) (Sung, Lee, & Song, 2009). These results suggest that internal cues such as anxiety or stress may be more detrimental in eliciting the desire to eat than external cues, such as exposure to highly palatable food in one's environment, thus increasing food consumption and leading to weight gain.

Intervention Studies

Internal disinhibition and weight loss. Internal disinhibition as measured by the TFEQ has also been examined in the context of weight loss interventions. Niemeier and colleagues (2007) conducted a yearlong behavioral weight loss trial and found that higher baseline internal disinhibition significantly predicted less weight loss at 6 months (B = 0.59, SE = 0.27). External disinhibition was not related to weight loss. These findings suggest that internal disinhibition is an important factor to address in short-term weight loss.

Similarly, Butryn, Thomas, and Lowe (2009) found that internal disinhibition was related to weight loss outcomes in their intervention; reductions during the first three months were associated with greater weight loss from months 4 thru 12 (r = .36). External disinhibition was not associated with weight outcomes (r = .04, ns).

More recently Braden et al. (2016) administered the TFEQ and examined the effect of emotional eating as assessed by the three items that measure eating when anxious, sad or blue, and lonely on weight loss. Decreased emotional eating was associated with increased weight loss

success (7% decrease in initial body weight or higher) at both 6 months (B = 0.30) and 12 months (B = 0.53) post-intervention.

Emotional eating and weight loss. Teixeira et al. (2010) administered the DEBQ in the context of a weight loss intervention. Weight loss was assessed upon completion of the intervention at 12 months and weight maintenance was measured at the 24-month follow-up. Lower DEBQ emotional eating was associated with increased weight loss at 12 months (r = .35), but not 24 months (r = .08). At 24 months, higher exercise self-efficacy and exercise motivation were more predictive of successful weight loss than emotional eating.

Researchers have also used other measures than the DEBQ and TFEQ to assess the impact of emotional eating on weight in intervention settings. These studies have found that higher levels of emotional eating are predictive of less weight loss. For example, Canetti and colleagues (2009) examined psychosocial predictors of weight loss following bariatric surgery and a weight loss program and found that higher levels of emotional eating (as assessed by the 7-item measure developed by Canetti called "Emotional Eating" or "EE" described in *Table* 1) were negatively correlated with weight loss (r = -.42 for surgery group and r = -.46 for weight loss program group).

Emotional eating has also been found to be associated with less weight loss in the Diabetes Prevention Program (DPP), a large-scale, manualized behavioral weight loss intervention (Delahanty et al., 2013). Participants who reported less frequent baseline emotional eating (measured by the Blair et al. questionnaire in *Table* 1) were more likely to achieve 7% weight loss at six months than those who reported more frequent emotional eating (odds ratio = 0.88). However, similar to the findings of Teixeira et al. (2010), baseline emotional eating was not predictive of weight loss upon completion of the intervention. The DPP encourages a low-fat

diet and addresses barriers to achieving this diet, which may have helped mitigate the effect of emotional eating on consuming high fat, high calorie foods.

Aim 2 Conclusions

Emotional eating and internal disinhibition have been found to negatively impact weight outcomes in longitudinal and intervention contexts. Not only are they associated with weight gain over time (e.g., Koenders & van Strien, 2011; Sung et al., 2009; van Strien et al., 2012), they are also associated with less weight loss (e.g., Butryn et al., 2009; Canetti et al., 2009; Delahanty et al., 2013; Niemeier et al., 2007; Teixeira et al., 2010). Despite impacting initial weight loss, emotional eating appears to be less related to weight loss maintenance. Other factors such as exercise more strongly predict weight maintenance (e.g., Delahanty et al., 2013; Teixeira et al., 2010). This finding has implications for developing interventions to target emotional eating: To maximize long term weight change, it may be useful to test if targeting emotional eating helps with initial weight loss while encouraging exercising later on might promote weight maintenance.

There is great heterogeneity in the effect sizes and regression coefficients in studies examining the relationship between emotional eating and weight. This is an indication that this research is still in the incipient stages and consistent methodology has not yet been established. It is worth noting that studies that have administered the DEBQ and TFEQ use and report results for all of the subscales on these measures. This reduces potential publication bias because it helps ensuring that emotional eating and internal disinhibition results are reported even if they are not significant. However, it does not eliminate the possibility of publication bias altogether. It could be that only the studies that find significant or mostly significant effects for these subscales are published. Overall the connections between emotions, eating, and weight warrant further

investigation to establish adequate treatment protocols to mitigate this relationship and help promote weight loss and weight maintenance.

Aim 3: Interventions to Target Emotional Eating and Weight Loss

Traditional forms of intervention, such as behavioral weight loss programs, have shown little efficacy in reducing emotional eating and internal disinhibition (e.g., Butryn et al., 2009; Delahanty et al., 2013; Niemeier et al., 2007). This is likely because they do not address weight loss challenges specific to emotional eaters, namely using food for emotion regulation. Several approaches have been proposed to address emotional eating and thus encourage weight loss. These include: mindfulness, Acceptance and Commitment Therapy (ACT), Cognitive Behavior Therapy (CBT), and Dialectical Behavior Therapy (DBT).

Mindfulness Interventions for Emotional Eating

Mindfulness is a technique that has been employed to target weight loss for emotional eaters and is defined as the act of paying attention to the present moment purposefully and nonjudgmentally (Bishop et al., 2014). This includes attending to internal experiences such as emotions. Learning to nonjudgmentally focus one's awareness on emotions may help emotional eaters to come to tolerate and accept their internal experiences, rather than feeling compelled to act on them by eating.

One of the most prevalent mindfulness-based eating interventions is the Mindfulness-Based Eating Awareness Training (MB-EAT) originally developed by Kristeller and Hallett to treat binge eating (1999). MB-EAT is a group intervention that involves cultivating mindfulness, mindful eating, emotional balance, and self-acceptance (Kristeller & Wolever, 2011). When delivered as an RCT MB-EAT was found to improve binge eating and other outcomes, such as weight loss, depression, and TFEQ disinhibition (Kristeller, Wolever, & Sheets, 2014). Although

emotional eating was not examined, many of the sessions in the MB-EAT program are relevant to emotional eaters (e.g., recognizing what triggers binge eating, learning hunger, taste satiety, and fullness cues, etc.). Future research could apply this program to emotional eaters.

A 2014 literature review by O'Reilly et al. found mindfulness-based interventions to be effective in reducing eating behaviors associated with obesity such as binge eating, external eating, and emotional eating. Of the studies reviewed, 63% were found to reduce emotional eating. The average weight loss in studies that reported this outcome was 4.5 kilograms. The effect sizes for changes in weight were small (Cohen's d = 0.12 to 0.26). Similarly, Katterman et al. (2014) did a systematic review of the literature on mindfulness meditation to treat binge eating, emotional eating, and weight loss. They found that although mindfulness produced reductions in emotional eating and binge eating, it did not consistently lead to weight loss post-intervention (Cohen's d = -0.17 to 0.04). Weight loss was greatest in interventions that focused on weight as a primary outcome; namely those that combined mindfulness with behavioral weight loss components like nutrition and exercise education, goal setting, and problem solving (Cohen's d = -3.29). This finding suggests that although mindfulness may help to reduce emotional eating, pairing it with a behavioral weight loss program may improve weight loss more.

Treating Emotional Eating with ACT

ACT has recently been proposed to reduce emotional eating, subsequently promoting weight loss and weight maintenance. ACT encourages tolerance of internal cues such as emotions and external cues such as food. Forman and Butryn (2014) proposed a theoretical basis for applying ACT strategies to help address weight loss challenges for emotional eaters. They argue that there are three psychological skills necessary for successful weight control: values

clarification, mindfulness, and distress tolerance. It should be noted that mindfulness is a component of ACT. However, it is not the exclusive component, and this differentiates ACT interventions from the mindfulness interventions described above.

ACT and Weight Loss Interventions for Emotional Eaters

ACT has been integrated into several weight loss programs in recent years. The "Mind Your Health" Project was a recent RCT comparing ACT to standard behavioral treatment (SBT) that examined weight loss in 128 overweight and obese individuals (Forman et al., 2013). The acceptance strategies used in the ACT group targeted commitment to weight loss and values, distress tolerance, and mindless eating. Post hoc analyses found that emotional eaters in the ACT group (n = 41) lost over 4% more weight than emotional eaters in the SBT group (n = 26), both at the post-treatment (12.68% vs. 8.21%) and 6-month follow-up (10.51% vs. 6%) time points. Emotional eaters benefited more from ACT than non-emotional eaters. One limitation of this intervention is that timing of the follow-up (6 months) does not inform about weight loss maintenance in the long term. The 40-week program was also unusually long compared to other behavioral weight loss programs, so it may not be feasible to achieve such significant weight losses outside of a structured research setting, in fewer sessions.

ACT interventions have also been shown to reduce internal disinhibition as measured by the TFEQ (e.g., Lillis et al., 2015; Niemeier et al., 2012). Emotional eating has not been examined in these interventions. It is therefore unclear whether reductions in weight are related to acceptance strategies that target emotional eating specifically or internal disinhibition more broadly. In order to determine this, it is important to administer a measure that exclusively examines emotional eating, and currently only a few studies have done so, using the EES to assess emotional eating (e.g., Forman et al., 2013; Hill et al., 2015).

CBT and DBT for Emotional Eating

Most of the research investigating the use of CBT and DBT to address eating behaviors has been with eating disorders, such as BED, anorexia nervosa, and bulimia nervosa (e.g., Lenz, Taylor, Fleming, & Serman, 2014; Safer, Robinson, & Jo, 2010; Turner et al., 2016). More recently, both CBT and DBT have been proposed to target and reduce emotional eating (e.g., Glisenti & Strodl, 2012). According to CBT, emotional eating and other problematic eating behaviors are maintained through maladaptive behavioral factors and maladaptive cognitions (Cooper, Fairburn, & Hawker, 2003). Both behaviors and cognitions must be targeted to alter the emotions that lead to eating. DBT, which was originally developed to treat borderline personality disorder (Linehan, 1993a, 1993b), is also applicable to emotional eating because of the emphasis it places on affect regulation. Emotional eaters use food as a way to regulate negative emotions that they experience. DBT may work to mitigate this by encouraging alternative emotion regulation skills that do not involve eating.

Glisenti and Strodl (2012) performed case studies comparing CBT and DBT for treating obese emotional eaters. Two of the cases received 22 sessions of CBT while the other two received 22 sessions of DBT. The CBT intervention involved elements such as addressing barriers to weight loss, addressing goals, and providing information on healthy eating and increasing physical activity. The DBT intervention included emotion regulation and distress tolerance skills to help acknowledge and manage negative emotions that lead to eating. While the emotional eaters who received CBT lost less than 1% of their initial body weight and displayed no reductions in emotional eating at 8-weeks, the emotional eaters who received DBT did display significant improvements in both areas, losing between 7-10% of their initial body weight. These results suggest that DBT may be more effective than CBT in reducing emotional

eating and improving weight loss for emotional eaters, likely because it actively focuses on emotion regulation. However, RCTs are required to test this possibility.

Roosen and colleagues (2012) also conducted a pilot study adapting group DBT for emotional eaters. They recruited 35 obese male and female emotional eaters and had them participate in 20 group sessions designed to target their emotional eating and promote weight loss. Sessions focused on teaching emotion regulation skills through mindfulness, emotion regulation (decreasing susceptibility to negative emotions and increasing positive emotions), and distress tolerance, similar to the mindfulness and ACT interventions described above. Upon completion of the intervention and at the 6-month follow-up, significant reductions were found in both emotional eating scores and weight. However, the effect sizes were small. Participants lost an average 1.7% initial body weight post-treatment and 2.4% at 6 months, suggesting that DBT may assist more with weight maintenance. Another strength is that the intervention had a very low attrition rate; only 1/35 participants dropped out.

Aim 3 Conclusions

Overall, several approaches have shown promising results in reducing emotional eating and facilitating weight loss, including mindfulness, ACT, CBT, and DBT interventions. More standardized RCTs are needed to test the effect of these treatments on weight loss and weight maintenance in emotional eaters. Moving forward, it would be useful to administer both the DEBQ or EES and the TFEQ in the context of a weight loss intervention. This would allow for the comparison of the predictive validity of emotional eating and internal disinhibition in relation to weight outcomes to see which construct has a greater effect on weight loss and weight loss maintenance.

Conclusions

Despite emotional eating's significant, negative association with weight loss and weight loss maintenance and its popularity as an anecdotally reported social construct, this is the first review that outlines the relationship between emotional eating and weight outcomes. The purpose of this review was to: (1) review common self-report questionnaires of emotional eating, (2) evaluate its impact on weight in various contexts, and (3) importantly, examine ways in which this knowledge can be used to treat emotional eating to improve weight loss outcomes.

As reviewed in Aim 3, there are various perspectives on how to treat emotional eating. To our knowledge, there is currently a lack of research comparing various treatment methods for emotional eating; rather treatments are compared to standard behavioral weight loss treatments. More research is needed to determine which methods are most appropriate for specific individuals and contexts. It may also be beneficial to combine treatment methods such as CBT and mindfulness in order to teach both behavior modification and acceptance strategies to reduce emotional eating (e.g., Corsica et al., 2014; Goldbacher et al., 2016). Gaining this insight will help to tailor interventions such that they are best suited to the individual situations of emotional eaters and maximize their effectiveness in reducing emotional eating and improving weight loss.

As seen in Aims 2 and 3, studies employ a variety of measures to assess emotional eating, from the DEBQ to assess emotional eating to the TFEQ to assess internal disinhibition. Future research could draw comparisons between the DEBQ and TFEQ to determine whether emotional eating or internal disinhibition is better at predicting weight outcomes. These distinctions influence treatment strategies, as researchers are required to choose whether to target emotional eating or internal disinhibition, rather than viewing them as synonymous.

This example reflects a larger concern that emotional eating is not a well-defined construct. Although van Strien's (2007) definition is frequently used, the definition itself is somewhat open to interpretation. For example, it is contingent on "overeating" in response to negative emotions but this term itself is not defined. When examining the DEBQ itself, questions only ask how often one experiences the desire to eat in response to a variety of negative emotions. It does not assess how much people eat when they experience this desire, so it is difficult to assess whether or not overeating is experienced. Even in questionnaires that assess emotional "overeating" (e.g., Masheb & Grilo, 2006), "overeating" is not formally defined. The EOQ asks respondents to endorse how often they have eaten an "unusually large amount of food, given the circumstances" in response to various emotions in the past 28 days, but what this means in terms of concrete consumption is open to individual interpretation. The lack of clarity makes it difficult to pinpoint what constitutes emotional eating and determine the extent to which specific emotional eating behaviors are problematic for weight outcomes. The ultimate implication of this ambiguity is that it makes it more difficult to design interventions to target emotional eating and help improve weight loss outcomes.

A large proportion of the population is overweight or obese, and a significant subset of these individuals eats in response to negative emotions. Thus emotional eating cannot be ignored in the development of weight loss programs. Yet current standard behavioral treatment fails to target the specific needs of emotional eaters and is thus rendered ineffective for this population. Implementing mindfulness and ACT techniques are two promising interventions used to teach emotional eaters to cope with negative emotions without eating. They have shown efficacy in reducing emotional eating as well as promoting weight loss in preliminary studies. Further research is necessary, in the form of large-scale RCTs, to develop programs that effectively and

efficiently target weight loss for emotional eaters. Combining this research with broad dissemination of the findings will aid in promoting effective weight loss for those who struggle with emotional eating.

***Table* 1 Other Self-Report Measures of Emotional Eating**

Name	Authors & Year	Number of Times Cited	Number of Items	Emotions Assessed (-/+)	Contributions	Limitations
-	Blair, Lewis, & Booth, 1990	94	10	(-)	Assesses actual frequency of emotional eating episodes	Assesses only 5 categories of emotions
Canetti's Emotional Eating Scale (EE)	Canetti et al., 2009	55	7	(-)	Brief and succinct measure of emotional eating	Assesses only 7 emotions
Emotional Appetite Questionnaire (EMAQ)	Geliebter & Aversa, 2003; Nolan, Halperin, & Geliebter, 2010	128	22	(-/+)	Assesses eating in response to both positive and negative emotions and emotional situations	Difficult to differentiate between eating in response to an emotional situation vs. an actual emotion
Emotional Overeating Questionnaire (EOQ)	Masheb & Grilo, 2006	115	6	(-/+)	Assesses frequency and specifies emotional "overeating" episodes	Assesses a limited scope of emotions, 5 negative and only 1 positive
The Eating and Appraisal Due to Emotions and Stress (EADES) Questionnaire	Ozier et al., 2007	33	54	(-/+)	Assesses both emotional eating and one's appraisal of their ability to cope with emotions and stress	Long and time-consuming to complete, requires personal insight to assess one's coping abilities

Transition from Chapter 1 to Chapter 2

Chapter 1 provided an overview of emotional eating, highlighting the relationship between emotional eating and weight outcomes such as weight gain and difficulties with weight loss. However, it also brought to light research that has studied individuals who maintain a normal weight, despite engaging in emotional eating. Little research has been done to explore why these individuals are able to control their weight in spite of consuming high-calorie foods as a result of emotional eating episodes. Particularly, it is unclear what compensatory behaviours individuals of normal weight may engage in to help maintain their weight. This information could be used to better inform interventions aimed at reducing emotional eating, especially those designed to target individuals with overweight and obesity who experience difficulty maintaining their weight.

Thus, the purpose of Chapter 2 (i.e., Manuscript 2) is to gain insight into emotional eating in individuals of normal weight, examining both compensatory behaviours used to maintain weight, as well as concerns these individuals may have with their behaviour. These data were collected through qualitative interviews and were subsequently subjected to thematic analysis. The resulting themes may be used to inform interventions designed to target emotional eating, as will be further elucidated by Manuscript 3 and Manuscript 4.

Chapter 2

Manuscript 2

Frayn, M., Livshits, S., & Knäuper, B. (2018). Emotional eating and weight regulation: A qualitative study of compensatory behaviors and concerns. *Journal of Eating Disorders*, *6*, 23. http://doi.org/10.1186/s40337-018-0210-6

Abstract

Background: Emotional eating, or overeating in response to negative emotions, is a behavior endorsed by both normal weight and people with overweight/obesity. For some individuals, emotional eating contributes to weight gain and difficulties losing weight. However, there are also many who engage in emotional eating who maintain a normal weight. Little is known about the mechanisms by which these individuals are able to regulate their weight.

Methods: The present study seeks to gain insight into the behaviors of individuals of normal weight who engage in emotional eating through a series of one-on-one, 1-hour long, qualitative interviews. Interviews were semi-structured and guided by questions pertaining to participants' compensatory behaviors used to regulate weight and concerns regarding their emotional eating. All interviews were transcribed and then objected to a thematic analysis of their content.

Results: The results of this analysis showed that participants endorsed using physical activity, controlling their eating behaviors, and engaging in alternative stress reduction and coping strategies to mitigate the effects of their emotional eating. They reported concern over the effects of emotional eating on their weight, body image, and health and saw this behavior as an unhealthy coping mechanism that was difficult to control.

Conclusions: These results suggest that programs promoting exercise, mindful eating, emotion regulation, and positive body image could have a positive effect on emotional eaters who struggle to maintain a healthy weight.

Background

Emotional eating is defined as the "tendency to overeat in response to negative emotions such as anxiety or irritability" (van Strien et al., 2007, p. 106). This behavior is of interest because emotional eating has been consistently associated with weight concerns such as overweight and obesity (Dohle, Hartmann, & Keller, 2014; Ganley, 1989; Koenders & van Strien, 2011). Additionally, individuals with overweight have been found to exhibit less effective coping skills in response to negative emotions, leading them to emotionally eat more frequently (Ozier et al., 2008). Difficulties with weight loss have also been associated with emotional eating (e.g., Butryn, Thomas, & Lowe, 2009; Delahanty et al., 2013). Difficulties with weight loss that have been associated with emotional eating are increased binge eating, reduced self-monitoring, and lower quality social support (Elfhag & Rossner, 2005; Kemp, Bui, & Grier, 2013; Konttinen, Männistö, Sarlio-Lähteenkorva, Silventoinen, & Haukkala, 2010; Powell, Frankel, & Hernandez, 2017; Raspopow, Matheson, Abizaid, & Anisman, 2013; Ricca et al., 2009).

Despite these findings, many individuals maintain a normal weight even though they engage in emotional eating (Geliebter & Aversa, 2003). Minimal focus has been dedicated to this group, and what differentiates these individuals from emotional eaters who become overweight or obese, as will be elaborated below. The present study seeks to illuminate the factors that allow emotional eaters of normal weight to maintain their weight through conducting in-depth one-on-one interviews. For reasons elaborated below, we chose to pursue the following two areas to increase understanding of the relationship between emotional eating and weight in individuals of normal weight: (1) compensatory behaviors used to regulate their weight, and (2) concerns regarding their emotional eating.

Compensatory Behaviors For Weight Regulation

The present study seeks to elucidate how some emotional eaters manage to maintain a normal weight despite consuming excess calories during emotional eating episodes. In order to do so, we aimed to identify behaviors that offset the excess calories (i.e. compensatory behaviors) that individuals of normal weight who engage in emotional eating use. Such compensatory behaviors may explain the lack of weight gain in these emotional eaters (e.g., Feller et al., 2015; Fogelholm & Kukkonen-Harjula, 2000; Garner, Davis-Becker, & Fischer, 2014; Hayes & Napolitano, 2012).

Many compensatory behaviors exist but specifically exercise and compensatory eating behaviors have been associated with emotional eating. Previous studies have shown that exercise contributes to weight maintenance in emotional eaters (Dohle et al., 2014; van Strien & Koenders, 2011), however the quantitative design of such studies has not allowed for an in-depth examination of what motivates these individuals to exercise and whether exercise is used as a direct compensation for overeating. Compensatory eating behaviors may also be related to emotional eating and weight maintenance. For example, the ability to monitor internal hunger and satiety cues has also been implicated in regulating eating behaviors and reducing food consumption (Geliebter & Aversa, 2003; Goossens et al., 2007; Tan & Chow, 2014). However, specific ways in which emotional eaters of normal weight may rely on these cues to regulate their eating and weight is not known.

Exercise as a compensatory behavior. Engaging in regular physical activity has been shown to protect against weight gain (Vuori, 2001) as well as reduce depression and other forms of negative affect (Dunn, Trivedi, Kampert, Clark, & Chambliss, 2005) that can lead to emotional eating. Subsequent longitudinal studies have shown the importance of physical activity for emotional eaters; physical activity has been found to moderate the relationship

between emotional eating and weight gain over time (Koenders & van Strien, 2011). Dohle et al. (2014) similarly found that emotional eaters who exercised more frequently had lower BMIs over a 1-year period than those who exercised less frequently. Physical activity may help compensate for overeating and thus help to prevent weight gain typically observed in emotional eaters.

Compensatory eating behaviors and emotional eating. Emotional eating has been associated with reduced awareness of internal hunger and satiety cues, in part because stress alters one's ability to be aware of these internal cues (Tan & Chow, 2014). Goossens, Braet, and Decaluwé (2007) also found that individuals who experienced binge-eating episodes engaged in emotional eating because they were unable to suppress their food consumption. However, individuals of normal weight who engage in emotional eating have been found to consume less food in response to negative emotions than individuals with overweight or obesity (Geliebter & Aversa, 2003). Thus, it may be that individuals of normal weight are more aware of their internal hunger and satiety cues even under stress.

Other compensatory eating behaviors are associated with eating disorders and disordered eating behavior. For example, fasting is a correlate of body dissatisfaction, internalization of thin ideals, and restrained eating (LePage, Crowther, Harrington, & Engler, 2008). Purging is also associated with eating disorders including bulimia and binge eating disorder (Roberto, Grilo, Masheb, & White, 2010). The present study seeks to examine whether or not such behaviors are present in emotional eaters of normal weight.

Concerns Regarding Emotional Eating

Emotional eating has been related to concerns including increased external motivation for eating healthily and heightened monitoring of one's food consumption, outside of emotional

eating episodes (Adriaanse, Ridder, & Evers, 2010). Similarly, worries about weight prior to a physical activity intervention have been shown to predict emotional eating and continued concern about weight but not post-intervention BMI (Belcher et al., 2011). Thus, weight concerns may help to protect against actual weight gain. The present study aims to identify what concerns individuals of normal weight who engage in emotional eating may have with regards to their eating behaviors and explore how such concerns may motivate weight regulation.

Concerns regarding body image. Negative body image has been associated with emotional eating (Annesi & Mareno, 2015). Additionally, being discontent with one's body is related to wanting to lose weight (Lee, Sohn, Lee, & Lee, 2004). Conversely, individuals who are less concerned about their body image and eating habits may be less likely to engage in emotional eating (Quick & Byrd-Bredbenner, 2014). Individuals with greater flexibility in their body image are also less likely to binge eat, which is associated with emotional eating (Duarte & Pinto-Gouveia, 2015). However, previous research on the relationship between body image, weight, and emotional eating has predominantly studied individuals with overweight or obesity or individuals with diagnosed eating disorders. The present study will explore the extent to which individuals of normal weight who engage in emotional eating experience body image concerns and examine the relationship between these concerns, emotional eating, and weight.

Aim

Through qualitative interviews examining the compensatory behaviors and concerns associated with emotional eating in individuals of normal weight, the present study aims to elucidate the mechanisms through which individuals of normal weight who engage in emotional eating maintain their weight.

Methods

Participants

Participants for the study were undergraduate students recruited from a larger survey study ($N = 200$) exploring the relationship between emotional eating and several psychological constructs. Both studies were approved by the university's research ethics board. Of those who completed the survey, a total of 58 participants were deemed eligible to participate in the present study based on the following three inclusion criteria: (1) scoring 3.25 or higher on the emotional eating subscale of the Dutch Eating Behavior Questionnaire (DEBQ; van Strien, Frijters, Bergers, & Defares, 1986), which represents the 80th percentile based on a normative Dutch sample (van Strien, Herman, Anschutz, Engels, & de Weerth, 2012), (2) endorsing a BMI within the normal weight range based on self-reported height and weight, and (3) reporting that they had maintained their weight within 5 pounds over the past 1 to 2 years. Weight maintenance was a criterion to ensure that participants were not formerly of higher weight, and thus did not differ in compensatory behaviors and concerns based on previous weight status.

Sampling

Recruitment for the present study was conducted sequentially, as the larger survey study from which participants were selected was ongoing. For every 50 participants who completed the larger survey study, eligible participants were identified based on the criteria outlined above. Two participants were then randomly selected using a random number generator (randomizer.org) and sent an email invite to participate in the interview. If a participant failed to respond, a new one was randomly selected and contacted from the same cohort of eligible individuals. Throughout this process and until data saturation was achieved, a total of five individuals refused to participate (3 did not respond to the initial email, 1 stated that they were

too busy to participate, and 1 failed to attend their interview appointment with no reason provided). This initial email was the only direct contact participants had with the researcher prior to the study.

Data Saturation

There is a lack of consensus between researchers regarding the number of interviews required in qualitative research to reach data saturation (Bernard, 2012). Rather it has been suggested to treat data saturation as a moving target that is achieved once no new codings and themes are identified from additional interviews (Guest, Bunce, & Johnson, 2006). To facilitate this approach in the present study, participants were recruited two at a time and preliminary codings and themes were generated after the first couple of interviews and then refined as subsequent interviews were conducted. Recruitment was terminated when new themes ceased to emerge in interviews. This point of data saturation was achieved after eight interviews in the present study as per consensus amongst the three researchers (all authors). This number of interviews was in line with findings by Guest, Bunce, and Johnson (2006) who conducted an experimental study and found that data saturation may occur within as few as six interviews. As emphasized by Burmeister and Aitken (2012), the focus of the present study was on data richness and depth, rather than solely data quantity.

Measures

The DEBQ is a self-report questionnaire with 33 items on three different subscales: restrained eating, emotional eating, and external eating. For the purpose of this study, only the 13-item emotional eating subscale was used. Participants were asked to rate the frequency with which they experienced the desire to eat in response to a variety of emotions on a 5-point Likert-

type rating scale from never (1) to very often (5). The DEBQ has been found to have high factorial validity as well as high internal consistency (van Strien et al., 1986).

Procedure

Individual in-depth interviews were conducted with each participant to learn about various aspects of their emotional eating. Each interview lasted between 45 to 60 minutes and was conducted in a closed office on the university campus. Participants were compensated $20 for their time at the end of the interview. The interviews were semi-structured, following a set of questions examining three aspects of emotional eating: (1) history of emotional eating, (2) compensatory behaviors used to maintain weight, and (3) concerns regarding emotional eating. For the purpose of this study and its focus on emotional eating and weight regulation, only data from the latter two sections of the interview were included. The interviews were conducted by the first author, a female senior PhD student in clinical psychology who had received training in interviewing and assessment as part of her clinical training. A female undergraduate research assistant (second author) observed some of the interviews for learning and training purposes.

Prior to commencing each interview, the researcher introduced herself and provided participants with a brief overview of the purpose of the study, namely that the researchers were interested in examining the relationship between emotional eating and weight. Participants were informed that they would be asked several questions pertaining to this topic and that they were free to answer as they wished, both regarding content and level of disclosure. They were also informed that the interview would be audio recorded for transcription purposes. All participants consented to this prior to study commencement.

The section on compensatory behaviors explored strategies that participants utilize to regulate their weight. They were asked how they thought they maintained a normal weight

despite their eating behaviors, as well as what behaviors they actively engaged in to maintain their weight. Questions were also asked to better understand what their episodes of emotional eating looked like, delving specifically into the factors that caused them to stop eating.

The final section asked questions about participants' concerns regarding emotional eating. This part of the interview explored the feelings individuals had when engaging in emotional eating, as well as the possible negative effects they thought emotional eating might have on their life, both in terms of weight and other health problems. Questions were also asked to ascertain individuals' interest in reducing or eliminating their emotional eating, versus how they felt about continuing to engage in this behavior.

Results

Data Analysis

Braun and Clarke's (2006) procedure for thematic analysis in psychological research was used to analyze the data. A data-driven approach was used for the analysis with themes derived from the data itself instead of being identified in advance. All interviews were first transcribed and then coded into basic elements. Codings were then organized into preliminary themes, based on the sections of the interviews pertaining to compensatory behaviors and and concerns with emotional eating. Preliminary themes were reviewed and edited, prior to defining and naming a finalized list of themes that encompassed the entirety of the data set. Codings and themes were reviewed by two researchers (first and second author) throughout the analytic process to ensure consensus.

Demographics

A total of 8 participants were interviewed, 7 of which were female. 88% of the sample identified as Caucasian. The mean age of participants was 19.00 years and the mean BMI was 22.09. Participants scored an average of 3.78 on the DEBQ emotional eating subscale.

Themes Pertaining to Compensatory Behaviors

Four themes were identified regarding compensatory behaviors used by individuals to compensate for their emotional eating: (1) physical activity as a compensatory behavior, (2) the use of alternative stress reduction and coping strategies, (3) compensatory eating behaviors, and (4) the impact of metabolism.

T1: Physical activity as a compensatory behavior. The vast majority of participants endorsed the use of physical activity to compensate for their emotional eating and regulate their weight. The type and duration of physical activity varied between participants, with some participants engaging in unstructured, moderate exercise (e.g., long walks) and others reporting structured, high intensity exercise (e.g., cardio exercises such as running or interval training). Some participants noted that they engaged in physical activity regardless of the severity and frequency of emotional eating episodes while others described engaging in more physical activity after episodes of emotional eating. Multiple participants reported using exercise for stress relief to avoid emotional eating.

> *I know that like as long as I get a workout in before noon every day, the rest of my day is going to be great. It's going to be fine, and whatever stress I have, I'm not going to go to an extreme. (8)*

Some participants also connected their use of physical activity to helping alleviate mental health concerns, both in the presence and absence of their emotional eating.

Even when I'm not overeating, exercise just makes me feel like a lot better, physically, but also emotionally and mentally. (4)

T2: The use of alternative stress reduction and coping strategies. Participants cited the use of specific stress reduction techniques and other coping strategies as replacements for the mood enhancing effects of emotional eating. Such techniques included tools derived from Cognitive Behavioral Therapy (CBT), like thought records for cognitive restructuring, that participants described learning during therapy for mental health concerns such as anxiety. Participants who had experienced mental health concerns noted that managing these concerns helped them to reduce emotional eating.

Part of the CBT techniques that my counsellor taught me was to pinpoint exactly what triggered my bad mood, and work from there to see whether or not it's rational for me to be upset over it, or if I'm blowing things out of proportion. (1)

Social support was also mentioned as a coping strategy. Some participants said that engaging socially with others compensated for negative emotions, such as loneliness, that led to emotional eating. Multiple participants discussed talking to friends about things that were bothering them while others reported using their parents as a support system.

It feels like I don't have to just turn to food to feel better, I can turn to friends instead. (7)

T3: Compensatory eating behaviors. Participants described eating behaviors they engaged in after emotionally eating to compensate for their overconsumption. A common theme was the reduction of food intake after emotional eating. Some participants fasted in the days after emotional eating episodes while others simply ate less food in the subsequent days.

If I do have a big weekend of eating, like a big emotional eating session, I will be more careful in what I'm eating for the following days. (6)

Many participants also endorsed the desire to engage in healthy eating habits, regardless of their emotional eating, viewing it as a lifestyle choice. However, many also cited healthy eating as motivation to avoid emotional eating. For example, participants described that by starting their day in a healthy way, they were more likely to continue eating healthy (and thus avoid emotional eating) throughout the remainder of the day.

Some participants took their perception of "healthy" eating to an extreme, engaging in cleanses after prolonged emotional eating. Most, however, simply monitored what they consumed and elected to make healthy, balanced dietary choices. Several participants also endorsed vegetarian or vegan lifestyles, which required them to consume healthier foods.

> *A big thing that has helped me in changing my diet has been becoming a vegetarian, and now becoming a vegan. I kind of create even more restrictions to my day. (5)*

Several participants mentioned that they avoided overeating during emotional eating episodes. In other words, despite consuming unhealthy foods when emotional, many described still trying to stop once they noted that they were full.

> *I don't tend to overeat that much because I don't want to gain weight. I don't want to be overweight, so I'll overeat to like 5% past my capacity. I won't get to a point where I want to vomit, it'll just be a point where I'm full. (3)*

Some participants noted mindful eating habits; they described intuitively paying attention to their hunger and satiety cues to guide their eating. This body awareness was attributed to a few factors. One participant credited chronic pain with helping her to be aware of what her body needed, while others endorsed feeling in tune with their bodies as helping them maintain a normal weight.

I've become a little bit better with recognizing what it is my body needs {as a result of chronic pain}, and this awareness helps with my eating. (4)

Avoiding unhealthy trigger foods was another strategy frequently used by participants. Participants endorsed not buying certain foods that they knew they would be likely to consume in response to emotions. Some participants avoided grocery shopping while hungry as to not make unhealthy choices, or even hid food from themselves to avoid consuming it while emotional.

Peanut butter, Nutella, those are my two big ones. So those just don't come into my apartment, and if they do they're in little individual packages, because it's really hard to eat those without noticing. (6)

Notably, most people did not endorse purposefully purging to compensate for overeating. One participant noted that while they did not actively attempt to purge, they would often eat so much during emotional eating episodes that they would inadvertently vomit.

I'm often physically sick like 75% of the time {when I engage in emotional eating}. (6)

Finally, participants put forward the idea that avoiding emotional eating behaviors led to feelings of competence and autonomy. In other words, avoiding emotional eating appeared to increase participants' self-efficacy that they could continue to disengage from this behavior and engage in healthier behaviors instead. Some participants thus made active attempts to improve their emotional eating habits and become healthier, as well as to attain a more balanced lifestyle.

I'll start, and like, today's going to be different, today I'll have a healthy breakfast, and then once you do and you feel really good about it and you're like "hey, this is nice to maintain", and then yeah, I feel like it's also just like a meal prep kind of thing of like

"oh, I'll make this and then I'll have it for lunch today, and lunch tomorrow, and then I'll take this snack to my class". (5)

T4: The impact of metabolism. Several participants believed that they were able to maintain their weight because of a fast metabolism. These participants, more often than not, reported that they did not eat particularly healthily and also did not exercise. However, they did acknowledge that they would not always be able to rely on their metabolism to maintain their weight.

I honestly could not tell you {how I maintain my weight}. I find it a miracle that I'm not morbidly obese. I think it's probably some sort of genetic thing because my weight doesn't fluctuate. (4)

Themes Regarding Concerns About Emotional Eating

There were six overarching themes regarding participants' concerns about their emotional eating: (1) concerns about weight, (2) concerns about health, (3) emotional eating as an ineffective coping mechanism, (4) emotional eating as difficult to abate, (5) avoiding immediate negative physical and psychological effects of emotional eating, and (6) negative social evaluation.

T1: Concerns about weight. The majority of participants endorsed concerns about eventual weight gain. While some participants viewed emotional eating as a barrier to attaining their ideal body weight, others believed that over time, emotional eating would cause them to become overweight. Some participants put forward the idea that their worry about weight gain would protect them from actually gaining weight. Similarly, some participants noted that they were diligent about compensatory behaviors such as exercise because they were concerned about weight gain.

I still do have a lot of anxiety over weight gain, so when I do have a large emotional eating session, I think about that a lot and stress over it, which is one of the reasons why exercise is such a compulsion afterwards. (8)

Although many participants were more concerned about long term weight gain, some participants endorsed that their emotional eating could trigger them to worry about immediate weight gain.

Total regret. Yeah, as soon as I start eating it, I'll be like "Ah this was a mistake". I know it's not happening, but I feel myself physically gaining weight. (3)

Additionally, a few participants described a relationship between avoiding emotional eating and body image concerns. The negative body image that they believed would come with weight gain was cited as motivation to avoid emotional eating.

I'll always have that fear of putting that weight back on, so that also keeps me from doing it a lot. I was just so unhappy at the weight that I was, I wasn't comfortable in my body, I didn't feel pretty, I hated my body. I'm terrified of ever feeling like that again. (6)

T2: Concerns about health. Participants reported concerns about their health, regardless of weight. Multiple individuals noted that they were actively trying to reduce their emotional eating because of anticipated health concerns. Some described worry about experiencing similar health concerns to their parents, such as developing chronic diseases like diabetes. Participants mostly predicted long-term concerns about their health but were not noticeably concerned about the implications of emotional eating on their health in the short-term. Multiple participants also noted that they were concerned about health problems associated with weight cycling that could occur as a result of emotional eating. Regardless of weight gain, however, individuals noted concern about the potential effects of their emotional eating on their overall health.

Even though you're not putting on weight, it still can affect your cholesterol, your, you know, everything else. There could be health consequences, so there's that that you need to be mindful about also. (4)

T3: Emotional eating as an ineffective coping mechanism. Some participants viewed emotional eating as an unhealthy way to cope with their problems. These participants believed that emotional eating carried mental repercussions such as negative body image and ineffective coping. A few participants put forth the idea that emotional eating covered up a deeper issue that needed to be dealt with. Some of the participants who endorsed emotional eating as an unhealthy way to cope with stress reported that they were actively working on using alternatives to coping mechanisms.

I think it's kind of a cover-up to a deeper issue that you're not dealing with. You have an issue and instead of learning to deal with it, you're covering it up. While that might work for the time, you can't live your whole life avoiding your problems. At some point, something's going to catch up to you. (5)

Multiple participants cited concern that their emotional eating would lead to other, more problematic behaviors. They believed that engaging in emotional eating reduced their willpower and could make it easier to use other substances for comfort and emotion regulation. In other words, they cited concerns about "addiction transfer" from food to other addictive substances.

I think it'd just become more and more easy to turn to any substance that would make you feel better. If it's not food, it's cigarettes, it's drugs, it's drinking. I think eventually, you just start looking for something to make you feel better, and then that stops working, so you look for something better than that, and something better than that. It can definitely be a spiral. (6)

T4: Emotional eating as difficult to abate. Participants were varied in their motivation to cease emotional eating. Many participants believed that their emotional eating would be virtually impossible to get rid of. While some described that they were actively trying to reduce emotional eating, others were more ambivalent about changing their emotional eating. Multiple participants tended to normalize their emotional eating, justifying that because they were normal weight, they needed not be concerned about it. Some had previously tried to eliminate their emotional eating and because of failed past attempts they were now content with the reality that their emotional eating could not be eliminated.

> *I mean, it's always good to dream that it will go away, but knowing myself I'll know that I'll be able to reduce it, but it will never go away. It will always be this part of me and it's just going to come back. (7)*

Many participants described concerns pertaining to emotional eating and control. Control was described on a continuum from feeling in control of their emotional eating at times, to worrying about "losing control" over emotional eating. For many of the participants who described concerns with control, emotional eating was considered an addiction. Also, some participants felt ashamed of their emotional eating and regarded it as an indicator of low self-control.

T5: Avoiding immediate negative physical and psychological effects of emotional eating. Most participants described that both the physical and psychological effects that occurred as a result of emotional eating were unpleasant. Some participants noted that they disliked the bloated and lethargic feelings that resulted from overeating. Participants also endorsed that avoiding aversive physical consequences related to emotional eating motivated them to avoid

engaging in this behavior. Some participants said that they avoided emotional eating because they knew that their bodies felt better when they consumed healthier foods.

> *Throughout the years with exercising more and everything, I feel like I have become a little better at recognizing what's healthy and what's not. As I've started eating healthier, my body just doesn't react as well to junk food. (4)*

Participants also cited the desire to avoid aversive psychological consequences of emotional eating, such as feelings of guilt and shame. Many participants described that guilt helped them to self-regulate. For example, for some participants guilt arose from fear of gaining weight, thus motivating them to avoid emotional eating. Overall, participants described that negative psychological feelings such as guilt helped motivate them to not engage in emotional eating.

> *I don't do well with guilt generally, and I generally tend to build up a lot of guilt that's unnecessary. So if I feel guilt after emotional eating, it really hits me hard, and I feel like it's motivation that I don't want to feel bad about this again. (5)*

Conversely, other participants endorsed that they did not experience negative feelings such as guilt after emotionally eating. They reported feeling that emotional eating was normal, had no noticeable effects on their body, and that the act of eating palatable food was overall pleasant.

> *It's anticipation {of eating}, it's enjoying it at the time. I don't know if I would necessarily feel super guilty after, maybe because it's become kind of status quo and I accept a little bit that it's out of my control. (2)*

T6: Negative social evaluation. Several participants saw their eating habits as abnormal compared to that of their peers and cited this as a motivation to change their behavior. Hearing

other people's negative comments about their eating, especially those of family members helped some participants reduce their emotional eating. Others described that seeing their roommates and friends eating healthier foods motivated them to do the same and thus not engage in emotional eating behaviors.

> *I feel like there's more of an expectation living with roommates. When I see them going through a healthy day, it's like, "well I'm not even hungry, so why, when like they're not constantly eating, why do I?" Then I don't do it as much, because you see healthy behavior and you're like, "well, that seems more logical, I'm going to do that." (5)*

Others endorsed the concern that their behavior would be off-putting to others if they were aware of it.

> *It was always the feeling of getting caught, and just being embarrassed that somebody saw me in that state, so, not that I think there's a real consequence, but more I just fear that judgment again. (6)*

Discussion

The present study aimed to provide insight into the ways in which individuals of normal weight who engage in emotional eating are able to maintain their weight, approaching this goal through qualitative interviews. These interviews focused broadly on two domains: (1) compensatory behaviors used by these individuals to maintain their weight, and (2) concerns held by individuals of normal weight regarding their emotional eating.

Compensatory Behaviors

Physical activity was a compensatory behavior frequently endorsed by participants. Because physical activity has been found to protect against weight gain, this relationship may explain why participants were able to maintain their weight while emotionally eating (Dohle et

al. 2014; Koenders & van Strien, 2011; Vuori, 2001). Additionally, participation in physical activity may play a role in reducing the severity of mental health concerns and disordered eating that were associated with emotional eating in the present study. Herring, O'Connor, and Dishman (2010) conducted a systematic review finding that exercise improved symptoms of anxiety. Because emotional eating has been linked to mental health concerns such as anxiety and depression (Eddy et al., 2007), these findings provide empirical support that physical exercise may have alleviated some of these concerns and thus lessened the severity of emotional eating for some participants.

Several participants mentioned their metabolism as a key factor in their weight regulation, attributing their ability to maintain a normal weight to their genetics and ability to metabolize foods quickly. Interestingly, these participants were less likely to endorse actively using compensatory mechanisms to try to maintain their weight. Future research could examine whether such individuals are more likely to gain weight in the future given that metabolic processes slow during aging (Poehlman, 1993).

Despite regularly engaging in emotional eating, some participants also endorsed the use of alternative stress reduction and coping strategies to try and reduce the frequency of their emotional eating. It is likely that the development of such strategies assisted their weight regulation as these participants had alternative options to cope with negative emotions that did not involve food. This finding points to the importance of teaching emotion regulation to emotional eaters to promote both physical and mental health.

Additionally, several participants cited compensatory eating behaviors; these individuals endorsed some ability to suppress their food intake in attempts to avoid overeating. Thus, some individuals of normal weight who engage in emotional eating may be able to maintain their

weight because they minimize consumption of large food portions during emotional eating episodes. This regulation of intake may result from attending to their internal hunger and satiety cues, as was cited by participants in the present study, and is consistent with the findings of Tan and Chow (2014). Thus, listening to internal cues to moderate food intake may help facilitate weight maintenance in emotional eaters of normal weight.

Concerns

Participants frequently endorsed concerns about their weight, specifically citing worry about weight gain. Consistent with previous research, these individuals endorsed high worry regarding weight gain, despite emotional eating not influencing their actual weight (Belcher et al., 2011). While body image concerns have been related to a desire to lose weight (Lee et al., 2004), participants in the present study cited motivation to maintain their current weight to avoid negative body image in the future. Participants also described concerns pertaining to their future health. This finding is consistent with studies that have found that emotional eating may lead to concerns such as heightened monitoring of eating habits and greater external motivation to pursue healthy eating and lifestyle habits (Adriaanse, Ridder, & Evers, 2010).

Furthermore, participants tended to view their emotional eating as an ineffective coping mechanism and also cited concerns that their behaviors could lead to negative social evaluation. It is possible that some individuals in the present study experienced stigmatization due to their emotional eating. Experiencing stigma has been associated with having eating disorders such as binge eating disorder (Puhl & Suh, 2015), which is related to emotional eating. Further research is needed to explore the presence of stigma towards emotional eaters and the possible effects this may have on these individuals.

Finally, participants endorsed the idea that emotional eating was difficult to abate, despite attempts to engage in alternative forms of emotion coping. They also noted that they disliked and thus attempted to avoid the short-term negative physical and psychological effects of emotional eating, such as guilt and shame, as much as possible. This is consistent with the findings of Bennett, Greene, and Schwartz-Barcott (2013) who found that guilt was associated with emotional eating, especially in females. Despite maintaining their weight, perceived weight concerns held by individuals of normal weight who engage in emotional eating may lead them to use food to cope, similar to those with overweight and obesity.

Conclusion and Clinical Implications

Findings from the present study highlight ways in which emotional eaters of normal weight maintain their weight. Comparing the present findings with the literature on emotional eating in individuals with overweight/obesity can provide insight on ways to target emotional eating in individuals of various weight statuses. For example, some emotional eaters in the present study were found to consume what they described as small amounts of food in response to negative emotions. Past studies have found that individuals with overweight and obesity consume greater amounts of food during negative mood-inducted emotional eating episodes than individuals of normal weight (Geliebter & Aversa, 2003; Jansen et al., 2008). In the present study, efforts to regulate food consumption was related back to both awareness of hunger and satiety cues, as well as attempts to use alternative coping strategies to address negative emotions.

Thus, emotional eaters of all sizes may benefit from learning strategies for regulating food intake, such as mindful eating techniques (e.g., Kristeller & Wolever, 2011). These techniques may help them to better attend to their internal hunger and satiety cues to guide them in when and how much to eat. Programs that involve emotion regulation strategies would also be

useful, such as those that teach emotional eaters how to utilize healthier coping mechanisms like social support and self-care when they are experiencing negative emotions. Therapeutic approaches such as Acceptance and Commitment Therapy (ACT; Hayes et al., 1999) and Dialectical Behavior Therapy (DBT; Linehan, 1993a, 1993b) may be applied to help promote distress tolerance in emotional eaters.

Also, these results suggest that promoting exercise may be useful for emotional eaters, both in terms of weight regulation and stress reduction. As discussed, past studies have found a protective effect of exercise on weight gain in emotional eaters (Dohle et al., 2014; Koenders & van Strien 2011). However, it is also necessary to consider the way in which exercise is viewed by the individual before recommending it to target emotional eating. In the present study, several participants used exercise to compensate for their emotional eating in an almost compulsive manner, exercising excessively to burn off perceived excess calories. This type of exercise has been implicated in disordered eating behaviors (Lichenstein et al., 2017). To avoid this, disordered eating should be screened for and exercise should be tailored to the individual, including both psychoeducational and nutritional information (Cook et al., 2017).

Finally, because negative body image has been associated with emotional eating, both by individuals of normal weight in the present study and by those with overweight and obesity in past research (Annesi & Mareno, 2015), programs that target body image improvement could also improve the overall health and well-being of emotional eaters.

Limitations and Future Directions

This study has a few limitations that should be addressed. First, the majority of the participants interviewed were Caucasian women. Additionally, all of the participants were undergraduate students, i.e. young adults and highly educated. Given the homogeneity of the

sample, it is important that future research target other populations of individuals of normal weight that engage in emotional eating. The findings of this study point to future directions for research on emotional eating, such as further examining differences between emotional eaters who are normal weight versus those with overweight and obesity in self-regulation, fear of weight gain, and body image concerns.

Transition from Chapter 2 to Chapter 3

Chapter 2 (i.e., Manuscript 2) used qualitative interviews with emotional eaters of normal weight to determine what compensatory behaviours these individuals use to regulate their weight and to highlight concerns related to their emotional eating. The study found that participants engaged in a variety of compensatory behaviours to promote weight maintenance, including physical activity, controlling their eating behaviours, and engaging in alternative coping strategies and stress reduction tools to offset their emotional eating. It also identified concerns participants held regarding their emotional eating, including both short and long-term health consequences as well as the potential for weight gain over time. Manuscript 2 thus highlighted the need for emotional eating interventions promoting more mindful eating habits and increased emotion regulation.

This insight, combined with the overview of interventions well-suited for targeting emotional eating provided in Chapter 1 (i.e., Manuscript 1), highlights the appropriateness of ACT interventions for emotional eating. Namely, skills promoted by ACT, including values clarification, distress tolerance, and mindfulness, are well-suited to target the areas that emotional eaters struggle with. Physicians were chosen to deliver the interventions due to their contact and credibility with patients seeking weight loss in primary care and endorsing concerns with emotional eating. Thus, Chapter 3 (i.e., Manuscript 3) tests the feasibility and efficacy of a brief, ACT intervention to target emotional eating in the context of a physician-delivered weight loss clinic.

Chapter 3

Manuscript 3

Frayn, M., Carrière, K, & Knäuper, B. Lessons learned from an ACT-based physician-delivered weight loss intervention: A pilot RCT demonstrates limits to feasibility. *Open Psychology (Under Review).*

Abstract

Background: Acceptance and Commitment Therapy (ACT) interventions have shown to be effective in facilitating weight loss for emotional eaters, however, the lack of accessibility of these interventions limits their impact. The present study aimed to increase the accessibility of an ACT intervention for emotional eaters through delivery by physicians.

Methods: This two-arm pilot randomized controlled trial tested the effectiveness and feasibility of a brief ACT intervention for emotional eaters compared with standard care at a weight loss clinic in Toronto, Canada. Primary outcomes were changes in weight and emotional eating. Treatment satisfaction was also assessed.

Results: Participants in neither condition lost weight. Both conditions displayed decreases in emotional eating, but no condition interaction was found. Both patients and physicians reported high treatment satisfaction with the ACT intervention. However, there were high attrition rates and variability in intervention completion times.

Conclusion: The ACT intervention led to reductions in emotional eating and was well received by patients and physicians alike. However, the present study identified high attrition as a limitation to the feasibility of this mode of intervention delivery. Future interventions may be more effectively delivered in primary care settings by encouraging further brevity and exploring delivery by other health professionals.

Trial registration: ClinicalTrials.gov NCT03611829. Registered 26 July 2018. Retrospectively registered.

Introduction

Obesity and Emotional Eating

Overweight and obesity are growing public health problems globally. Having overweight/obesity is associated with health issues such as type II diabetes, hypertension, and heart disease (Grundy, 2004; Haslam & James, 2005). Weight-related health problems contribute significantly to mortality rates and place a large burden on healthcare systems worldwide (Withrow & Alter, 2011). Intensive behavioral weight loss interventions such as the Diabetes Prevention Program (DPP) focus on changing diet and exercise habits and have shown to be efficacious in achieving weight loss in those who have overweight and obesity (Knowler et al., 2002). However, such programs have been shown to be less effective for individuals with overweight and obesity who engage in emotional eating (Delahanty et al., 2013; López-Guimerà et al., 2014; Teixeira et al., 2010). Emotional eating is defined as the tendency to overeat in response to emotions such as stress and anxiety (van Strien et al., 2007). A recent review found emotional eating to be linked to weight concerns, both in terms of weight gain over time as well as difficulties with weight loss (Frayn & Knäuper, 2017). Emotional eating may lead to weight gain and deter weight loss through increased consumption of unhealthy foods (Elfhag & Rossner, 2005). Individuals who engage in emotional eating have been shown to be over 13 times more likely to have overweight and obesity than those who do not (Ozier et al., 2008). Between 43% to 60% of those with overweight/obesity are estimated to engage in emotional eating (Ganley, 1989; Jääskeläinen et al., 2014).

Traditional behavioral weight loss interventions use control-based techniques in an attempt to change negative emotions through the manipulation of thoughts and behaviors (Butryn, Webb, & Wadden, 2011). However, control-based techniques used to suppress thoughts

and emotions can actually exacerbate the exact thoughts and emotions one is trying to eliminate, in an ironic process known as the "rebound effect" (Wegner, 1994). This is problematic for emotional eaters because by definition, experiencing negative emotions triggers emotional eating. Studies have indeed shown that emotional suppression is associated with increased, rather than decreased emotional eating to cope with negative emotions (Evers, Stok, & de Ridder, 2010; Ferrer, Green, Oh, Hennessy, & Dwyer, 2017). In summary, control-based techniques such as emotion suppression may be detrimental to emotional eaters as they may increase emotions and may subsequently increase emotional eating, which may then hinder weight loss efforts.

Additionally, traditional behavioral weight loss interventions devote little time to specifically targeting emotional eating. For example, in the 22-session DPP, only two sessions address possible causes of overeating that may include emotional eating, (e.g., Knowler et al., 2002). Thus, in such interventions, emotional eaters are not taught the skills necessary to reduce their emotional eating and improve weight loss.

More recently, Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 1999) has been proposed for weight loss, particularly for emotional eaters (Forman & Butryn, 2014; Lillis & Kendra, 2014). A meta-analysis by A-Tjak et al. (2015) found that ACT-based interventions are effective for treating a variety of mental and physical health problems such as depression and anxiety. Similar interventions applying ACT for weight loss have found it to be especially effective for emotional eaters (Forman et al., 2013; Niemeier et al., 2012). Importantly, ACT focuses on accepting internal thoughts and feelings as a way of promoting healthy behaviors that align with personal values (Forman & Butryn, 2014), unlike control-based techniques used in traditional behavioral weight loss interventions. It teaches emotional eaters skills that they lack including mindfulness, acceptance, and values clarification in order to

facilitate weight loss (Forman & Butryn, 2014). Niemeier (2012) conducted a pilot study finding 13.5% weight loss for emotional eaters when ACT was added to a behavioral weight loss intervention. Similarly, Forman et al. (2013) conducted an ACT randomized control trial (RCT) for weight loss and found in post hoc analyses that those in the sample who were emotional eaters and were in the ACT condition lost almost 5% more of their initial body weight than emotional eaters who received a standard behavioral intervention (10.5% vs. 6%, respectively). Lillis et al. (2016) found that ACT interventions may be particularly useful for buffering against weight regain in emotional eaters, with a higher proportion of emotional eaters in their ACT condition achieving 5% weight loss at 24 months compared to those in the control condition. Despite the efficacy of the interventions described, a significant limitation is their time and resource intensive delivery. Such interventions are usually delivered over the duration of 1 year in the context of RCTs and are thus unavailable to those seeking weight loss in other settings, such as primary care.

The Role of Physicians in Implementing Behavioral Weight Loss Interventions

To promote greater accessibility of behavioral weight loss interventions, the Canadian Task Force on Preventative Health Care (2015) recommended that behavioral weight loss interventions should be implemented in primary care. It stated that, "Primary care providers have an important role in preventing and managing obesity through services offered to patients" (Canadian Task Force on Preventive Health Care, 2015, p. 184). The Task Force's guidelines emphasize the need for primary care settings to offer intensive behavioral weight loss interventions to individuals with overweight/obesity to manage their weight and related health concerns. Intensive behavioral interventions are defined by the Task Force as involving several sessions focused on diet, exercise, and lifestyle change over the course of weeks to months

(Canadian Task Force on Preventive Health Care, 2015). Consistent with Canadian guidelines, the U.S. Preventive Services Task Force submitted a 2011 report supporting the efficacy of behavioral weight loss interventions and recommended their implementation in primary care (LeBlanc et al., 2011).

Physicians are especially well suited to deliver behavioral weight loss interventions for several reasons. First, they are in direct contact with patients with overweight and obesity because of obesity-related comorbidities. Physicians treat a large portion of individuals with obesity because they require continuous medical care for chronic conditions such as high blood pressure, heart disease, and diabetes (Guh et al., 2009; Peirson, Douketis, Ciliska, et al., 2014; Thompson & Wolf, 2001). Second, physicians have great potential to effect weight loss in patients with overweight and obesity beyond that of other health care professionals because they are perceived as experts and viewed as role models (Fraser, Leveritt, & Ball, 2013; Galuska et al., 1999). Patients are likely to follow their physician's advice even more so than that of other healthcare professionals (Dimmateo, 1994). Rose, Poynter, Anderson, Noar, and Conigliaro (2013) found a positive association between the provision of weight loss advice by physicians and the initiation of weight loss attempts by patients.

A recent review by Tsai, Remmert, Butryn, and Wadden (2018) highlighted physicians' potential to deliver intensive behavioral weight loss interventions in primary care. They noted empirical evidence that effectiveness of such interventions hinge on physicians' abilities to engage patients in personalized treatment, provide positive reinforcement, and overall offer supportive, empathetic care. Thus, the personal contact and accountability that physicians provide to patients in conjunction with their ability to provide medically supervised weight loss management may be key to achieving clinically relevant weight loss in this high-risk population.

Current Constraints of Weight Loss Intervention Delivery by Physicians

While the delivery of intensive behavioral weight loss interventions by physicians is a tempting solution to the obesity problem, two challenges prevent physicians from effectively and efficiently delivering them to patients with overweight and obesity: (1) Lack of training and expertise and (2) lack of time.

(1) Lack of Training and Expertise

The primary challenge is that physicians are not formally trained in obesity management (Plourde & Prud'homme, 2012). A systematic review also showed that obesity management and weight loss counselling are not substantial components of medical school curricula (Chisholm et al., 2012). This lack of training indicates that physicians do not gain skills to effectively counsel patients on weight loss and effect behavior change and physicians may feel uncomfortable advising patients on weight loss because of their lack of expertise in this area (Bleich, Bennett, Gudzune, & Cooper, 2012; Jay et al., 2009). This is particularly problematic because patients with overweight or obesity constitute a large portion of physicians' caseload and given more training, physicians' contribution to obesity treatment could be substantially enhanced. Results from a recent meta-analysis identified barriers to providing weight management showed that clearer guidelines and specialized training for physicians would help reduce barriers (Dewhurst, Peters, Devereux-Fitzgerald, & Hart, 2017).

(2) Lack of Time

Second, physicians severely lack time to implement intensive behavioral weight loss interventions (Plourde & Prud'homme, 2012). Existing interventions such as the highly successful NIH-developed National Diabetes Prevention Program (DPP; Knowler et al., 2002) are administered over the course of one year and last up to 22 sessions, each session being one

hour long. The Mind Your Health Project (Forman et al., 2013), a weight loss intervention based on ACT, is also one year in duration. Thus, intensive interventions such as these are unrealistic to be administered by physicians in primary care settings.

Brief interventions, however, have shown to be effective in both reducing emotional eating and facilitating weight loss. Focused ACT interventions have shown to be effective when delivered in as little as two to four sessions (Glover et al., 2016; Strosahl, Robinson, & Gustavsson, 2012). Specific to emotional eating, a recent study found that a one-day ACT workshop reduced emotional eating at 2-weeks and 3-months post-intervention (Frayn, Khanyari, & Knäuper, 2019). Further, a brief, intensive version of the DPP for weight loss has been successfully delivered in primary care via 15-minute sessions, leading to 6.1% weight loss at 1 year (Wadden et al., 2019).

The Present Study

As described, previous studies have found ACT-based weight loss interventions to be effective for emotional eaters (Forman et al., 2013; Forman & Butryn, 2014; Hill et al., 2015; Lillis et al., 2016; Niemeier, 2012). However, such interventions are not yet widely available to the large numbers of people who struggle with emotional eating. Physicians are in a unique position to increase the accessibility of weight loss interventions by delivering them in primary care settings. Frequent patient contact and the influence physicians have on individuals with overweight and obesity makes them prime candidates to deliver weight loss interventions, but they currently lack the training and time to do so.

The purpose of the present study was to conduct a pilot RCT to test the feasibility of a physician-delivered ACT-based intervention for emotional eaters with overweight/obesity against standard care at a network of weight loss clinics. Clinical psychology doctoral students

trained physicians in the delivery of the brief manualized intervention and were available for regular consults to address the aforementioned barrier of lack of training. To address lack of time, the intervention consisted of eight, 5-10 minute sessions that could be easily incorporated into the physician's current practice. Over the duration of the ACT intervention, physicians met individually with patients to teach them various techniques to address and improve mindfulness, acceptance, and values clarification and commitment, all of which emotional eaters have been found to struggle with (Forman & Butryn, 2014). The proven habit formation technique of if-then planning (Gollwitzer, 1993) was used throughout these sessions in order to train emotional eaters to habitually use ACT techniques and to change the maladaptive habit of eating in response to negative emotions.

It was hypothesized that emotional eaters in the ACT intervention would achieve greater weight loss and greater decreases in emotional eating post-intervention than emotional eaters who received standard care (primary outcome). Hypotheses for secondary outcomes were that emotional eaters in the intervention would display decreased body fat percentage, decreased external eating, increased restrained eating, increased distress tolerance, increased mindfulness, and increased clarification of values as a result of the ACT skills taught over the course of the intervention. Patient and physician treatment satisfaction, recruitment rates, attrition rates, questionnaire completion, and intervention completion time were also assessed to evaluate the feasibility of the intervention.

Methods

The study was approved by the Research Ethics Board at the author's university. Participants provided written informed consent prior to commencing the intervention. The trial

was registered on ClinicalTrials.gov, identification number NCT03611829, and the trial protocol can be accessed there.

Trial Design

The present study was a two-arm pilot randomized controlled trial conducted from May 7, 2016 to March 7, 2018. Participants were randomized to eight sessions of either an ACT-based intervention aimed at reducing emotional eating or standard care, which involved diet and exercise counselling. All outcomes were assessed at baseline and post-intervention. The present study aimed to recruit 128 participants (64 per condition), similar to the trial protocol outlined by Knäuper et al. (2014).

Participants

Participants were adults over the age of 18 with overweight or obesity who were seeking treatment for weight loss at a clinic in Toronto, Ontario. Only participants considered to be emotional eaters, as assessed by a score of 3.25 or higher on the Dutch Eating Behavior Questionnaire (DEBQ), were included in the study (van Strien, Herman, Anschutz, Engels, & de Weerth, 2012). In addition, participants who did not speak, write, and read in English fluently were excluded from the study, as well as those who were pregnant.

Study Procedures

Participants were recruited upon initial registration at the weight loss clinic. Those who expressed interest to participate were assigned a participant ID number and asked to complete a brief prescreen questionnaire to determine their eligibility based on the criteria described above. Eligible participants were randomly assigned to either the ACT intervention or control condition based on the ID number they had initially received. Participants completed a battery of questionnaires both baseline and Session 8. Weight was measured every session.

Randomization and Blinding

Participants were randomized in 1:1 sequence using a random number generator (randomizer.org). Two hundred participant ID numbers (1-200) were randomized prior to study commencement and assigned to patients who were prescreened. Due to a high number of ineligible participants, an additional 100 ID numbers (201-300) were randomized during the recruitment process. Participants retained the same ID number throughout, regardless of their eligibility, to simplify the process for administrative staff at the clinics. Participants were blind to their condition, but physicians and administrative staff were not blind to participant condition. Physicians were not blind to participant condition because they were responsible for delivering the ACT intervention or standard care. They were thus required to know the participant's condition in order to deliver the adequate treatment. Administrative staff was responsible for providing physicians with this information and organizing study paperwork and thus needed to be aware of participant condition as well.

Physician Training

Physicians were trained in the delivery of the weight loss interventions in a 1-hour Skype training session delivered by a clinical psychology doctoral student. During this training session, each physician was taught how to administer the manualized ACT intervention and provided the opportunity to ask questions pertaining to the various skills that they would be required to teach their patients. Copies of the manual were provided to physicians to follow during sessions. Follow-up training sessions were conducted as necessary to ensure treatment fidelity and clarify questions that arose as physicians began delivering the interventions.

Intervention

Participants in the standard care condition were provided with diet and exercise counselling and psychoeducation from their physicians over the course of 8 sessions, as was routinely done at the clinic. Standard care did not involve any targeted intervention to reduce emotional eating. Thus, in addition to standard care, participants in the ACT condition were taught techniques to reduce their emotional eating. All sessions were approximately 5-10 minutes in length and weight was assessed at each visit. Three overarching skills were taught over the course of the ACT intervention: (1) values clarification and commitment, (2) metacognitive awareness, and (3) distress tolerance (Forman & Butryn, 2014). ACT participants were first taught values clarification and commitment techniques, where they reflected on their reasons for losing weight and how this would improve their quality of life. Participants were taught the BOLD technique (Breathe, Observe sensations, Listen to values, Decide on actions that are in line with values) to use their values to make discussions pertaining to avoiding emotional eating (Ciarrochi, Bailey, & Harris, 2013). Next, participants were introduced to the concept of metacognitive awareness, or recognizing and identifying one's thoughts, feelings, and emotions. Specifically, participants were trained in mindful eating, in order to increase awareness of hunger and satiety cues and avoid eating when not physically hungry (Kristeller & Wolever, 2011). Lastly, participants were taught to increase distress tolerance in the face of negative emotions that typically led to emotional overeating. Participants were taught acceptance techniques (dropping the rope, urge surfing) to use when experiencing triggering emotions or cravings (Bowen & Marlatt, 2009). An intervention summary can be found in Table 1 and the intervention manual (Frayn & Knäuper, 2016) is available from the authors upon request.

Throughout the sessions, physicians formed if-then plans with the patients to specify how to habitually use the ACT techniques to reduce emotional eating in their everyday lives. At the

end of each session, participants were given a one-page homework sheet that asked them to monitor their behavior and their use of the ACT techniques during the week. Participants were instructed to bring the homework back with them for the next session so that it could be reviewed with their physician.

Measures

Demographics. At baseline, participants reported basic demographic information including gender, age, English fluency, ethnicity, marital status, educational attainment, employment status, household income, and whether or not they smoked.

Anthropomorphic measures. Weight was measured at each of the eight sessions (primary outcome). Participant body fat percentage was assessed and recorded by their physician at baseline and at completion of the eight sessions (secondary outcome).

Emotional, restrained, and external eating. Participants were pre-screened for emotional eating using the Dutch Eating Behavior Questionnaire (DEBQ; van Strien et al., 1986). The DEBQ is a 33-item questionnaire that assesses three dimensions of eating behaviors: emotional eating (primary outcome), restrained eating (secondary outcome), and external eating (secondary outcome). The emotional eating subscale assesses the reported desire to eat under specific negative emotional conditions such as stress, anxiety, and depression. The DEBQ has high internal consistency and factorial validity (van Strien et al., 1986). The DEBQ was administered again post-intervention.

Distress tolerance. The Distress Tolerance Scale (DTS; Simons & Gaher, 2005), a brief self-report questionnaire that assesses one's ability to tolerate distressing emotions, was completed at baseline and post-intervention (secondary outcome). The scale is made up of items that assess the dimensions of distress tolerance, absorption, appraisal, and regulation. The DTS

has high reliability and high discriminant, convergent, and criterion validity (Leyro, Bernstein, Vujanovic, McLeish, & Zvolensky, 2011; Simons & Gaher, 2005).

Mindfulness. At both time points (i.e. baseline, post-intervention) participants completed the Philadelphia Mindfulness Scale (PHLMS; Cardaciotto, Herbert, Forman, Moitra, & Farrow, 2008), a 20-item self-report questionnaire that assesses two components of mindfulness: present-moment awareness and acceptance (secondary outcome). The scale has been shown to have good internal consistency and construct validity (Cardaciotto, Herbert, Forman, Moitra, & Farrow, 2008).

ACT application. At baseline and post-intervention participants filled out a self-report questionnaire designed to assess the extent of the participant's use of ACT strategies to reduce emotional eating (secondary outcome). This questionnaire was developed for the present study to evaluate participants' real world application of the intervention. Participants were asked to indicate their level of agreement on a 5-point scale (1 = strongly agree and 5 = strongly disagree) to prompts such as "My values motivate me to lose weight" and "I am able to accept negative emotions and don't have to eat when I'm feeling bad".

Treatment satisfaction. After the eighth session, participants completed a brief, self-developed questionnaire to assess their overall satisfaction with the intervention. Participants were asked to indicate their level of agreement on a 5-point scale (1 = strongly agree and 5 = strongly disagree). Physicians were also asked to complete a similar questionnaire at various points throughout the intervention to obtain their input on its feasibility and effectiveness of the intervention. Open-ended feedback was also collected from physicians, asking for their suggestions on ways to improve the intervention, and to provide insight on patient dropout/non-responsiveness.

Results

Data Analysis

All analyses were conducted in SPSS version 24. Two separate 2 (Condition: Standard Care, ACT Intervention) x 2 (Time: Baseline, Session 8) repeated measures MANOVAs were conducted for the anthropomorphic and questionnaire data outlined above, respectively, with follow-up *t*-tests conducted as necessary. Two separate MANOVAs were conducted to not lose data from incomplete cases (i.e., participants who had completed anthropomorphic but not questionnaire data). Independent samples *t*-tests were conducted for treatment satisfaction data collected at Session 8, whereas chi-square tests were conducted to compare recruitment rates, attrition rates, questionnaire completion, and intervention completion time between conditions. Missing data were not imputed because of the large drop out rates: Imputation with small sample sizes and high rates of missingness has been shown to be highly prone to Type I error (McNeish, 2016).

Sample

Recruitment was conducted from May 7, 2016 to March 7, 2018. The trial was ended prematurely due to low enrolment and mutual decision between participating collaborators to cease recruitment. No important harms or unintended effects occurred.

A total of 87 participants enrolled in the study. Forty-four received the ACT intervention and 43 received standard care. The majority of the sample was female (92.4%) and Caucasian (59.1%). Detailed demographic information and baseline characteristics for those who participated can be found in Table 2.

Figure 1 presents a flow chart outlining recruitment, randomization, and completion rates. As can be seen in the figure, only 46.0% of participants who enrolled completed all eight

sessions and even fewer completed the requisite questionnaires. Figure 2 presents a bar graph with the number of participants who completed each of the eight sessions, showing that the majority of the dropouts occurred before Session 4, with 43.7% of participants completing four sessions or less. Figure 3 presents a scatterplot of completion times (with each marker representing one participant) for those who finished Session 8, ranging from 7 weeks to over 50 weeks. The average time to complete all eight sessions was 16.3 weeks (i.e., approximately bi-weekly sessions). No differences between conditions were found on any of these variables.

Anthropomorphic measures. Anthropomorphic data was available and analyzed from 40 participants at Sessions 1 and 8. The MANOVA conducted for weight and body fat percentage yielded no significant multivariate main effect of time or interaction between time and condition, and no univariate main effects or interactions. That is, individuals in neither condition lost significant amounts of weight or body fat.

Self-Report measures. Self-report data was available and analyzed from 26 participants at Sessions 1 and 8. The MANOVA conducted for the DEBQ subscales, DTS, PHLMS subscales, and ACT assessment yielded a significant multivariate main effect of time, $F(7, 18) = 4.57$, $p = .004$, partial $\eta^2 = .64$, but no time by condition interaction. Participants in both conditions improved on all of the measures described above. Univariate results for each of the measures are described below. Main effects of time were found for all DEBQ subscales, distress tolerance, and the ACT assessment. Mean changes in all outcomes from baseline to Session 8 pooled across conditions and separately by condition can be found in Table 3.

Emotional, restrained, and external eating. Across conditions, there was a significant main effect of time on emotional eating showing a reduction of emotional eating from baseline to Session 8. There was no significant interaction between time and condition. Similar results were

found for external eating, which decreased from baseline to Session 8 for both conditions. There was no significant interaction by condition. A main effect but no interaction was also found for restrained eating, which increased from baseline to Session 8.

Distress tolerance. A significant interaction between time and condition was found for distress tolerance, $F(1, 24) = 6.16$, $p = .020$, partial $\eta^2 = .20$. Follow-up *t*-tests revealed that, unexpectedly, distress tolerance increased in the control condition from baseline to Session 8 ($M = 2.35$ and $M = 2.87$, respectively), $t(13) = -3.30$, $p = .006$, while it remained the same in the intervention condition ($M = 2.71$ and $M = 2.75$, respectively), $t(11) = -0.24$, $p = .813$.

Mindfulness. There were no significant main effects or interactions for the PHLMS Awareness or Acceptance subscale scores.

ACT application. There was a significant main effect of time on participants' ACT assessment scores from baseline to Session 8, such that scores improved over time. Participants in both conditions endorsed being better able to cope with negative emotions without eating and that their values motivated them to lose weight.

Treatment satisfaction. Treatment satisfaction did not significantly differ between conditions. All participants endorsed that the intervention helped to reduce their emotional eating, was easy to follow, and was applicable to their everyday life. Physicians also endorsed that the ACT intervention was easy to deliver, required minimal preparation time, and perceived it to be effective with their patients. Results for specific treatment satisfaction survey items from patients and physicians can be found in Tables 4 and 5, respectively.

Open-ended feedback from physicians revealed limited suggestions on ways to improve the intervention. The only feedback provided was to shorten the self-report questionnaire component of the study to facilitate ease of delivery at the clinics (i.e., some physicians reported

that the questionnaires took too long for patients to complete). Reasons provided for patient dropout and non-responsiveness included: lack of motivation, not completing the homework and not practicing the skills taught, and difficulty attending regular appointments.

Discussion

Despite the potential for physicians to deliver weight loss interventions in primary care, the present study found limitations with the feasibility of this mode of intervention delivery. Attrition was 54.0%, with only 40 of the 87 individuals who initiated the intervention completing all eight sessions. Of the 47 participants who dropped out, 31 (66.0%) did so by Session 4 (i.e., halfway through the intervention). Participants in neither condition lost weight nor decreased in body fat percentage. However, individuals in both conditions displayed decreases in emotional eating and external eating as well as increases in restraint eating, distress tolerance, and a clarification of values. In addition, both physicians and patients reported high treatment satisfaction. Physicians endorsed that the intervention was easy to deliver and well received by their patients and patients endorsed that the intervention helped to reduce their emotional eating and was applicable to their everyday lives. It should be noted that treatment satisfaction was assessed by non-validated questionnaires and that high treatment satisfaction for participants may have been influenced by high attrition.

Lack of weight loss or decreased body fat percentage in either group may be explained by several factors. First, variability in intervention completion time likely contributed to the absence of weight loss. Average intervention completion time for all eight sessions was 16 weeks (i.e., bi-weekly sessions), ranging from 8 to 50 weeks across participants. For those who took longer to complete the intervention, the lack of regular attendance and thus lower intensity likely prevented consistent behavior change that is needed to facilitate weight loss. Attrition in the

present study was also high and so results for both weight loss and other outcome variables should be interpreted with caution. Second, the lack of weight loss suggests that participants were not consistently altering their diet and exercise habits. Given that the ACT intervention specifically targeted instances of emotional eating and not other eating occasions, it may be that patient's overall dietary habits did not change substantially enough to facilitate weight loss.

The lack of group differences in significant improved outcomes (i.e., emotional eating, external eating, distress tolerance, values clarification) suggests there may have been contamination such that the control group also received strategies by the physicians to reduce their emotional eating. Given that physicians reported finding the ACT intervention to be useful, it may be that they applied some variation of these strategies to patients in the control group who brought up concerns with emotional eating, in order to facilitate the most effective care. Although this may not be desirable from a research standpoint, given that the present study was conducted in a real-world setting, it is understandable that physicians may have been motivated to use the training they received to most effectively help their patients. Future research could explore such limitations of conducting research in less controlled environments (i.e., real world settings) such as primary care.

Addressing Lack of Training in the Present Study

The present study aimed to address physicians' lack of training in behavior change (Plourde & Prud'homme, 2012) in a concise manner by having clinical psychology doctoral students deliver virtual training and provide ongoing support. Past research has suggested that physicians are open to receiving training in this area (Dewhurst, Peters, Devereux-Fitzgerald, & Hart, 2017) and the present study generally supported this. Many of the physicians, particularly those who were younger, were receptive to the training and delivery of the ACT intervention to

their patients. Although some physicians initially reported skepticism towards the intervention, quantitative feedback collected throughout the intervention suggests that physicians overall had positive views of the intervention with regards to its perceived efficacy and ease of delivery. Thus, their opinions may have changed as they delivered the intervention and saw that it was positively received by patients.

More research is needed to better identify factors that contribute to physician's willingness and openness to facilitate behavioral interventions. It may be that as behavior change is gradually incorporated into medical school curricula (Hauer, Carney, Chang, & Satterfield, 2012; Hivert et al., 2016), the newer generation of physicians acknowledges the need for effective behavioral weight loss interventions and may be more open to participating in continuing education to learn how to deliver such interventions. This emphasizes the need for the continued addition of weight management and behavior change training to medical school curricula and increasing the availability of continuing education programs in this area.

Our lack of significant changes in outcomes may have been influenced by the brevity of the training that physicians received. Although training was tailored to physicians' schedules to be as brief as possible (i.e., 1 hour), with follow-up sessions conducted as needed, this dose may still have been too small. Other brief interventions have provided physicians with 4-6 hours of training for a 21-session intervention (Wadden et al., 2019). Thus, closer to 2 hours of training may be more effective for a comparably brief 8-session intervention.

Addressing Lack of Time in the Present Study

The present study also aimed to address physicians' lack of time to deliver behavioral weight loss interventions by providing them with a brief, manualized, 8-session intervention to deliver to their patients. Our attrition rates suggest that even condensing elements from existing

interventions (e.g., Forman et al., 2013) down to as few as eight sessions is unfeasible for delivery in a primary care setting. This may be addressed in future interventions by further condensing interventions into their most active ingredients to deliver over fewer sessions. Past research has found that behavioral interventions, including emotional eating and weight-related interventions, can be effectively delivered in as little as one day (Dindo et al., 2017; Frayn, Khanyari, & Knäuper, 2019; Lillis, Hayes, Bunting, & Masuda, 2009). Future research is needed to test if this would be effective for weight loss interventions in primary care.

In addition to further condensing future interventions, it may be useful to examine and address barriers to treatment retention. In the present study, patients who completed the intervention endorsed high treatment satisfaction. However, it is not known what motivated other patients to drop out of the study. Treatment retention may be augmented by the use of Therapeutic Assessment, an approach that has been found to increase the effectiveness of short, manualized treatments (Kraupl-Taylor, Ng, & Low, 2008; Morey, Lowmaster, & Hopwood, 2010). Additionally, interventions with high retention have been found to address knowledge, attitudes, and barriers to treatment (Greene, Bina, & Gum, 2016). Qualitatively assessing these elements could inform ways to improve retention in future interventions.

Alternatively, delivery by other health care professionals such as nurses, physician's assistants, and dieticians, in conjunction with physicians, may allow for more time to be allocated to effectively delivering such interventions to patients. Past studies have found that delivery of behavioral weight loss interventions by trained non-specialists in primary care can lead to clinically significant weight losses of 5-10% (Nanchahal et al., 2012; Wadden et al., 2011). However, these interventions were not brief; they were delivered over 1 to 2 years, rendering them costly.

Conclusion

Overall, the present study found positive effects of both interventions on emotional eating and related outcomes such as distress tolerance and values clarification. The ACT intervention was also positively received by physicians and patients alike, all of which reported high treatment satisfaction. Despite these positive findings, our study also identified limitations with delivering an 8-session intervention in a real-world setting. Namely, participants struggled to complete all eight sessions, likely rendering the intervention less effective than its potential. The lessons learned from the present study, including increasing intervention brevity and testing delivery by other health care professionals, may be useful in increasing the effectiveness and feasibility of future interventions in primary care settings.

Recommendations for future interventions

1. Interventions may be more effectively delivered by other health care professionals (physician assistants, nurses, dietitians, etc.) who have more time and more training in behavior change. This could be done in collaboration with physicians and psychologists to offer patients access to a multi-disciplinary team to address their weight and health concerns.
2. If physicians deliver such programs, it is important to ensure motivation and training. Physicians' openness and confidence in delivering behavioral weight loss programs hinges on receiving sufficient training in this field, ideally beginning in medical school and in subsequent continuing education.
3. Further condensing and testing existing, effective weight loss interventions may be useful to determine the minimum effective dose. This may better facilitate the delivery of such interventions in primary care settings where time and resources are often limited.

4. Conducting focus groups or needs assessments with physicians, other health care professionals, and patients would be useful to gain their insight into how best to develop such interventions to be as efficient and effective as possible for all stakeholders. This feedback could be used to guide development of such interventions, tailoring them to the target population and setting. This may help to increase the integration of behavioral interventions into primary care, thus broadening their dissemination to individuals seeking help with changing health-related behaviors.

Table 1. Intervention summary

Session	Session Content	Homework
1 – Emotional eating	The patient and physician discussed emotional eating and what emotions lead to the patient overeating, and what situations in the patient's life lead to these emotions. They went over the patient's DEBQ results to determine what emotions they scored the highest on.	The patient kept an emotional eating diary for 1 week, where each time the patient overate they wrote down the emotions they felt before and after overeating, as well as whether or not they were truly hungry.
2 – Values	The patient and physician discussed what core values are. They discussed why the patient wanted to lose weight and why weight loss is important to them, as well as how their values are related to emotional eating and how emotional eating may hinder their weight loss progress.	The patient wrote down their reasons for wanting to lose weight and how these reasons are related to emotional eating.
3 – Using values to make decisions	The patient and physician briefly reviewed the patient's values related to losing weight. The physician taught the patient the BOLD technique and how to use it to reduce emotional eating, as well as introduced if-then plans and how they can be used to reduce emotional eating.	The patient practiced following if-then plans (IF I want to eat when I experience _____ emotion, THEN I will use the BOLD technique). They journaled their observations from a time when the BOLD technique was used to reduce emotional eating.
4 – Acceptance	The patient and physician discussed the concept of accepting and tolerating negative emotions. The tug-of-war metaphor and the concept of dropping the rope in the face of negative emotions was introduced. They brainstormed alternative ways to respond to negative emotions (instead of eating).	The patient practiced dropping the rope and finding alternatives to eating in response to negative emotions. The patient used the if-then plan "IF I feel _____ emotion, then I will practice dropping the rope and do (alternate behaviour) instead of eating". They journaled a time when this occurred doing the week and what the experience was like.

5 – Urge surfing	The patient and physician discussed the concept of urge surfing and how it can be used when experiencing emotions or cravings to prevent overeating.	The patient practiced urge surfing using the if-then plan "IF I feel _____ emotion, THEN I will practice urge surfing". They journaled a time during the week when urge surfing was used and what the experience was like.
6 – Mindful eating	The physician explained the concept of mindful eating and how to do it. They completed a mindful eating exercise to train the patient in how to prevent mindless eating.	The patient practiced mindful eating at home. They used the if-then plan "IF I want to eat my favourite treat, THEN I will practice eating it mindfully". They journaled a time during the week when mindful eating was used and what the experience was like.
7 – Establishing habits	The physician reviewed the skills taught in the first six sessions to help reduce emotional eating and promote long-term weight loss. They discussed the techniques that the patient found most useful and emphasized the importance of practicing these skills routinely to establish a habit.	The patient chose the if-then plans that worked best for reducing their own emotional eating and wrote them down. They tailored them to the emotions the patient finds most triggering.
8 – Commitment to values	The patient and physician discussed setbacks, loss of motivation, and how they are a normal and inevitable part of the weight loss journey. They discussed ways to stay committed to values and goals despite setbacks. The if-then plans the patient had chosen as the most effective were reviewed. The patient wrote those plans on a summary card.	The patient was encouraged to keep the summary card of if-then plans somewhere accessible to act as a constant reminder of values when feeling a lack of motivation.

Table 2. Baseline characteristics

	Standard Care	ACT Intervention
Demographics		
Age, mean (*SD*) (years)	46.87 (15.18)	46.94 (14.21)
Gender, *n* (%) female	30 (96.77)	31 (88.57)
Caucasian, *n* (%)	15 (48.39)	24 (68.57)
Married, *n* (%)	17 (53.13)	19 (54.29)
Education, *n* (%) some college/university	15 (48.39)	11 (31.43)
Employed, *n* (%)	19 (61.29)	20 (57.14)
Household Income, > $40,001, *n* (%)	11 (35.48)	17 (48.57)
Smoker, *n* (%)	2 (0.06)	3 (0.09)
Anthropomorphic Measures		
Weight, mean (*SD*) (kg)	96.01 (25.66)	96.93 (25.85)
Body fat percent, mean, (*SD*)	43.53 (7.70)	43.19 (7.77)
Self-Report Measures		
DEBQ emotional eating, mean (*SD*)	4.09 (0.53)	3.96 (0.49)
DEBQ external eating, mean (*SD*)	3.57 (0.65)	3.56 (0.56)
DEBQ restrained eating, mean (*SD*)	3.18 (0.64)	3.17 (0.69)
DTS total score, mean (*SD*)	2.48 (0.94)	2.69 (0.84)
PHLMS awareness, mean (*SD*)	36.03 (6.01)	36.06 (6.78)
PHLMS acceptance, mean (*SD*)	24.94 (7.79)	26.00 (7.00)
ACT assessment, mean (*SD*)	2.92 (0.73)	2.90 (0.70)

Notes. n = 43 and n = 44 for the standard care and ACT intervention conditions for anthropomorphic and DEBQ data. n = 31 and n = 35 for the standard care and ACT intervention conditions for the remaining questionnaire data. No significant differences were observed between conditions on anthropomorphic or questionnaire measures at baseline using independent samples t-tests ($p < .05$*)*

Table 3. Mean changes with confidence intervals in all outcomes from baseline to Session 8 separately by condition and pooled across conditions

	Standard Care	ACT intervention	*t*	*df*	*p*	Cohen's *d*	Pooled	*F*	*df*	*p*
Anthropomorphic Measures										
Weight, kg	1.56 [-7.49, 10.62]	0.71 [-2.32, 3.76]	0.18	38	.861	0.06	1.16 [-3.60, 5.92]	0.23	1, 38	.636
Body fat %	-0.72 [-1.53, 0.09]	0.16 [-0.92, 1.23]	-1.38	38	.175	-0.45	-0.30 [-0.95, 0.35]	0.78	1, 38	.382
Self-Report Measures										
Emotional eating	-0.92 [-1.35, -0.49]	-0.91 [-1.47, -0.35]	-0.04	24	.968	-0.02	-0.92 [-1.23, -0.60]	33.05	1, 24	< .001
External eating	-0.52 [-0.98, -0.06]	-0.31 [-0.78, 0.16]	-0.70	24	.489	-0.29	-0.42 [-0.73, -0.12]	7.50	1, 24	.011
Restrained eating	0.27 [-0.01, 0.55]	0.26 [-0.16, 0.68]	0.06	24	.954	0.02	0.27 [0.04, 0.49]	5.47	1, 24	.028
Distress Tolerance	0.52 [0.18, 0.86]	0.04 [-0.31, 0.39]	2.14	24	.043	0.87	0.30 [0.05, 0.54]	6.16	1, 24	.020
Mindfulness										
Awareness	-1.50 [-4.51, 1.51]	1.67 [-1.76, 5.10]	-1.52	24	.142	-0.62	-0.04 [-2.23, 2.16]	0.01	1, 24	.937
Acceptance	1.64 [-2.16, 5.45]	-1.83 [-3.82, 0.15]	1.76	24	.095	0.72	0.04 [-2.18, 2.25]	0.01	1, 24	.928
ACT application	-0.60 [-1.15, -0.04]	-0.43 [-1.06, 0.20]	-0.43	24	.673	-0.17	-0.52 [-0.91, -0.13]	7.09	1, 24	.014

Notes. *40 participants were included in the analyses for anthropomorphic measures and 26 participants were used in the analyses for self-report measures.*

Table 4. Patient treatment satisfaction

	Standard Care	ACT Intervention	*t*	*df*	*p*	Cohen's *d*
	Mean (*SD*)	Mean (*SD*)				
1. The program reduced my emotional eating.	2.33 (0.72)	2.00 (0.58)	1.33	26	.194	0.52
2. The program was easy to follow.	2.13 (0.83)	2.15 (0.55)	-0.75	26	.941	-0.29
3. I applied what I learned in this program to my everyday life.	1.87 (0.74)	2.08 (0.49)	-0.87	26	.394	-0.34
4. I can see myself using what I learned in the program in the long term.	1.67 (0.82)	1.85 (0.90)	-0.55	26	.585	-0.22
5. I consistently completed the homework assignments between sessions.	-	2.31 (0.85)	-	-	-	-
6. The homework wasn't too difficult for me to complete.	-	2.15 (1.07)	-	-	-	-
7. It would be easier if the homework was completed online vs. on paper.	-	2.69 (1.18)	-	-	-	-
8. My physician delivered the program effectively and was supportive of helping me to achieve my weight loss goals.	1.73 (0.88)	1.46 (0.52)	1.01	26	.324	0.40

Notes. Scores represent mean ratings on a 5-point Likert-type rating scale from 1 = strongly agree to 5 = strongly disagree.

Table 5. Physician feedback

	Physician Rating
	Mean (*SD*)
1. Ease of delivery (1 = very difficult, 5 = very easy).	4.29 (0.76)
2. Required preparation time (1 = very little, 5 = too much).	2.71 (0.76)
3. Adherence to the manual (1 = did not adhere, 5 = adhered closely).	4.29 (0.76)
4. Patient comprehension difficulty (1 = no difficulty, 5 = a lot of difficulty).	1.71 (0.76)
5. Perceived patient resistance (1 = very resistant, 5 = very embracing/engaged).	4.00 (0.82)
6. Perceived effectiveness compared to usual treatment (1 = less effective, 5 = more effective).	3.86 (0.69)
7. Screening effectiveness (1 = patients were not emotional eaters/program did not apply, 5 = patients were emotional eaters/program was well-suited to their needs).	3.71 (0.95)

Notes. N = 7.

Figure 1. CONSORT flow chart

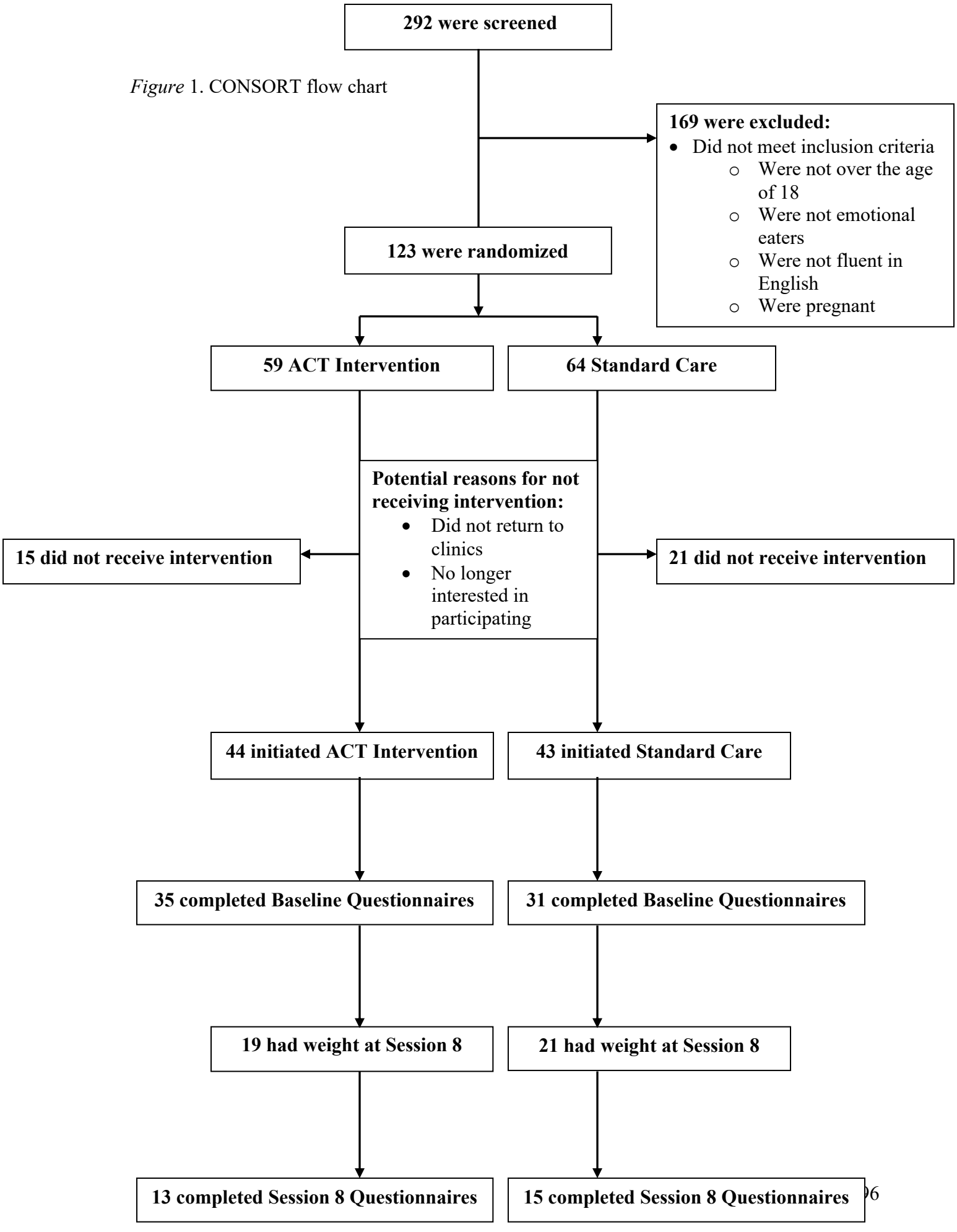


Figure 2. Cumulative session completion by condition.

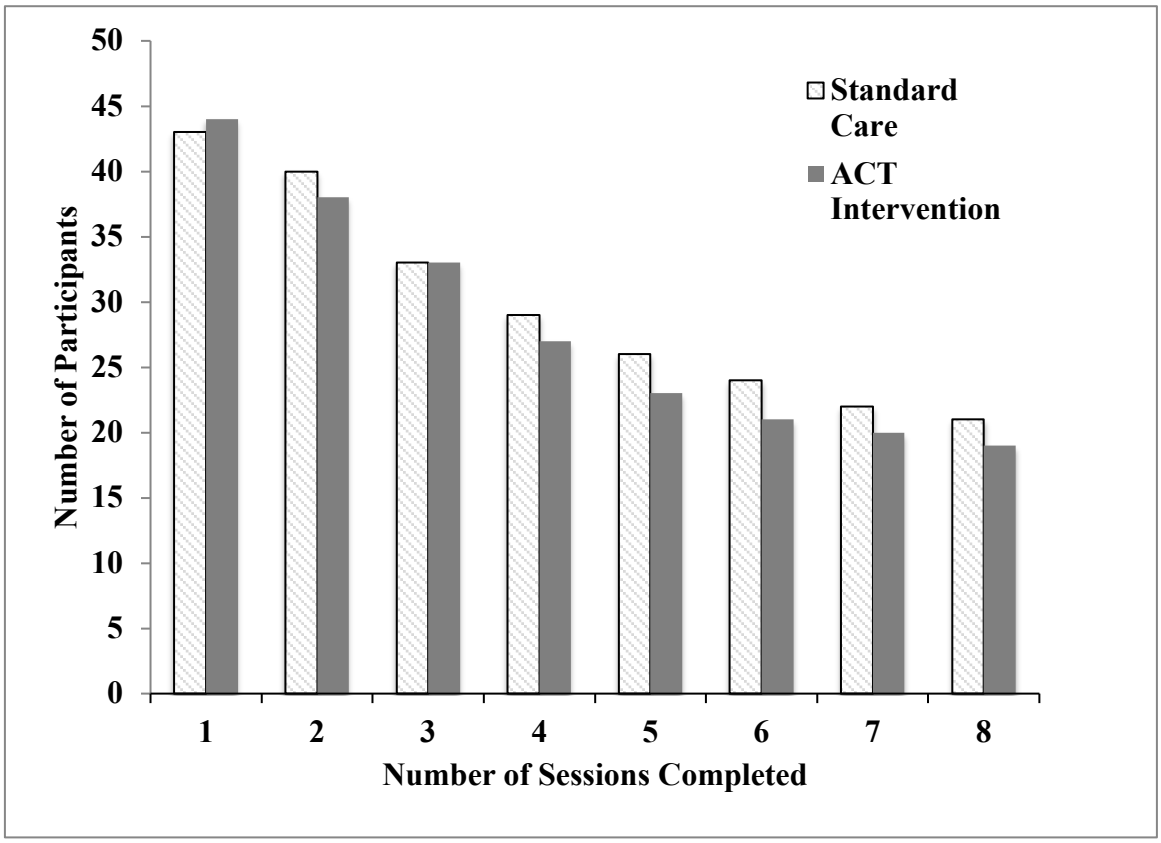
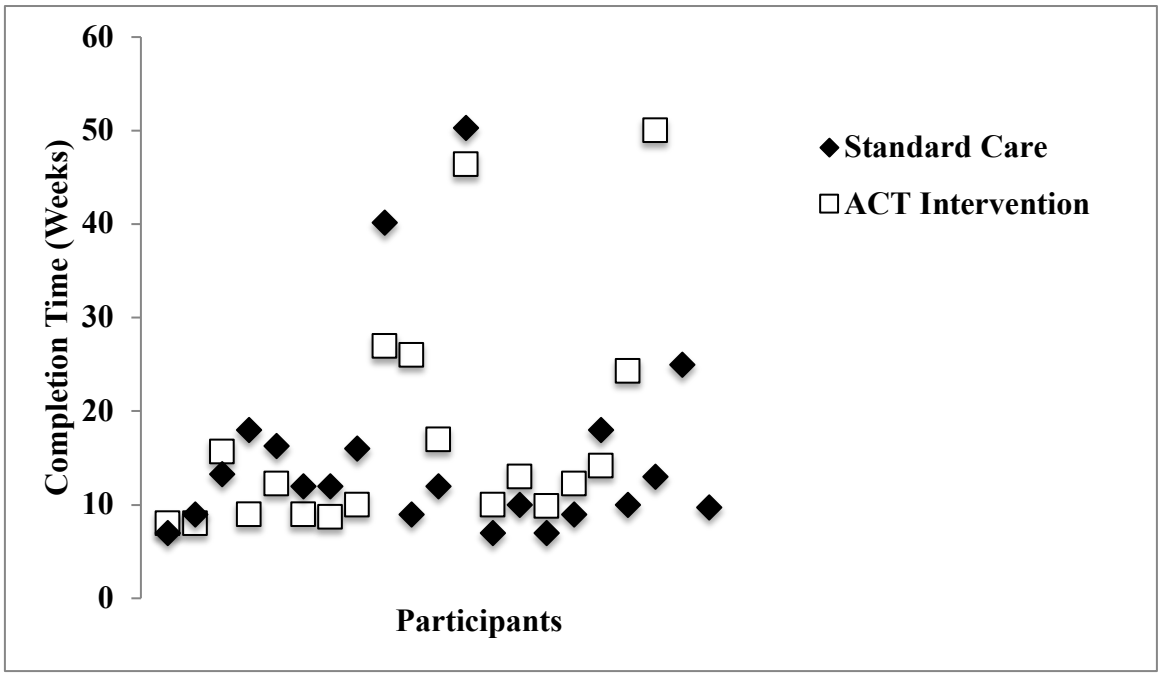


Figure 3. Intervention completion time in weeks.



Notes. $N = 40$

Each marker presents one participant.

Transition from Chapter 3 to Chapter 4

Chapter 3 (i.e., Manuscript 3) described the development and testing of a brief, ACT intervention for emotional eating as delivered by physicians at a weight loss clinic. Despite the need for accessible delivery of emotional eating interventions in primary care, the study did not support the feasibility or efficacy of a physician-delivered intervention. Insights gained from the study suggest that physicians do not have adequate knowledge in the area of behaviour change to effectively deliver such interventions, even with additional training. They may also lack the buy-in towards therapeutic orientations such as ACT needed to convincingly deliver such interventions to patients.

As a result of these findings, the purpose of Chapter 4 (i.e., Manuscript 4) is to test the feasibility and efficacy of a one-day ACT workshop designed to reduce emotional eating. The workshops were delivered by a PhD candidate in Clinical Psychology who has received extensive training in both behaviour change and ACT. The workshops were delivered without promoting weight loss, making it the first intervention to target emotional eating independent of weight. This builds on the findings of Manuscript 2, which indicated that emotional eaters experience distress resulting from this behaviour regardless of their weight and actively want to seek strategies to reduce it. Also, delivery of the intervention in such a condensed format (i.e., a single day) can help to determine the minimum effective dose for emotional eating interventions moving forward.

Chapter 4

Manuscript 4

Frayn, M., Khanyari, S., & Knäuper, B. (2019). A one-day Acceptance and Commitment Therapy workshop leads to reductions in emotional eating in adults. *Eating and Weight Disorders*. doi: 10.1007/s40519-019-00778-6. [Epub ahead of print]

Abstract

Purpose: Emotional eating has been defined as the tendency to overeat in response to negative emotions and is a symptom of emotion dysregulation. Interventions for emotional eating have been developed based on Acceptance and Commitment Therapy (ACT). However, these interventions only address emotional eating in the context of weight loss programs and are therefore not available in a weight neutral context.

Methods: The present study aimed to test the feasibility and acceptability of a one-day ACT workshop that taught skills to reduce emotional eating, without promoting weight loss. The workshop was delivered in a single day and aimed to reduce emotional eating by improving values clarification and commitment, acceptance, and mindfulness. Follow-ups were conducted at 2-weeks and 3-months post-intervention.

Results: Results suggest feasibility and acceptability of the one-day workshop; participants described appreciating the brevity of the program and its applicability to their everyday lives. Reductions in emotional eating were found at 2-weeks ($t(31) = 5.80$, $p < .001$) and 3-months ($t(29) = 6.96$, $p < .001$). A repeated measures MANOVA revealed a significant main effect of time ($F(14, 96) = 4.98$, $p < .001$, partial $\eta^2 = .421$), with follow-up ANOVAs indicating that this effect held for all variables.

Conclusion: The results from this study can be used to inform a larger scale randomized controlled trial (RCT) to determine the efficacy of the program in a larger sample and eventually disseminate it in other real-world settings.

Trial Registration: ClinicalTrials.gov, NCT03744780

Level of Evidence: Level IV, evidence obtained from multiple time series with the intervention

Introduction

Emotional Eating, Emotion Dysregulation, and Associated Concerns

Overarchingly, emotional eating has been shown to be an ineffective coping mechanism to respond to negative emotions such as anxiety or sadness. According to the affect regulation model (Hawkins & Clement, 1984), individuals who experience increased negative emotions use eating as a coping mechanism in an attempt to decrease these emotions. However, emotional eating does not effectively regulate emotions, with negative emotions persisting after emotional eating episodes (Frayn, Livshits, & Knäuper, 2018; Haedt-Matt et al., 2014). The ineffectiveness of emotional eating may be the combined result of guilt associated with overeating (Frayn, Livshits, & Knäuper, 2018), as well as emotional eating serving to avoid rather than accept the experience of negative emotions (Litwin, Goldbacher, Cardaciotto, & Gambrel, 2016). Given that emotional eating is ineffective in regulating negative emotions, emotional eaters may benefit from interventions that help them to more effectively cope with negative emotions and reduce emotional eating.

From a symptom reduction perspective, it is also important to address emotional eating as a symptom of emotion dysregulation that is associated with both physical and mental health concerns (Evers, Stok, & de Ridder, 2010; Gianini, White, & Masheb, 2013; Jones et al., 2019). Emotional eating has often been studied in the context of weight concerns, such as weight gain over time (Frayn & Knäuper, 2017; Koenders & van Strien, 2011) and difficulties with weight loss (Frayn & Knäuper, 2017; Niemeier, Phelan, Fava, & Wing, 2007). However, emotional eating contributes to an unhealthy diet through increased consumption of high calorie foods (Konttinen et al., 2010; Oliver, Wardle, & Gibson, 2000), and there is increasing evidence that unhealthy dietary habits are better predictors of physical health than weight or BMI (Bacon &

Aphramor, 2011; Bombak, 2014). This emphasizes the need to target emotional eating itself beyond or separately from its contribution to weight gain. In addition to weight concerns, emotional eating is also a symptom of both affective disorders and eating disorders (Annesi & Mareno, 2015; Devonport, Nicholls, & Fullerton, 2017; Eldredge & Agras, 1996; Engelberg, Steiger, Gauvin, & Wonderlich, 2007; Frayn, Livshits, & Knäuper, 2018; Ricca et al., 2012). Thus, addressing emotional eating and the emotion dysregulation that underlies it may help to reduce these symptoms to help alleviate mental health concerns such as eating and affective disorders.

Interventions Related to Emotional Eating

Acceptance and Commitment Therapy (Hayes, Strosahl, & Wilson, 1999) may be a useful approach to address emotional eating because of its focus on tolerance of emotions as a means to reduce engagement in ineffective coping mechanisms, such as eating (Forman & Butryn, 2014). ACT focuses on commitment to values and emphasizes relationships, personal growth, and engagement in meaningful life activities even when faced with negative emotions (Dindo, Van Liew, & Arch, 2017). It has been theorized that ACT's focus on: (1) acceptance of negative emotions (i.e., distress tolerance), (2) mindfulness (i.e., present moment awareness), and (3) value clarification addresses challenges relevant to emotional eaters (Forman & Butryn, 2014). Together, difficulties with these processes represent "psychological inflexibility", which is associated with binge eating, depression, anxiety, and stress in those with overweight and obesity (Finger, de Freitas, & Oliveira, 2018). First, emotional eaters struggle with tolerating negative emotions and thus turn to food to soothe these emotions. Therefore, by increasing their ability to accept and tolerate negative emotions, it follows that they would be less likely to use food as a coping mechanism. For example, past research has found that individuals who are more

accepting of cravings are less likely to act on these cravings by eating (Hooper et al., 2012). Second, emotional eating has been associated with reduced mindful awareness of hunger and satiety cues (Frayn, Livshits, & Knäuper, 2018). Thus, emotional eaters may benefit from interventions that incorporate mindfulness, such as ACT, to increase awareness of physical and emotional cues related to food and eating. Indeed, interventions derived from mindfulness have been shown to reduce emotional eating (Katterman et al., 2014; Lattimore, 2019). Third and finally, in the presence of negative emotions, emotional eaters often fail to attend to their values, or reasons for wanting to change their behavior (Forman & Butryn, 2014). Therefore, these values do not guide their eating in favour of healthier choices (Forman & Butryn, 2014). Improving values clarification and commitment has been shown to motivate healthier eating in past studies (Bryan et al., 2016). Thus, ACT may be used to reduce emotional eating through increases in acceptance of negative emotions, mindfulness, and value clarification.

As such, emotional eating has been targeted in previously developed ACT intervention programs where weight loss has been the primary outcome (Forman et al., 2013; Lillis et al., 2016). In these interventions, ACT techniques such as acceptance, mindfulness, and value clarification have been used as a means to target emotional eating, thereby reducing calorie intake and increasing weight loss. A recent meta-analysis and systematic review compared ACT and mindfulness interventions to standard behavioral treatment (e.g., counselling on diet and exercise habits) on weight loss (Roche, Kroska, & Denburg, 2019). It found a small effect size (Hedge's $g = 0.30$) for ACT and mindfulness interventions and them to lead to significantly more weight loss than standard behavioral treatments (Roche, Kroska, & Denburg, 2019). In their study on behavioral treatments for obesity, Forman et. al (2013) found in post hoc analyses that the ACT-based treatment resulted in greater weight loss among those with high as opposed to

low emotional eating. However, at 36-month follow-up, both the ACT and standard care groups showed similar weight regain, suggesting a lack of efficacy for long-term weight loss maintenance (Forman et al., 2019). Lillis et al. (2016) also found that ACT was more beneficial for producing weight loss for participants higher in emotional eating than for those lower in emotional eating at up to 24-month follow-up. However, longer-term weight loss maintenance (i.e., > 24-months) was not assessed (Lillis et al., 2016).

We believe that there are two main benefits to using ACT to address emotional eating in a weight neutral context: (1) mitigating risks associated with dieting, especially for this population, and (2) improving intervention efficacy for healthy eating behaviors by focusing on emotional eating rather than weight loss. As such, the purpose of the present study was to test the feasibility and efficacy of an ACT workshop for emotional eating that does not address weight loss as a target.

First, weight loss dieting is associated with a host of negative causes and consequences such as weight cycling, binge eating, negative body image, eating disorders, and weight stigma (Ackard, Croll, & Kearney-Cooke, 2002; Bacon & Aphramor, 2011; Neumark-Sztainer et al., 2011; Stevens et al., 2017). These consequences are all specifically implicated in emotional eating, with emotional eaters being more susceptible to body image concerns, binge eating, and other eating disorders (Annesi & Mareno, 2015; Eldredge & Agras, 1996; Engelberg, Steiger, Gauvin, & Wonderlich, 2007; Ricca et al., 2012). Thus, it is contraindicated to promote weight loss for emotional eaters, as this may trigger or exacerbate concerns that they are already experiencing or are at risk of experiencing. Instead, using ACT to focus on reductions in emotional eating may help to manage this risk and encourage better outcomes for emotional eaters.

Second, weight loss maintenance is difficult to achieve due to physiological mechanisms that encourage weight regain following weight loss (Ochner et al., 2013; Verhoef et al., 2013) and interventions that have been effective, such as the Diabetes Prevention Program (DPP; Knowler et al., 2002), require extensive resources to deliver. Further, encouraging weight loss as a value may detract from promoting values such as health and wellness that could better motivate participants to engage in behavior change to improve their eating behaviors (Tylka et al., 2014). However, ACT has been shown to be efficacious in improving other eating behaviors relevant to emotional eating; it has been effectively used to treat binge eating (Juarascio et al., 2017), anorexia and bulimia nervosa (Juarascio et al., 2013), and to improve healthy eating behaviors in brief contexts, such as e-health interventions (Järvelä-Reijonen et al., 2018). Thus, targeting emotional eating with ACT may promote positive dietary changes such as reduced consumption of high fat, high sugar, high calorie foods (Järvelä-Reijonen et al., 2018). Such changes have been shown to improve health (e.g., improve cardiovascular and diabetic outcomes) through metabolic and endocrine changes, even in the absence of weight loss (Appel et al., 1997; Gaesser, Angadi, & Sawyer, 2011; Gannon & Nuttall, 2006). Given the negative consequences associated with dieting, and benefits of focusing on eating behaviors rather than weight, especially for emotional eaters, ACT may be better suited for reducing emotional eating in a weight neutral context.

Movements such as Health at Every Size® (HAES®) focus on the pursuit of health through such a weight neutral lens, acknowledging the limitations of weight as a marker of health (Association for Size Diversity and Health, 2019; Bacon & Aphramor, 2011). HAES® interventions focus on changing diet and exercise habits while fostering self-acceptance and wellbeing, rather than explicitly promoting weight loss (Association for Size Diversity and

Health, 2019). A recent systematic review of 14 HAES® interventions found this approach to be efficacious in improving eating behaviors, quality of life, and psychological well-being, as well as increasing physical activity and improving physiological outcomes such as blood pressure (Ulian et al., 2018). In the majority of the interventions reviewed, these changes occurred in the absence of weight loss (Ulian et al., 2018). Thus, there is increasing evidence to show that interventions that focus on changing eating behaviors themselves, rather than encouraging weight loss, can lead to improvements in physical and mental health outcomes.

One-Day ACT Interventions

Another limitation of previous ACT interventions that have targeted emotional eating is their lengthy and resource-intensive delivery, with sessions conducted over a one-year period. Conversely, one-day ACT workshops have been shown to be effective in facilitating health behavior change. One-day ACT workshops follow the same ACT principles as longer interventions, however, are tailored for delivery in a brief setting (Dindo, Van Liew, & Arch, 2017). In-session exercises and metaphors can be used to elucidate specific skills, such as using a chocolate tasting exercise to encourage mindfulness. Because ACT focuses on behavior change, it is well suited for condensing into brief sessions where participants can practice skills necessary to help them achieve their goals, in this case, learning strategies to reduce emotional eating. The intervention manual for the present study can be found in the electronic supplementary materials and an outline of the intervention has been provided in Table 1.

Specifically, previous research has examined the effects of a one-day ACT workshop on improving acceptance and mindfulness in those seeking to lose weight (Lillis, Hayes, Bunting, & Masuda, 2009). The study found improvements in quality of life, distress tolerance, and acceptance 3-months post-intervention. However, emotional eating was not targeted or assessed

as part of the intervention. Brief ACT interventions have also shown efficacy in improving outcomes related to chronic pain (Dindo, Van Liew, & Arch, 2017), migraines (Dindo et al., 2014), diabetes (Gregg et al., 2007), and cardiovascular disease (Dindo, Marchman, Gindes, & Fiedorowicz, 2015).

The Present Study

The study was a single arm feasibility study that used a pre-post design to examine: (1) changes in emotional eating and related ACT processes (i.e., values clarification/commitment, acceptance/distress tolerance, mindfulness) from baseline to 2-weeks and 3-months post-intervention and, (2) treatment acceptability and feasibility, assessed through both quantitative and qualitative measures. Following the workshop, participants were asked to provide their feedback on the perceived usefulness of the workshop in reducing their emotional eating, as well as input pertaining to the one-day format. Based on past ACT research examining emotional eating, it was hypothesized that the intervention would lead to reductions in emotional eating, as well as improvements in the three underlying ACT processes (values clarification, acceptance/distress tolerance, and mindfulness) at 2-weeks and 3-months post-intervention.

Methods

The study was approved by the Research Ethics Board at the author's university. Participants provided written informed consent prior to commencing the intervention. The trial was registered on ClinicalTrials.gov, identification number NCT03744780. CONSORT guidelines for trial reporting were followed.

Trial Design

The present study was a single-arm feasibility study conducted from November 1, 2018 to March 5, 2019. Participants were all assigned to a one-day ACT workshop designed to reduce

emotional eating. All outcomes were assessed at baseline and both 2-weeks and 3-months post-intervention. The present study aimed to recruit approximately 30 participants, as recommended for feasibility studies (Lancaster, Dodd, & Williamson, 2004). The trial ended upon reaching the determined sample size and no harms or unintended effects occurred.

Participants

Participants included 32 adults over the age of 18 who engaged in emotional eating, as assessed by a score of 3.25 or higher on the Dutch Eating Behavior Questionnaire, which has been found to represent the 80th percentile for emotional eating (DEBQ; van Strien et al., 2012). The sample consisted of 28 female participants and 4 male participants.

Study Procedures

Participants were recruited through both posters and an email newsletter directed towards staff at the university. They were told that an intervention was being offered to help reduce emotional eating using ACT techniques and were asked to contact the researchers if interested. Those who expressed interest to participate were assigned a participant ID number and asked to complete a brief prescreen questionnaire to determine their eligibility based on the criteria described above. Eligible participants were offered a date to participate in the workshop and were enrolled based on their preference. A total of three workshops were held, each with nine to 12 participants.

Participants completed a battery of questionnaires at baseline, 2-weeks, and 3-months post-intervention. Baseline questionnaires were completed upon enrollment in a specific workshop timeslot, approximately 2 weeks or less prior to the workshop. Participants were sent the survey link via email and completed the questionnaires online via SurveyMonkey. Participants were informed that the questionnaires would take approximately 10 to 15 minutes to

complete and were instructed to complete the 2-week and 3-month questionnaires within 48 hours of receipt. The rate of attrition is 6%, with 94% of participants completing follow-up questionnaires at 3-months post intervention.

Randomization and Blinding

Participants were all assigned to the ACT workshop, therefore there was no randomization nor blinding.

Intervention

The workshops were held over the course of a single day (i.e., 6 hours) and participants were taught techniques to reduce their emotional eating. Three overarching skills were introduced over the course of the ACT workshops: (1) values clarification and commitment, (2) acceptance/distress tolerance, and (3) mindfulness (Forman & Butryn, 2014). The intervention was developed based on ACT principles (Forman & Butryn, 2014) and previous weight loss interventions that used ACT to facilitate changes in eating behaviors (Forman et al., 2013; Frayn & Knäuper, 2016).

An outline of the intervention has been provided in Table 1 and the full-length intervention manual and participant handouts can be found as electronic supplementary materials. During the first hour of the workshop, participants were provided with an overview of emotional eating and introduction to the three ACT skills that were to be taught to help reduce it. The remainder of the workshop time as divided evenly amongst the three ACT skills. Participants were first taught values clarification and commitment techniques, where they reflected on their reasons for reducing emotional eating and how this could improve their quality of life through group discussion (Ciarrochi, Kashdan, & Harris, 2013). Next, participants were taught to increase distress tolerance in the face of negative emotions that typically led to

emotional eating. As a first line, they were asked to come up with alternative activities to engage in to address negative emotions, such as obtaining social support from a friend, or engaging in breathing exercises. Participants were also taught acceptance techniques (e.g., dropping the rope metaphor, urge surging) to use when experiencing triggering emotions or cravings without acting on them (Bowen & Marlatt, 2009). Lastly, participants were trained in mindful eating, in order to increase awareness of hunger and satiety cues and avoid eating when not physically hungry (Kristeller & Wolever, 2011). Finally, the end of the workshop was dedicated to reviewing the three ACT skills taught over the course of the day and answering any questions that arose for participants.

The structure of the workshop followed a format in which topics were introduced and explained, followed by group discussion in which participants were asked to reflect on what they had just learned and how they could apply it to their everyday life. Experiential exercises were also engaged in, including the use of imagery to elucidate the tug-of-war metaphor, as well as a chocolate tasting to practice mindful eating. Workshop content was personalized to each participant as much as possible by encouraging them to focus on values most applicable to their lives, as well as choose distress tolerance strategies that resonated most with them. The intervention was delivered by a PhD Candidate in Clinical Psychology who also has training in ACT.

Measures

Demographics. At baseline, participants reported basic demographic information including gender, age, ethnicity, marital status, education, employment status, and household income.

Emotional eating. Participants were pre-screened for emotional eating using the Dutch Eating Behavior Questionnaire emotional eating subscale (DEBQ-EE; van Strien et al., 1986). The 13-item emotional eating subscale assesses the reported desire to eat under specific negative emotional conditions such as stress, anxiety, and depression. Participants are asked to rate the frequency with which they engage in particular eating behaviors, on a 5-point Likert-type rating scale from 1 (never) to 5 (very often). The DEBQ has high internal consistency and factorial validity (van Strien et al., 1986). Cronbach's alpha in this sample was .81.

Additional emotional eating items (developed by Frayn & Knäuper). In additional to the DEBQ-EE, two items were administered to provide further information regarding participant's episodes of emotional eating. These assessed: (1) the number of times in the past week participants engaged in emotional eating, and (2) instances in which participants begin to engage in emotional eating and were able to stop themselves. These items were added to better inform about the frequency of emotional eating, and emotional eating attempts, given that the DEBQ-EE only looks at frequency from "never" to "very often", rather than a concrete number of instances.

Distress Tolerance. The Distress Tolerance Scale (DTS; Simons & Gaher, 2005) is a brief, 15-item self-report measure that assesses one's ability to tolerate distressing emotions. Specifically, it asks individuals to indicate the extent to which they agree with statements aimed at assessing distress tolerance, absorption, appraisal, and regulation from 1 (strongly disagree) to 5 (strongly agree). Sample items include "Feeling distressed or upset is unbearable to me" and "I'll do anything to stop feeling distressed or upset." The DTS has high reliability, as well as high discriminant, convergent, and criterion validity (Leyro et al., 2011; Simons & Gaher, 2005). Cronbach's alpha in this sample was .94.

Acceptance and Committed Action. The Food Craving Acceptance and Action Questionnaire (FAAQ; Juarascio et al., 2011) is a 10-item self-report questionnaire that examines the extent to which an individual is able to accept his or her food cravings or urges and their attempts to control or change these cravings or urges. Items are rated on a 6-point Likert-type rating scale from 1 (very seldom true) to 6 (always true). The FAAQ has been shown to have high internal consistency (Cronbach's alpha =.93) and acceptable test-retest reliability (*ICC* = .72) in past research (Juarascio et al., 2011). Cronbach's alpha in the present study was acceptable (.68).

Mindful Eating. The Mindful Eating Questionnaire (MEQ; Framson et al., 2009) is a 28-item self-report measure that assesses five domains of mindful eating: disinhibition, external cues, awareness, emotional response and distraction. Individuals are asked to indicate the extent to which extent they agree with each item from 1 ("never" / "rarely") to 4 ("usually"/ "always"). Sample items include: "I eat so quickly that I don't taste what I'm eating" and "When I'm eating one of my favorite foods, I don't recognize when I've had enough." The MEQ has been shown to have good validity and reliability (Framson et al, 2009). Cronbach's alpha in this sample was .80.

Values Application (developed by Frayn & Knäuper). These four self-report items assessed to which extent an individual is able to use their values to reduce their emotional eating. Sample items included "My values motivate me to not engage in emotional eating" and "I reflect on my values before deciding whether or not to engage in emotional eating." Participants were asked to rate the extent to which they agreed with each item on a 5-point Likert-type rating scale from 1 (strongly disagree) to 5 (strongly agree).

Feasibility Data. In addition to the questionnaires described above, feasibility data were collected and analyzed including: (1) recruitment rates (i.e., the overall number of participants who expressed interest in the workshop over this time period; the time period required to recruit the 30 required participants) (2) eligibility rates (i.e., of those who expressed interest, the percentage that met the DEBQ-EE 3.25 cut-off and were thus eligible to attend), (3) attendance rates (i.e., of those who signed up, the percentage that attended the workshop), and (4) attrition at 2-weeks and 3-months follow-up (i.e., of those who attended the workshop, the percentage that completed the subsequent follow-up questionnaires).

Qualitative Feasibility and Acceptability Data. At the conclusion of each workshop, participants consented to participate in a brief, group discussion to provide their feedback. They were asked a series of questions assessing their expectations for the workshop, to what extent these expectations were met, and whether or not they would recommend the workshop to others struggling with emotional eating. Participants were also asked to describe which of the three workshop skills (values clarification, acceptance/distress tolerance, mindfulness) they thought would be most and least useful in addressing their emotional eating. Finally, they were asked to provide their feedback on the dose of the workshop (i.e., one-day) and any thoughts they had pertaining to convenience and accessibility.

Results

Data Analysis

All analyses were conducted in SPSS version 24. A one-way, repeated measures MANOVA was used to compare changes between baseline, 2-weeks, and 3-months on emotional eating and related ACT processes, with follow-up *t*-tests conducted as necessary, using Bonferroni to correct for multiple comparisons.

Demographic information for the sample is available in Table 2. The mean age of the sample was 46.71 (*SD* = 13.43) and the mean BMI was 33.13 (*SD* = 5.40, min = 24.03, max = 47.34). Based on BMI, three participants fell into the "normal weight" range (9.38%), eight were within the "overweight" range (25.00%), and 21 were in the "obese" range (65.63%). Qualitative feasibility data were analysed using the procedure described by Braun and Clarke (2006). Feedback provided immediately after each of the three workshop sessions was recorded and transcribed, prior to being coded and thematically analysed to identify common themes across participants. Twenty seven out of 28 participants consented to participate in the qualitative portion of the study.

Quantitative Feasibility Data

During the recruitment period, 59 people expressed interest in the study and were emailed the pre-screen questionnaire to determine their eligibility. Of these, 48 people completed the pre-screen questionnaire and 44 (91.67%) were eligible to participate based on the DEBQ-EE cut-off of 3.25. Thirty-nine people then signed up to attend the workshops. Furthermore, the workshops had an attendance rate of 82.05%; of the 39 people who signed up, 32 were in attendance. Seven participants cancelled last minute due to illness or scheduling changes. Finally, all 32 participants in attendance completed both the baseline and 2-week questionnaires. Thirty of these participants completed the 3-month questionnaires (93.75% response rate). Further, two questionnaires could not be included in the analyses due to incomplete data, bringing the sample size for the quantitative analyses to 28 participants.

Quantitative Results

The MANOVA revealed a significant main effect of time, $F(14, 96) = 4.98$, $p < .001$, partial $\eta^2 = .421$, with follow-up ANOVAs indicating that this effect held for all variables (see

Table 3 for *F*-test statistics). Follow-up *t*-tests revealed that there were significant improvements from baseline to 2-weeks ($t(31) = 5.80$, $p < .001$) and baseline to 3-months for DEBQ-EE ($t(29) = 6.96$, $p < .001$), but no change from 2-weeks to 3-months ($t(29) = 1.44$, $p = .160$). FAAQ ($t(31) = -4.81$, $p < .001$), values ($t(31) = -3.89$, $p = .001$), emotional eating frequency ($t(31) = 3.78$, $p = .001$), and ability to stop emotional eating ($t(31) = -3.47$, $p = .002$), improved from baseline to 2-weeks but not baseline to 3-months or 2-weeks to 3-months. There were no significant changes in DTS at either time points. Finally, there were significant improvements in MEQ from baseline to 3-months ($t(29) = -4.43$, $p < .001$), and 2-weeks to 3-months ($t(29) = -3.78$, $p = .001$), but not baseline to 2-weeks ($t(31) = -3.23$, $p = .003$). The *t*-test statistics can be found in Table 4.

Qualitative Results

Expectations of workshop. Overall, participants reported that their expectations for the workshop were to gain skills to cope with their emotional eating. Some described having participated in past programs to change their eating behaviors and were subsequently looking for a refresher. Overarchingly, participants endorsed that their initial expectations were met following the workshop and that they did walk away with skills to help them reduce their emotional eating.

"I think the expectations were met. I wanted to have some additional tools in order to analyze my approach to emotional eating. You know insanity is doing the same thing all the time and expecting a different result, so I needed some different way of looking at it or different ideas that I could put together. So, from that point of view it has been useful."

They also appreciated that a variety of strategies were taught so they could have options to use what they found most useful. For some, the framework within which the workshop was taught (i.e., ACT) was unexpected, rather, they cited anticipating a "stricter" approach ultimately

aimed at demonizing and eliminating emotional eating. Despite this discrepancy in expectation, these participants reported appreciating the acceptance and non-judgment embodied during the workshop.

"It wasn't what I expected in a way because I thought it would be more like, 'ok we're going to stop emotional eating,' but the whole acceptance part really threw me for a loop because that's not what I was expecting. {A stricter approach} would have been a more familiar, but probably not the best for me, so I think this took me a while to fully accept but I think it'll help."

Most useful aspects of workshop. Participants endorsed appreciating the discussion and social support provided during the workshop and felt like a safe environment was created to allow them to open up about their concerns. Values clarification and commitment was cited as the element of the workshop that resonated most with participants. This was endorsed as a different way of looking at emotional eating and most admitted that they had never considered their values in relation to emotional eating before.

"I like the values one because I never really framed it that way of, 'you say you want to be these things, yet you're not doing anything to achieve them,' so I think if I could hold onto those values in my head, they might be what I need to execute on the other tactics."

Mindful eating was also a popular aspect of the workshop, namely for the experiential component that accompanied it (i.e., mindful chocolate tasting exercise). Acceptance was described as the most polarizing element of the workshop; although it resonated with many participants, others found it more difficult to comprehend. Also, participants reported appreciating that all of the workshop elements complemented each other and that they could use them in tandem to be most successful in addressing their emotional eating. Finally, many

participants endorsed valuing that the workshop was not focused on weight and weight loss, but rather overall health and well-being.

"I liked that the focus is not on weight; it's more about how to make life better, not just about looking better or meet someone else's standards."

Least useful aspects of workshop. As mentioned, some participants cited that acceptance was more difficult to comprehend, specifically the tug-of-war metaphor. Also, a select number of participants wished for the provision of more concrete nutritional information.

Feedback on workshop dose. In terms of the workshop dose (i.e., one day), many participants appreciated the brevity and felt like they walked away with useful strategies in a condensed time frame, rather than having to participate in multiple sessions. Participants described other benefits of the single day delivery, including this helping to prevent forgetting the material, as well as the group cohesion created from spending several hours together.

"I think having it all in one day, instead of two one-hour sessions or three two-hour sessions, makes it more interesting because you don't have time to forget about what you saw the first time around. We can put things in context more easily together because we see it all in one day."

Many participants stated that they would prefer having "booster" or follow-up sessions, if only for the social support that these would provide. The preferred frequency of follow-up varied from monthly, to once every three or four months. In fact, one of the groups exchanged contact information to organize meeting up on their own to help support each other.

Recommending workshop to others. Everyone who attended the workshops endorsed that they would recommend it to others struggling with emotional eating. Many participants cited

feeling like the program should be broadly applied to all staff at the university, and/or be offered to individuals at a younger age to facilitate earlier exposure to the concepts taught.

"Something like this should be offered at a younger age so we don't live our lives being shamed for certain habits. It would help to have better coping mechanisms throughout our lives and not only the solution of, 'oh go to a dietician', 'you're not eating well', or 'you're too fat'. There's a lot of emotional behaviors that take place before emotional eating and so if we can break that earlier on and have this amazing knowledge before, I think we can make a world of difference for a lot of people out there."

Convenience and accessibility of workshop. Finally, with regards to convenience and accessibility, participants found the location to be convenient and easily accessible by transit. They reported that the group size (i.e., 9-12 people) was good for facilitating discussion and allowing everyone to be heard. Also, participants appreciated that the workshop was held on a weekend, so they could dedicate the "mental energy" to participating, rather than having to do it after a long day at work. Logistical concerns did arise for some participants, for example obtaining childcare for the day, however these were ultimately not a barrier to participation.

Discussion

The aim of the study was to test the feasibility, acceptability, and efficacy of a one-day ACT workshop to reduce emotional eating without promoting weight loss. Reductions in emotional eating were found at 2-weeks post-intervention, and these improvements held at 3-month follow-up. There were also significant improvements in acceptance, mindfulness, and values clarification and commitment at 2-weeks post-intervention, with improvements in mindfulness holding at 3-months as well.

Quantitative feasibility data showed high rates of attendance (82.7%) and responses to follow up questionnaires that assessed emotional eating and related ACT skills taught in the workshop (93.75%). Through qualitative methods, participants reported that their expectations for the workshop were to gain skills to cope with their emotional eating and they felt these expectations were adequately met. While values clarification and commitment were seen as the most useful aspect of the workshop, acceptance/distress tolerance was identified as being harder to comprehend for most participants. Participants also reported appreciating the brevity, convenience, and accessibility of the workshop, and reported that they would recommend it to others struggling with emotional eating.

The results demonstrate that a one-day ACT workshop can be efficacious in reducing emotional eating behavior for adults. While positive changes were observed in the specific ACT skills taught at 2-weeks post-intervention, mindfulness was the only process that showed improvements at 3-months post-intervention. Mindfulness may be useful in reducing emotional eating as it focuses on increasing the individual's sensitivity to their hunger and satiety cues (Frayn, Livshits, & Knäuper, 2018). Inability to respond to or be aware of internal cues of hunger and satiety has been found to be associated with increased emotional eating behavior (Tan & Chow, 2014). Thus, mindfulness training to increase awareness of these cues may in turn have contributed to reductions in emotional eating in the present study.

Also, emotional eating is thought to be indicative of emotion dysregulation, as proposed by the affect regulation model (Hawkins & Clement, 1984). Mindfulness training has been shown to help regulate emotions, which may be another factor that accounted for the observed reductions in emotional eating (Chambers, Gullone, & Allen, 2009). It is also possible that simply by attending a workshop aimed at emotional eating, participants were more aware of, and

sensitive to their eating behavior, thus promoting mindfulness. Moreover, many participants reported appreciating the experiential nature of the mindful chocolate tasting exercise that was included in the workshop. Therefore, this practical experience of mindful eating may have helped with the increased integration of this particular skill into their daily lives.

These findings may suggest that future brief interventions for emotional eating may be even more efficiently delivered by focusing exclusively on mindfulness and mindful eating. Acceptance and values clarification skills may require more time to internalize and be better targeted in a longer-term intervention or further emphasized through booster sessions, which some participants expressed interest in through the qualitative feedback. Future research is needed to better understand the mechanisms behind changes in eating behaviors in such interventions, to identify and target the relevant processes and understand the intensity with which they need to be addressed in interventions.

Contrary to our hypotheses, participants did not show decreases in distress tolerance at either the 2-week or 3-month time points. Reasons for this may be twofold. First, these findings are consistent with qualitative data showing that participants found acceptance/distress tolerance to be a more difficult component of the workshop to comprehend. Thus, lack of understanding of these principles may have prevented participants from effectively applying them in their everyday lives. Second, distress tolerance was assessed by the Distress Tolerance Scale (Simons & Gaher, 2005), which is a general measure of distress tolerance. It may be that the questionnaire's lack of specificity towards food and eating contributed to the lack of change on this variable. In other words, because the questionnaire assessed distress tolerance generally, it may be that changes relevant to food and eating did not generalize to other areas of life and thus could not be identified by the questionnaire. It is important to continue to target distress tolerance

in future interventions because of its role as a component of psychological inflexibility, which is associated with eating behaviors such as binge eating, as well as mental health symptoms such as depression and anxiety (Finger et al., 2018).

Despite decreases in emotional eating at both follow-up time points as assessed by the DEBQ (van Strien et al., 1986), decreases in emotional eating frequency (i.e., the self-reported number of times in the past week participants engaged in emotional eating) were only found at 2-weeks post-intervention. It is suspected that the discrepancy in these findings are likely attributable to a lack of statistical power due to the small sample size. The means for this variable did improve at both time points but the improvements were not statistically significant at 3-months post-intervention. The aim of the present study was to test feasibility and efficacy; thus the interpretation of our efficacy results points more to initial trends that need to be replicated with larger samples in future research.

Strengths and Limitations

A notable strength of the intervention was that many participants appreciated its lack of focus on weight and treatment of emotional eating as a behavior to target in and of itself. Qualitative feedback collected at the end of the workshops reflected these views, with several participants appreciating the emphasis on overall health and well-being, rather than on weight reduction. Participants highlighted that removing the focus off of weight subsequently helped to reduce their experience of weight bias and stigma that may have previously prevented them from engaging in behavior change. This supports the need for HAES® interventions that target emotional eating and other behaviors from a weight neutral perspective, rather than focusing on weight loss as the targeted outcome (Ulian et al, 2018). Instead of focusing solely on weight outcomes, adopting a weight neutral approach could increase the inclusivity of future

interventions to target unhealthy eating behaviors that predispose individuals to a variety of physical and mental health concerns, as seen with emotional eating.

The limitations of this study are that it was a small, uncontrolled intervention. The efficacy of the intervention needs to be investigated in a larger randomised controlled trial. Further, the follow-up duration was limited to 3-months, therefore more research is needed to determine whether the reductions in emotional eating and improvements in mindfulness are maintained over a longer time period. Another limitation with the present sample was the lack of diversity; this sample consisted of primarily female, white, highly educated, and middle-aged participants. Future research could recruit more varied samples with different socioeconomic statuses, ethnicities, ages, and genders to inform on the generalizability of such interventions. Finally, it is not known what proportion of participants were motivated to attend the workshop due to an underlying desire to lose weight. Although the majority of participants were very receptive to the intervention's lack of emphasis on weight, it should be acknowledged that weight loss is still a societally promoted ideal that may interfere in the administration of HAES®-based interventions.

Future Research Directions

Given that this feasibility study has demonstrated the efficacy of addressing emotional eating in a time efficient and accessible manner, future research could test the intervention in the context of a larger randomised controlled trial. The intervention could also be compared against other behavioral interventions such as Cognitive Behavioral Therapy (Beck, 2011) or Dialectical Behavior Therapy (Linehan, 2015) to determine whether or not different therapeutic modalities are more effective for emotional eating in a one-day format. It may also be informative to test an ACT intervention for emotional eating against a pure mindfulness intervention for emotional

eating to determine whether or not there are differential outcomes. Such an intervention could also be modified to address the emotional eating challenges faced by individuals struggling with eating disorders such as binge eating disorder or bulimia nervosa (Engelberg et al., 2007; Ricca et al., 2012; Stein et al., 2007). Therefore, testing this design with various samples would be an important part of future research in this area. Further, testing workshop delivery in other community settings is a potential direction for future research. As a one-day workshop, the intervention requires minimal resources and could be delivered in other accessible settings such as community centres, schools, or even workplaces.

Conclusions

Overall, the results of the present study suggest that it is feasible, acceptable, and efficacious to implement a brief, one-day emotional eating intervention that focuses not on weight loss, but reducing this eating behavior in and of itself. Therefore, to assist a wider population in improving their eating behavior and subsequently their health, future interventions could benefit from removing their focus on weight and instead target emotional eating itself, independent of the number on the scale.

Table 1. Workshop summary

Theme	Time Allotted	Example Exercises
1 – Introduction to emotional eating (EE) and core ACT processes	1 hour	- Introduced EE and discussed how it presents itself in participant's lives. - Introduced the three ACT processes and how these can be used to reduce EE.
2 – Values	1 hour	- Discussed core values related to wanting to reduce EE. - Used the choice-point model to highlight value-consistent and value-inconsistent decisions. - Introduced BOLD (breath, observe, listen, decide) for making value-consistent decisions in the face of EE.
3 – Acceptance/ Distress Tolerance	1 hour	- Used the tug-of-war metaphor experientially to highlight the process of acceptance and its benefits compared to trying to fight emotions. - Introduced urge surfing and steps to use this to avoid emotional eating.
LUNCH BREAK	1 hour	
4 – Mindful eating	1 hour	- Conducted a modified version of the raisin exercise using chocolate to practice mindful eating in vivo. - Discussed what participant's experience of this exercise was like and how they could apply mindful eating to their everyday lives.
5 – Establishing habits and commitment to values	1 hour	- Reviewed the three ACT processes taught during the workshop with time for discussion and questions. - Discussed ways to use values to motivate continued behavior change in the face of potential setbacks or barriers. - Had participants complete a summary card with their values and how they can use these to guide their eating.

Table 2. Demographics.

Category	Response	Intervention	
		N	% of Total (32)
Gender	Male	4	12.5
	Female	28	87.5
Ethnic Group	Caucasian	25	78.13
	Middle Eastern	1	3.13
	Black	1	3.13
	Hispanic	1	3.13
	Other	4	12.5
	Prefer not to answer	0	0
Marital status	Married	13	40.63
	Widowed	2	6.25
	Divorced	4	12.5
	Never married	12	37.5
	Prefer not to answer	1	3.13
Educational attainment	High school diploma or equivalent	1	3.13
	CEGEP (Quebec only)	1	3.13
	Some college/university	3	9.38
	Bachelor's degree	13	40.63
	Graduate degree	14	43.75
Employment status	Employed	28	87.5
	A student	3	9.38
	Retired	1	3.13
Household income 2018	$20,000 or less	2	6.25
	$20,001 - $40,000	3	9.38
	$40,001 - $60,000	4	12.5
	$60,001 - $80,000	3	9.38
	$80,001 - $100,000	5	15.63
	$100,001 - $120,000	2	6.25
	More than $120,000	5	15.63
	Prefer not to answer	8	25
		Mean	*SD*
Age	Male	43.75	11.93
	Female	47.15	13.79
BMI	Male	35.17	8.35
	Female	32.84	5.01

Table 3. Follow-up *F*-test statistics.

	Mean (*SD*) baseline	Mean *(SD)* 2-weeks	Mean *(SD)* 3-months	*F*	*df*	*p*	η^2_p
Measure							
DEBQ-EE	3.91 (0.46)	3.27 (0.58)	3.10 (0.55)	28.97	2, 54	<.001	.518
DTS	3.32 (0.92)	3.17 (0.79)	2.87 (0.86)	5.99	2, 54	.004	.182
FAAQ	28.18 (6.24)	32.71 (4.29)	32.68 (4.76)	11.06	2, 54	<.001	.291
MEQ	2.35 (0.35)	2.51 (0.35)	2.65 (0.41)	13.09	2, 54	<.001	.326
Values	3.24 (0.66)	3.79 (0.63)	3.63 (0.66)	8.98	2, 54	<.001	.250
EE Frequency	4.64 (1.66)	3.00 (1.49)	3.43 (1.67)	9.41	2, 54	<.001	.258
EE Ability to stop	1.96 (0.88)	2.68 (1.12)	2.71 (1.01)	6.77	2, 54	.002	.200

Table 4. Follow-up *t*-test statistics.

	t	*df*	*p*
Measure			
DEBQ-EE			
Change from baseline to 2-weeks	5.80	31	<.001*
Change from baseline to 3-months	6.96	29	<.001*
Change from 2-weeks to 3-months	1.44	29	.160
DTS			
Change from baseline to 2-weeks	0.67	31	.506
Change from baseline to 3-months	2.89	28	.007
Change from 2-weeks to 3-months	2.56	28	.016
FAAQ			
Change from baseline to 2-weeks	-4.81	31	<.001*
Change from baseline to 3-months	-3.09	28	.004
Change from 2-weeks to 3-months	0.00	28	1.000
MEQ			
Change from baseline to 2-weeks	-3.23	31	.003
Change from baseline to 3-months	-4.43	29	<.001*
Change from 2-weeks to 3-months	-3.78	29	.001*
Values			
Change from baseline to 2-weeks	-3.89	31	.001*
Change from baseline to 3-months	-2.73	29	.011
Change from 2-weeks to 3-months	1.35	29	.188
EE Frequency			
Change from baseline to 2-weeks	3.78	31	.001*
Change from baseline to 3-months	3.30	28	.003
Change from 2-weeks to 3-months	-1.07	28	.293
EE Ability to stop			
Change from baseline to 2-weeks	-3.47	31	.002*
Change from baseline to 3-months	-3.19	28	.003
Change from 2-weeks to 3-months	-0.15	28	.882

*Notes. * denotes statistical significance at $p \leq 0.002$ after applying Bonferroni correction*

General Discussion

Emotional eating is defined as the tendency to overeat in response to negative emotions such as stress and anxiety (van Strien et al., 2007). This eating behaviour has been observed across the weight spectrum, occurring in individuals of normal weight as well as those with overweight or obesity (Geliebter & Aversa, 2002). Emotional eating has also been associated with weight gain over time in longitudinal studies (e.g., Koenders & van Strien, 2011; van Stien et al., 2012) and has been shown to inhibit weight loss in the context of weight loss interventions (e.g., Delahanty et al., 2013; Tiexeira et al., 2010). As such, the aims of the present dissertation were to: (1) outline the relationship between emotional eating and weight in individuals of normal weight and with overweight/obesity, in order to (2) develop and test the feasibility and efficacy of two interventions designed to reduce emotional eating.

The first manuscript in my dissertation was a comprehensive literature review of the relationship between emotional eating and weight outcomes. This review provided an overview of both longitudinal and experimental studies linking emotional eating with weight concerns such as weight gain and difficulties and weight loss (e.g., Butryn et al., 2009; Dohle et al., 2014; Niemeier et al., 2007). It also reviewed the available interventions for emotional eating, finding that ACT has shown to be efficacious in reducing emotional eating when delivered in weight loss interventions (e.g., Forman & Butryn, 2014; Forman et al., 2013; Lillis et al., 2016).

The review also identified that emotional eating occurs in individuals of normal weight (e.g., van Strien et al. 2013; Wallis and Hetherington 2009; Werthmann et al. 2014). However, it is not known how these individuals manage to maintain their weight. Thus, the second manuscript in my dissertation was a series of qualitative interviews with individuals of normal weight to determine what compensatory behaviours they engaged in in response to their

emotional eating and what concerns they held with their emotional eating. The study found that exercise, control of eating behaviours, and stress reduction techniques were all used as compensatory behaviours. It also identified that participants were concerned with both short and long-term consequences of emotional eating on their weight and health. Insight gained from Manuscripts 1 and 2 thus helped to inform the development of emotional eating interventions in Manuscripts 3 and 4 by recognizing how some individuals cope with their emotional eating and identifying ACT as an appropriate intervention framework.

The third manuscript in my dissertation tested the feasibility and efficacy of a brief, physician-delivered ACT intervention to reduce emotional eating. It found a lack of feasibility for this method of program delivery, suggesting that lack of knowledge and buy-in from physicians may have hindered effective dissemination. As such, the fourth and final manuscript in my dissertation tested the feasibility and efficacy of a similar, brief, ACT intervention for emotional eating, delivered by a PhD candidate in Clinical Psychology who was trained in behaviour change and ACT. The results from this one-day workshop suggest both treatment acceptability and efficacy to inform a larger RCT.

Altogether, this dissertation helps further insight into the relationship between emotional eating and weight, while also providing evidence for the feasibility and efficacy of brief, ACT interventions to reduce emotional eating. This information can be used to provide emotional eaters with efficacious interventions to improve their emotional eating and thereby reduce the distress experienced by it.

Methodological Considerations

The first manuscript in my dissertation was conducted as a comprehensive literature review. This format allowed for a thorough and reflective description of the associations between

emotional eating and weight outcomes, as well as an evaluation of the available treatments. However, one limitation of this format is that it is not as statistically informative as a meta-analysis or systematic review, thus effect sizes across studies are not known. At the time of publication, there were too few studies to conduct a meta-analysis/systematic review. This will be an informative area for future research once more studies are available.

Manuscripts 2 through 4 utilized the DEBQ to assess emotional eating, and despite being the most widely used measure of emotional eating, the psychometric scale does have limitations that warrant discussing. The scale asks individuals to rate the frequency with which they experience the desire to engage in emotional eating, on a Likert-type rating scale from 1 (never) to 5 (very often). The first issue with these items and the general use of this questionnaire is that the endorsement of a "desire to engage in emotional eating" is regularly treated as "actual emotional eating". However, it is not assessed whether individuals actually engage in the behaviour. The second issue is that the response options are highly susceptible to interpretation and do not provide an exact frequency with which an individual has the desire to engage in this behaviour. The final issue is that the DEBQ does not evaluate whether or not an individual experiences distress as a result of their emotional eating, which is an important factor to assess in determining whether or not this behaviour should be is treated. Taken together, these are important considerations for evaluating the way in which emotional eating is assessed, not only in the context of this dissertation, but in the literature on emotional eating in general. As reviewed in Manuscript 1, other measures of emotional eating exist but come with similar limitations. Thus, it may be a useful future direction to develop a measure of emotional eating that assesses the actual frequency of this behaviour, as well as the extent to which it causes distress.

Another methodological consideration related to the DEBQ is the establishment and use of cut-off scores to create dichotomous groups of emotional eaters versus not. In manuscripts 2 through 4, a cut-off score of 3.25 was used, which has been found to represent the 80th percentile of emotional eating, as per the procedure of van Strien, Herman, Anschutz, Engels, and de Weerth (2012). Although this cut-off captured a group of individuals for whom emotional eating was problematic in the present studies, it is not known whether or not a less conservative cut-off would include a larger proportion of individuals who might benefit from interventions to reduce their emotional eating. Moving forward it would be important to explore the potential clinical significance of establishing more liberal cut-offs for emotional eating scores.

Contributions to Knowledge

The first manuscript in my dissertation provides a comprehensive overview of the relationship between emotional eating and weight outcomes. Until the publication of this review, there had been no update regarding the state of the field since Ganley's (1989) general review of emotional eating. My review thus provides researchers with an update on the state of the field, and highlights areas for future research. Importantly, it summarizes treatment options for emotional eating that have clinical utility to address and reduce this behaviour.

Manuscript 2 examined emotional eating in individuals of normal weight, a population which has been neglected when examining the potential negative effects of emotional eating. Past research has typically studied emotional eating in conjunction with other physical and mental health concerns that have been found to be associated with chronic disease, such as obesity (e.g., Lillis et al., 2016) and eating disorders (e.g., Eldredge & Stewart, 1996; Pinaquy et al., 2003). Thus, individuals who struggle with emotional eating but do not experience concerns with weight or diagnosable eating disorders are an understudied population. Manuscript 2

highlighted that emotional eaters of normal weight do experience concerns over this behaviour, and that they would benefit from strategies to reduce their emotional eating in order to improve their eating behaviours and reduce the associated distress. The study also provided insight into the methods used by these individuals to regulate their weight, such as exercise, which may have implications for encouraging weight regulation in emotional eaters with overweight or obesity.

The third manuscript in my dissertation tested the feasibility and efficacy of a brief, physician-delivered, ACT intervention for emotional eaters. Findings of non-feasibility suggest that physicians are not ideal candidates to deliver such interventions. This finding is consistent with past research that has shown that physicians do not have adequate training in behaviour change to effectively treat patients with overweight and obesity (Chisholm et al., 2012; Plourde & Prud'homme, 2012). Despite the training provided in the present study, the physicians were still ill-equipped to deliver the intervention. Given the high prevalence of overweight/obesity (Twells, Gregory, Reddigan, & Midodzi, 2014) and increasing push for the delivery of weight loss interventions in primary care (Canadian Task Force on Preventive Health Care, 2015), systematic changes to better educate physicians in behaviour change and obesity beginning in medical school are needed. Alternatively, interventions that target obesity would likely be more effectively delivered by health practitioners with education and training in behaviour change, as has been shown in other studies (e.g., Wadden et al., 2011).

The fourth and final manuscript in my dissertation tested the feasibility and efficacy of a one-day ACT workshop for emotional eating. This study was the first intervention to target emotional eating independent of weight loss and outside of the context of a larger-scale weight loss program. As such, the findings can be used to inform other emotional eating interventions tailored towards individuals who engage in this behaviour and experience both physical and

mental health concerns as a result, regardless of weight status. Furthermore, the results provide support for the efficacious delivery of a brief (i.e., one day) intervention to reduce emotional eating, as has been shown in other health-related conditions such as chronic pain and cardiovascular disease (Dindo et al., 2017). These findings challenge the assumption that time and resource-intensive interventions are required to facilitate behaviour change, with changes maintained at 3-months post-intervention in this study.

Future Directions

Despite the contributions to knowledge described above, the findings reported in this dissertation also highlight important areas for future research. These include: (1) changing the conceptualization of emotional eating as a behaviour to address independent of weight, (2) addressing assessment and cut-offs for emotional eating, and (3) exploring future directions for the treatment of emotional eating.

Changing the conceptualization of emotional eating. First, this dissertation identified that emotional eating occurs across the weight spectrum, both in the context of disordered eating and weight-related concerns, but also independent of these. Regardless of weight status or related physical or mental health concerns, participants in both studies that were described in Manuscripts 2 and 4 expressed that emotional eating, in and of itself, leads to distress in the lives of some individuals. This finding suggests that emotional eating is a behaviour that should be studied and targeted as its own entity and not just as a means of facilitating weight loss. Conceptualizing emotional eating as its own entity, and not solely as a contributor to weight outcomes, is consistent with the growing movement away from viewing weight as the only indicator of physical and mental health (Penney & Kirk, 2015; Robison, 2005).

Rather, research has shown that eating behaviours themselves (e.g., emotional eating) have a greater impact on physical health than BMI (Bacon & Aphramor, 2011; Bombak, 2014), with evidence that improving one's diet can reduce cardiovascular and diabetic risk without altering weight (Appel et al., 1997; Gaesser, Angadi, & Sawyer, 2011; Gannon & Nuttall, 2006). Meanwhile, focusing solely on weight loss may exacerbate detrimental outcomes such as weight cycling, binge eating, negative body image, eating disorders, and weight stigma (Ackard, Croll, & Kearney-Cooke, 2002; Bacon & Aphramor, 2011; Neumark-Sztainer et al., 2011; Stevens et al., 2017), especially for emotional eaters (e.g., Annesi & Mareno, 2015; Eldridge & Agras, 1996; Engelberg et al., 2007; Ricca et al., 2012. Thus focusing on emotional eating itself, rather than weight, is important not only to prevent negative outcomes associated with dieting for emotional eating and to reduce the stigmatization surrounding weight concerns (Puhl & Heuer, 2010), but also to encourage effective change in physical health by having a specific behaviour to target.

Addressing assessment and cut-offs for emotional eating. Second, in preparing Manuscript 1 and reviewing the various questionnaires used to assess emotional eating, I identified issues regarding the specificity of existing emotional eating measures. As discussed earlier, the most common measure of emotional eating is the Dutch Eating Behavior Questionnaire (DEBQ; van Strien et al., 2016). However, as reviewed in the methodological considerations, the questionnaire lacks specificity in its assessment of one's actual engagement in emotional eating (i.e., response options are limited to assessing "desire" to engage in emotional eating from "never" to "very often", instead of assessing concrete frequency). Thus, given the plethora of research on emotional eating, the field would benefit from the development

of a measure that more precisely assesses actual behavioural frequency of emotional eating episodes and the associated impact that these have on one's overall functioning.

Also, in Manuscripts 2 to 4 of this dissertation, we elected to use an established cut-off (van Strien, Herman, Anschutz, Engels, & de Weerth, 2012) to classify potential participants into the binary categories of "emotional eater" and "not an emotional eater." In the context of these studies, this cut-off was able to accurately capture a group of individuals who engaged in emotional eating at a high frequency and were thus interested in trying to reduce this behaviour. However, future research could be done to identify whether or not a lower cut-off would still capture individuals who feel affected by their emotional eating enough to wanting to make changes to reduce it. Given that emotional eating is a widely reported and culturally normalized behaviour (Bennett, Greene, & Schwartz-Barcott, 2013; Jääskeläinen et al., 2014), it is not clear at what point: (1) this behaviour becomes psychologically distressing to individuals, and (2) consuming an unhealthy diet through emotional eating becomes problematic to physical health. It is thus not known what profile of emotional eating is associated with causing distress/health problems or what factors may contribute to this distress/health problems over and above the frequency with which the behaviour is engaged in. Establishing a clearer criterion for problematic emotional eating would allow for the better identification of individuals who engage in it and may benefit from interventions to reduce it.

Future directions for treatment emotional eating. Third and finally, there are many future directions for the treatment of emotional eating. As mentioned, there is a need for more interventions that target emotional eating without promoting weight loss. One of such interventions was introduced in Manuscript 4. Given that this study tested and supported the feasibility of such an intervention, further research is required to test its efficacy in the context of

a larger-scale RCT with long-term follow-up (i.e., greater than three months post-intervention) and a control group. Should an intervention be efficacious in this context, the next step would be its implementation in a public setting, such as the health care system, to test its effectiveness in a real-world context. Based on the findings of Manuscript 3, interventions should be facilitated by health care providers trained in behaviour change, such as clinical psychologists. Broader dissemination is a critical direction for future research because few of the behavioural interventions that are tested in an RCT ever become available to the large population of individuals in the community who could benefit from them.

Concluding Statement

Put together, this dissertation highlights the relationship between emotional eating and weight outcomes while also establishing why emotional eating is an important behaviour to address and to do so across the weight spectrum. Through both exploratory and intervention research, the studies in this dissertation package elucidate ways in which emotional leading may lead to distress and provide preliminary evidence supporting the efficacy of ACT interventions to reduce emotional eating. Thus, this dissertation may act as a starting point for the development and testing of other emotional eating interventions, delivered in the context of an RCT and eventually disseminated into public settings.

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Supplementary Materials

One-day ACT Workshop for Emotional Eating – Manual

Text written in normal font is to be verbalized to the participants.
Text written in italic font is instructions for facilitators.
Text written in bold indicates section headings and points to emphasize.

Section 1: Introduction (9-9:15AM)

Welcome to today's workshop. You are all here today because you've identified that emotional eating is something that you struggle with and would like to try and reduce. Over the course of the day, we will talk more about emotional eating, why we do it, and learn ways in which we can try and reduce it.

Today's workshop is grounded in an approach called Acceptance and Commitment Therapy, which we will refer to from now on as ACT. ACT emphasizes that negative emotions are an inherent part of being a human being, and works to help people learn strategies to better accept and tolerate these negative emotions, to live in line with their values. We think this is very relevant to emotional eating, which is in essence avoidance of these very same negative emotions. By promoting acceptance of negative emotions, it can thus help to reduce emotional eating.

The workshop will be largely discussion based so we encourage everyone's participation. Of course, you don't have to share anything that you are not comfortable with sharing. This is a safe space and nothing we discuss today will be shared outside of this room. Please keep this in mind in respect for your fellow participants. We will also walk you through several experiential exercises to help elaborate on the points we are discussing. Again you don't have to participate in these if you are not comfortable, but we encourage that you try them in order to get the most out of the workshop. Does anyone have any questions before we get started? *Allow a brief question period, max 5 minutes.*

Section 2: Emotional Eating (9:15-9:45AM)

Before we jump into ways to reduce emotional eating, let's take a look at what emotional eating actually is and what it looks like for each of you.

Emotions can trigger overeating. We might eat when we are stressed, anxious, sad, or have other feelings that we want to cope with. Food helps to relieve these emotions. The more we do this, the more that emotional eating becomes a habit, making it that much more difficult to break.

I want you all to think of the last time you overate, or ate more than usual. How were you feeling at that exact moment? *Facilitator will lead a 10-15 minute group discussion to help establish rapport with participants and gain a better understanding of what emotional eating looks like for each participant. If a participant is having difficulties identifying specific emotions that lead*

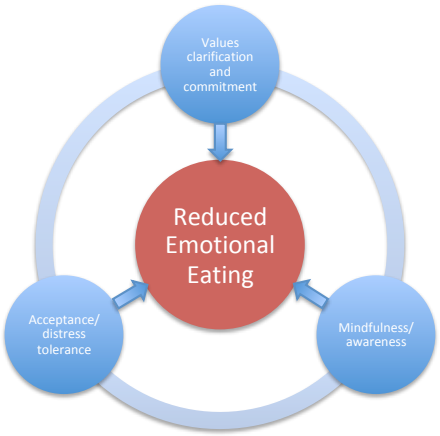
them to eat, work backwards and get them to describe situations in which they are most likely to overeat. Ask them about the physical sensations they feel when they are tempted to eat too much. Sometimes people are unaware of their emotions and so it can be helpful to tie these to physical symptoms of stress and anxiety. For example, tension in the neck and shoulders, racing heart, etc.

The thing about emotional eating is that it usually does not make us feel better. As much as we try to control our emotions by eating, we can't. We can change what's around us, but what is going on inside of us, our emotions, we cannot easily change. When we eat, we might feel better for a short time but it doesn't last. *Engage in a brief group discussion to explore how emotional eating makes participants feel. Does it alleviate the emotions that led them to eat in the first place? Or does it contribute to the development of other emotions such as guilt and shame?*

As you can likely see from what we've just discussed, emotional eating serves a purpose – it helps us to feel better in the short term when we struggle with negative emotions. However, in the long-term, it isn't an effective strategy to deal with these emotions. Throughout today's workshop, we will discuss alternative ways to cope with negative emotions that do not involve food.

Section 3: Introducing the Three ACT Skills Related to Emotional Eating (9:45-10AM)

As we mentioned earlier, today's workshop is based on an approach called ACT. ACT is used to address mental health concerns such as depression and anxiety, and is also used to promote behaviour change, such as encouraging healthy eating and exercise. Three of ACT's components are particularly relevant to emotional eating: (1) values clarification/commitment, (2) acceptance/distress tolerance, and (3) mindfulness/awareness. In the context of emotional eating, this behaviour often: (1) goes against one's values, especially those pertaining to health and wellness, (2) occurs due to a lack of tolerance or acceptance for negative emotions, and (3) occurs in the absence of mindfulness or awareness towards eating and knowing what your body needs in the moment. Thus, throughout the course of the workshop we will aim to: (1) clarify your values to help guide you in the direction of more value-consistent behaviours that replace emotional eating, (2) teach you to better tolerate and accept negative emotions that would otherwise lead you to eat, and (3) teach strategies to promote mindfulness of eating, as well as your thoughts and feelings around food and eating.



Use the above diagram to explain how each of the 3 components interact with each other to lead to reductions in EE.

Adapted from Forman & Butryn (2015).

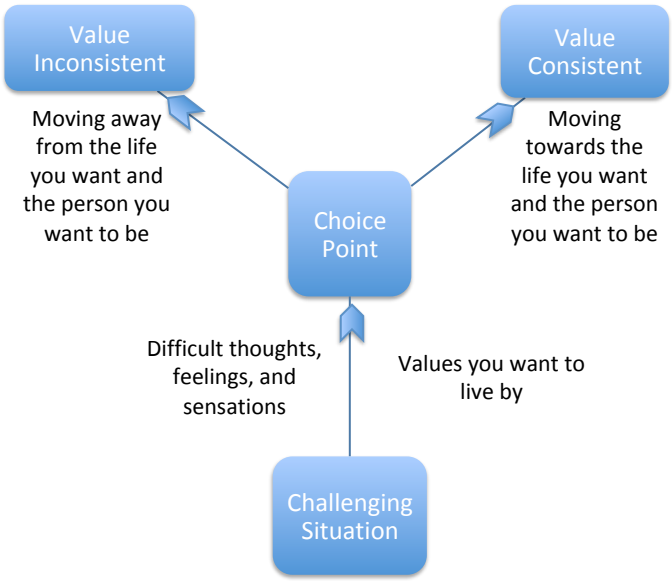
Section 4: Values (10-10:30AM)
ACT Skills Taught: values clarification/commitment

To start off with, we are going to talk about values and how these relate to emotional eating, because this lays the foundation for understanding why reducing emotional eating is important to you. So, what are values? Values are what is important to us that we choose to live by. Values are NOT goals. They are not something we can achieve. Rather, they are intertwined with our actions and exist continually as we go about our everyday lives. Our values can be related to various aspects of our lives; our work, our families, our relationships, and of course, our eating and our health.

Engage in discussion with participants about their core values. Get participants to come up with a list of values, especially those pertaining to eating and health.

Values are very important in our lives because they help us make meaningful choices. Every time we make a decision, whether it be related to eating or otherwise, we choose whether or not to act in line with our values. Sometimes we are able to make decisions that are in-line with our values, and sometimes other things get in the way that deter us from acting in-line with our values. *Show Choice-Point model and walk through an example of how decisions can be value-consistent or value-inconsistent. After the facilitator has described an example, ask the*

participants to provide an example of a challenging situation related to emotional eating, and walk through a value-inconsistent and value-consistent decision with them.



Model from Ciarrochi, Bailey, and Harris (The Weight Escape, 2014).

As you can see, values come into play when deciding whether or not to engage in emotional eating. To help clarify your values and how they relate to emotional eating, I want you to think about your values we just discussed. Is emotional eating consistent with these values? Why or why not? *Allow participants to briefly brainstorm answers and then engage in a group discussion on values pertaining to emotional eating. Overall the aim is to emphasize that emotional eating is generally inconsistent with one's values.*

BREAK (10:30-10:45AM)

Section 5: Using Values to Make Decisions (10:45-11:15AM)

ACT Skills Taught: values clarification/commitment

Now that you have a better understanding of your values and how these relate to your emotional eating, you can use these to motivate you to engage in behaviours that are consistent with our values (i.e., avoid emotional eating). In this case, if you value health and wellness for example, you can use this to help you avoid emotional eating because you know that the foods you consume when you emotionally eat are inconsistent with valuing a healthy lifestyle and feeling good in your body.

However, sometimes when we are stressed or experience other difficult emotions, we stray away from these core values. In the Choice-Point model we just talked about, difficult thoughts, feelings, and sensations can come up that lead to value-inconsistent choices. In the moment before engaging in emotional eating, it is useful to be able to bring yourself back to your values

to be able to address these difficult thoughts, feelings, and sensations, to make an informed decision about whether or not eating is what you want to do.

This is where the BOLD technique comes in. It can help you to deal with the emotions that make you want to eat by remembering your values before doing so.

BOLD stands for:

- ✤ **B** - Breath—Take a couple of breathes, slow down!
- ✤ **O** - Observe—Observe what you are feeling – are you tired or tense perhaps? Angry or bored?
- ✤ **L** - Listen to values—What are your values? Why do you want to avoid emotional eating? Why is this important to you?
- ✤ **D -** Decide to eat or not to eat and how much. Decide in line with your values!

Adapted from Ciarrochi, Bailey, and Harris (The Weight Escape, 2014).

Spend 5-10 minutes experientially walking participants through BOLD. Have participants imagine that they are about to engage in emotional eating and are applying BOLD to try and make a value-consistent decision.

B - Discuss belly breathing and how this helps to slow down the fight-or-flight response. Have participants practice belly breathing by putting one hand on their chest and one hand on their stomach to see how these body parts rise and fall in tandem. O - Then have participants observe what is going on in their bodies. The facilitator can offer an example of how they are feeling to help get people started. Notice physical sensations, as well as any thoughts and/or feelings. L - Reflect on values discussed earlier and how these relate back to emotional eating. D - Finally, using the information collected, make a decision about how to proceed. Note that the goal of this exercise is NOT to ALWAYS avoid emotional eating, but rather make an informed decision in the moment about whether or not this will be an effective way of making oneself feel better.

Does anyone have any questions about how to apply BOLD, or foresee any barriers that might get in the way of applying it effectively? *Allow participants to answer these questions and help brainstorm solutions to identified barriers such that BOLD can be a useful technique for participants to apply in their day-to-day lives.*

Section 6: Acceptance (11:15-11:45AM)
ACT Skills Taught: acceptance/distress tolerance

Now that we have clarified your values related to emotional eating and you have a more solid understanding of why it is a value-inconsistent behaviour, we are going to move on to learning alternative, value-consistent behaviours; skills to help promote the tolerance and acceptance of negative or distressing emotions such that you can reduce your emotional eating.
Negative emotions are an inevitable part of life. There will always be times when we are sad, stressed, or anxious, just as there will be times when we are happy and joyful. It is important to know that just because we are feeling negative emotions, it doesn't mean that we have to act on them. We don't have to try and push them away. Also, based on what we discussed earlier with

values and BOLD, acting on such emotions is often inconsistent with the values that are important to us. The goal of the next technique is to teach you to accept negative emotions for what they are, rather than trying to get rid of them by eating. In the context of BOLD, this is a value-consistent behaviour.

Introduce Tug-of-War Metaphor

Adapted from Forman & Butryn (Mind Your Health Interventionist Manual, 2012) and Stoddard, Afari, & Hayes (The Big Book of ACT Metaphors, 2014).

Introduce the following metaphor as an experiential exercise, allowing space between points so participants can pause and reflect on what you are having them imagine. You may suggest that they close their eyes if they are comfortable, or find something immovable to stare at.

Every time we want to eat because of the negative emotions we are experiencing, think of this struggle like a tug-of-war between yourself and a monster. The monster represents your negative emotions making you want to eat. Between you and the monster is a gigantic, bottomless pit. Whenever you are overwhelmed by negative emotions that make you want to eat, it may feel like the monster is going to win the tug-of-war and pull you into the pit. At other times it may feel that if you pull the rope just the right way, you can drag the monster into the pit and be free from negative emotions forever. Time after time though, no matter how hard you try, you realize it is impossible to pull the monster into the pit.

So why doesn't pulling back against the monster work? As we just spoke about, negative emotions are an inherent part of life as a human being and their pull can be strong. When you experience them, you can fight against the metaphoric monster, trying to force them to go away but that takes a lot of effort. No matter how hard you try, you can't force the emotions to just go away.

Luckily, there's another option. You can simply drop the rope and walk away from the pit. If you do this, the monster (i.e., your negative emotions) won't go away, but from across the impassible pit, it can't do you any harm either. You can still keep living your life in the presence of the monster – it can no longer reach you because there is a pit in between you and it. In fact, the monster is much less scary when you're not engaged in a heated battle with it - same for your negative emotions: they are easier to tolerate when you're not trying to fight them. This is called acceptance.

Off in the opposite direction of the pit are your values. By dropping the rope, you can give up the fight with the monster and free up your energy to pursue the things that are important to you. You can use the energy you have saved by not fighting against the monster to do other things that are more consistent with your values. For example, you could go for a walk to get fresh air and relieve stress or talk to a friend or loved one for support. By making the choice to drop the rope, it gives you the option to live consistently with your values, even in the presence of negative emotions.

Imagine what this would feel like to drop the rope when it comes to your emotional eating. When you choose not to fight against the monster that is your negative emotions, but rather accept it, how does that change your ability to act consistently with your values?

Briefly discuss what it was like for participants to imagine dropping the rope and accepting their negative emotions. Once they have dropped the rope, get participants to brainstorm alternative ways to respond to emotions, rather than eating. Tie this back in with BOLD and explain how during the final step when deciding what to do, people can opt to engage in these value-consistent activities rather than eating.

LUNCH (11:45AM-12:45PM)

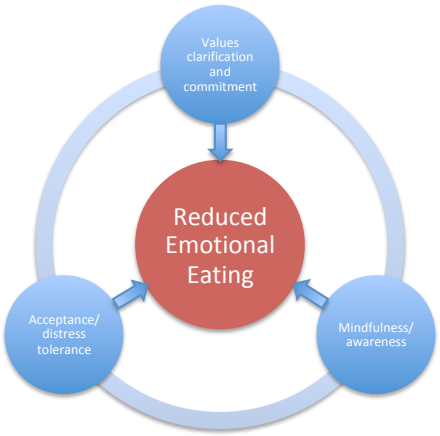
Section 7: Urge Surfing (12:45-1:15PM)
ACT Skills Taught: acceptance/distress tolerance

This morning we discussed your values related to emotional eating and started to learn techniques to help with acceptance of negative emotions. We introduced the tug-of-war metaphor, which represents learning to accept negative emotions, rather than fighting against them or trying to push them away by eating. Now we are going to move on to a more specific strategy to help you sit with the food urges or cravings that arise as a result of negative emotions. When we engage in emotional eating, we might have a craving for a specific food (like chips or chocolate), or we might have a craving for a general taste (like something sweet or something salty). However, just because the urge or craving is there doesn't mean that you have to act on it. Think of an urge or a craving like a wave. There will be ebb and flow; it will come and go. Sometimes it will be stronger and sometimes it will be weaker. Urge surfing is like riding a wave. The goal is to become aware of your emotions and cravings, but to not try to fight them. Over time, you might begin to find that they naturally go away on their own, without you having to do anything to try and change them.
Briefly discuss how participants typically respond to cravings. Do they act on them immediately, sit with them for a time, or even notice that sometimes they go away without eating at all?

To practice urge surfing, you can follow 5 easy steps:

1. Acknowledge your urge or craving ("I'm having the urge to…" or "I'm craving…")
2. Observe your urge or craving. Notice how it feels in your body (are you tense, anxious, fatigued, etc.?).
3. Rather than trying to make it go away, just sit with it for now.
4. Watch the urge or craving as it rises and falls like a wave, noticing as it gets stronger and then weaker. It may help to score the urge or craving on a scale from 1-10 (10 being the strongest) to see how it changes over time.
5. Check in with your values. Is acting on the urge or craving consistent with your values?

Adapted from Forman & Butryn (Mind Your Health Interventionist Manual, 2012).



Use the above diagram to elucidate how urge surfing combines acceptance/distress tolerance and values clarification, as well as mindfulness, to lead to reductions in emotional eating.
As you practice this exercise, you can see how your tolerance for food urges or cravings change. Maybe the first time you try it, you'll be able to delay eating by 5 minutes, maybe the second time, 10 minutes. Eventually, you may be able to sit through the craving and note that it goes away without having to eat at all. All of these possibilities are ok. Similar to all of the techniques taught thus far, the purpose of urge surfing is not to try and fight to get rid of said urges. Rather, it's about becoming more mindful of the cravings you experience and thus giving yourself the option to act on these or not.
Allow participants to ask any questions they may have about urge surfing and answer accordingly.

Section 8: Mindful Eating (1:15-1:45PM)
ACT Skills Taught: mindfulness/awareness

The third and final ACT skill that relates to emotional eating is mindfulness, or present moment awareness. Often there are times when we don't notice what we are eating because we are too busy, too tired, or too preoccupied with other things, like our emotions (stress, irritation, anxiety, etc.). This is what we call "mindless eating". The opposite of mindless eating is mindful eating. Mindful eating is being totally focused on each sensation that happens while eating; chewing, tasting, swallowing, and savouring each bite. Mindful eating can help you to be more aware of your hunger and fullness, eat less food, reduce binge eating, increase the pleasure you get out of eating, and of course, reduce emotional eating. Let's do an exercise to practice mindful eating.

Mindful Eating Exercise (use a piece of dark chocolate)

Adapted from the raisin exercise in Jon Kabat-Zinn's MBSR program.

This exercise is an exaggeration of mindful eating, in order to help show you the importance of taking your time to enjoy your food. By being fully aware of what you are eating, and how you feel when eating, you will make better eating decisions and be more satisfied with what you are eating, and therefore more likely to eat when you are actually physically hungry and less likely to overeat. Basically, for everything you eat, you can ask yourself mindfully whether or not it is worth it; whether the taste experience and the pleasure are what your mind and body needs in the moment.

The purpose of this activity is to exaggerate the act of tasting and eating by **slowing down** and **focusing on all of the sensations** associated with food and eating. The goal is to take your time to eat this chocolate mindfully. This is relevant to emotional eating, because when we engage in emotional eating, we are rarely mindful of what we are eating, how it tastes, and whether or not we are enjoying it. By learning to eat more mindfully, we can question whether or not emotional eating is actually satisfying, and if we realize that it is not, we can choose another behaviour to engage in. *Give each participant 1 piece of dark chocolate.*

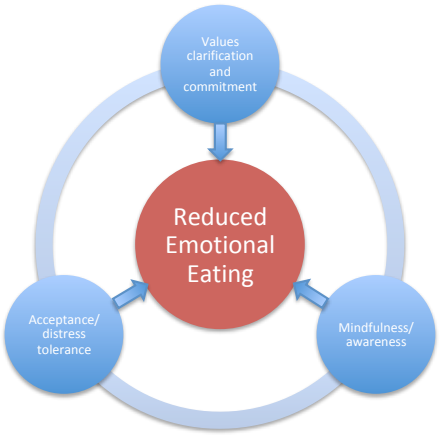
Before putting the chocolate in your mouth, I want you to take time to examine it. Take a mental note of what it looks like, and feels like. Do you notice it starting to melt on your fingertips? What is that sensation like? Bring the chocolate up to your nose and smell it. What does it smell like? Does the smell remind you of anything, does it bring up any memories or feelings? When you are ready, put the chocolate into your mouth. Try not to chew it right away. Instead, notice the way it feels in your mouth and on your tongue. Notice the chocolate start to melt. How does the flavour change as the chocolate turns from solid to liquid? Notice all of the sensations in your mouth; taste, texture, temperature. If you start to chew the piece of chocolate, how does this feel in your mouth? What does it taste like? Note if you experience a different texture or flavour as you chew the chocolate. When you are done chewing, you can swallow. Notice how this feels as the chocolate leaves your mouth and moves down the back of your throat. Finally, when you've finished swallowing, be aware of no longer feeling any sensation of the chocolate in your mouth. What lingers? Notice any sensations that still remain even though the piece of chocolate is gone. *Take time to work through this experiential exercise slowly, allowing for pauses between points and questions such that participants can reflect on the experience.*

How was that experience for everyone? How was it similar to or different from how you normally eat? How can you envision applying it to your daily life to help with emotional eating? *Engage in a brief discussion on participant's experiences with the exercises and how they foresee applying it in their day-to-day lives. Again discuss any anticipated barriers and address these. Reinforce how mindful eating can help reduce emotional eating by making participants more aware of what they need and want in the moment, and not engage in eating that they may find dissatisfying.*

Section 9: Establishing Habits (1:45-2:15PM)
ACT Skills Taught: values clarification/commitment, acceptance/distress tolerance, mindfulness/awareness

All of the techniques that have been taught up to this point will be most effective if it is practiced routinely such that they become a habit. Decreasing emotional eating and improving health goes beyond today's workshop. The skills you have learned today can be used indefinitely. There is no quick fix solution to changing habits like emotional eating, which makes it important to focus on applying skills consistently over the long term to manage emotional eating going forward throughout your life.

Let's review some of the skills we've covered over the past several hours. First, we discussed the values that you hold related to emotional eating. We taught you to use BOLD (Breathe, Observe, Listen, Decide) to slow down in the face of emotional eating, and to remember your values before choosing whether or not to eat. We also discussed the importance of accepting your emotions for what they are, rather than trying to change them (*remind them of dropping the rope).* Similar to this, we talked about riding your urges and cravings (urge surfing) to see if they go away on their own without acting on them by eating. Finally, last time we talked about mindful eating, to help you truly enjoy the act of eating and experience all of the sensations associated with it.



Use the above diagram to help with the review of skills taught to show how each component interacts with the others to lead to reductions in emotional eating.

Do you have any questions about any of these techniques or how to apply them to help reduce your emotional eating? *Engage in brief discussion, keeping in mind that the qualitative*

component at the end of the session will ask more specific questions about elements of the workshop participants found most/least useful.

Like I said earlier, these are all skills you can use not only now, but also long after the workshop's completion. You can basically use them for life, or until they have become a habit and you no longer need to think about them. With practice, these skills can consistently help you to reduce emotional eating.

BREAK (2:15-2:30PM)

Section 10: Commitment to Values (2:30-3PM)
ACT Skills Taught: values clarification/commitment

The purpose of today's workshop is not to eliminate emotional eating altogether. Realistically, it is something that we all do from time to time, and that is ok. The goal is rather to reduce the frequency of your emotional eating by teaching you alternate ways to cope with negative emotions. When applying these techniques to your day-to-day lives, setbacks and loss of motivation are normal. They happen to everyone and are an inevitable part of making any sort of behaviour change. In a way, changing your habits is like hiking a mountain. For a while, it feels like the hike is never going to end and there is no way that you will make it to the top. But once you get out of the trees, you can see a clear path to the summit and know that you are going in the right direction. Success isn't all about the final outcome (in this case, making it to the top of the mountain). You can also achieve success along the way. It's like the old saying, "it's not about the destination, it's about the journey." The journey won't always be easy, or smooth, but that doesn't mean you can't get where you want to go eventually if you set your mind to it.

Discuss potential setbacks that participants have had or think that they might have in the future related to their emotional eating. Remind them of how they can apply the skills taught during the workshop to target various emotions that lead to eating using strategies like BOLD, urge surfing, etc. ***Overall it is important to convey that setbacks are normal and inevitable.*** *What matters is reacting to these setbacks proactively to prevent them from leading to more setbacks.*

Ways to stay committed

If you feel like you are struggling to use the techniques taught today to not engage in emotional eating, it is important to remember your values and goals. Think back to our early discussion on values. We discussed reasons why you want to avoid engaging in emotional eating. It can help to think of these values when you experience a setback, because it helps to remind you why you want to reduce emotional eating and its inconsistency with your values.

Having participants complete a summary card with their values to reaffirm how emotional eating is inconsistent with these. Suggest that participants keep this card where they can see it (for example, in the kitchen or wherever also they would be forced to see it when tempted to engage in emotional eating).

Section 11: Qualitative Component (3-3:30PM)

Thank you for your participation in today's workshop. Before you go, we'd like to hold a brief discussion to get your overall thoughts on the workshop so that we can use your feedback to help to modify and improve it moving forward. *Engage in discussion using qualitative prompts from ethics application.*

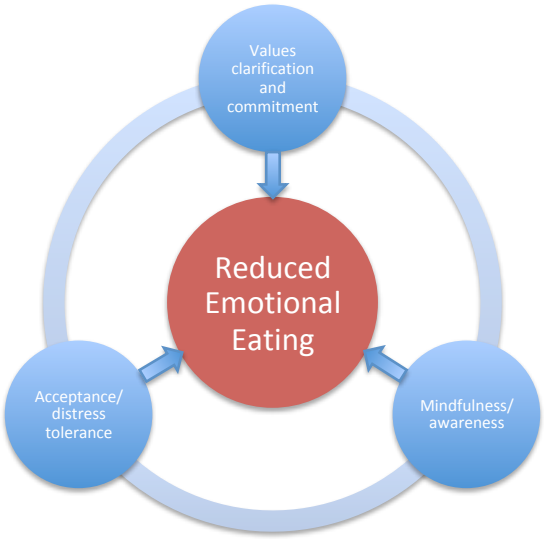
One-day ACT Workshop for Emotional Eating – Participant Handouts

ACT Skills for Emotional Eating

Acceptance and Commitment Therapy (ACT) is used to address mental health concerns such as depression and anxiety, and is also used to promote behaviour change, such as encouraging healthy eating and exercise. Three of ACT's components are particularly relevant to emotional eating: (1) values clarification/commitment, (2) acceptance/distress tolerance, and (3) mindfulness/awareness.

In the context of emotional eating, this behaviour often: (1) goes against one's values, especially those pertaining to health and wellness, (2) occurs due to a lack of tolerance or acceptance for negative emotions, and (3) occurs in the absence of mindfulness or awareness towards eating and knowing what your body needs in the moment.

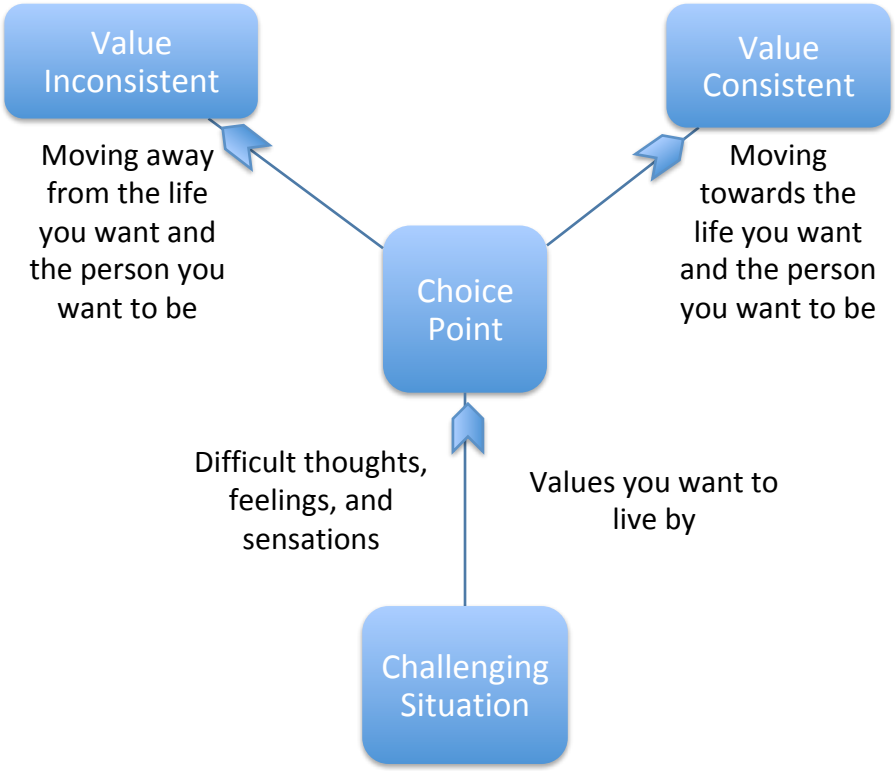
Thus, to reduce your emotional eating it can help to: (1) clarify your values to help guide you in the direction of more value-consistent behaviours that replace emotional eating, (2) learn to better tolerate and accept negative emotions that would otherwise lead you to eat, and (3) learn strategies to promote mindfulness of eating, as well as your thoughts and feelings around food and eating.



Values

Values lay the foundation for understanding why reducing emotional eating is important to you. So, what are values? Values are what is important to us that we choose to live by. Values are NOT goals. They are not something we can achieve. Rather, they are intertwined with our actions and exist continually as we go about our everyday lives. Our values can be related to various aspects of our lives; our work, our families, our relationships, and of course, our eating and our health.

Values are very important in our lives because they help us make meaningful choices. Every time we make a decision, whether it be related to eating or otherwise, we choose whether or not to act in line with our values. Sometimes we are able to make decisions that are in-line with our values, and sometimes other things get in the way that deter us from acting in-line with our values.



BOLD

BOLD can help you to deal with the emotions that make you want to eat by remembering your values before doing so.

BOLD stands for:

- **B** - Breath—Take a couple of breathes, slow down!
- **O** - Observe—Observe what you are feeling – are you tired or tense perhaps? Angry or bored?
- **L** - Listen to values—What are your values? Why do you want to avoid emotional eating? Why is this important to you?
- **D -** Decide to eat or not to eat and how much. Decide in line with your values!

Acceptance

Negative emotions are an inevitable part of life. There will always be times when we are sad, stressed, or anxious, just as there will be times when we are happy and joyful. It is important to know that just because we are feeling negative emotions, it doesn't mean that we have to act on them. We don't have to try and push them away.

Tug-of-War Metaphor

Every time we want to eat because of the negative emotions we are experiencing, think of this struggle like a tug-of-war between yourself and a monster. The monster represents your negative emotions making you want to eat. Between you and the monster is a gigantic, bottomless pit. Whenever you are overwhelmed by negative emotions that make you want to eat, it may feel like the monster is going to win the tug-of-war and pull you into the pit. At other times it may feel that if you pull the rope just the right way, you can drag the monster into the pit and be free from negative emotions forever. Time after time though, no matter how hard you try, you realize it is impossible to pull the monster into the pit.

So why doesn't pulling back against the monster work? As we just spoke about, negative emotions are an inherent part of life as a human being and their pull can be strong. When you experience them, you can fight against the metaphoric monster, trying to force them to go away but that takes a lot of effort. No matter how hard you try, you can't force the emotions to just go away.

Luckily, there's another option. You can simply drop the rope and walk away from the pit. If you do this, the monster (i.e., your negative emotions) won't go away, but from across the impassible pit, it can't do you any harm either. You can still keep living your life in the presence of the monster – it can no longer reach you because there is a pit in between you and it. In fact, the monster is much less scary when you're not engaged in a heated battle with it - same for your negative emotions: they are easier to tolerate when you're not trying to fight them. This is called acceptance.

Off in the opposite direction of the pit are your values. By dropping the rope, you can give up the fight with the monster and free up your energy to pursue the things that are important to you. You can use the energy you have saved by not fighting against the monster to do other things that are more consistent with your values. For example, you could go for a walk to get fresh air and relieve stress or talk to a friend or loved one for support. By making the choice to drop the rope, it gives you the option to live consistently with your values, even in the presence of negative emotions.

Urge Surfing

When we engage in emotional eating, we might have a craving for a specific food (like chips or chocolate), or we might have a craving for a general taste (like something sweet or something salty). However, just because the urge or craving is there doesn't mean that you have to act on it. Think of an urge or a craving like a wave. There will be ebb and flow; it will come and go. Sometimes it will be stronger and sometimes it will be weaker. Urge surfing is like riding a wave. The goal is to become aware of your emotions and cravings, but to not try to fight them. Over time, you might begin to find that they naturally go away on their own, without you having to do anything to try and change them.

To practice urge surfing, you can follow 5 easy steps:

6. Acknowledge your urge or craving ("I'm having the urge to…" or "I'm craving…")
7. Observe your urge or craving. Notice how it feels in your body (are you tense, anxious, fatigued, etc.?).
8. Rather than trying to make it go away, just sit with it for now.
9. Watch the urge or craving as it rises and falls like a wave, noticing as it gets stronger and then weaker. It may help to score the urge or craving on a scale from 1-10 (10 being the strongest) to see how it changes over time.
10. Check in with your values. Is acting on the urge or craving consistent with your values?

Mindful Eating

Often there are times when we don't notice what we are eating because we are too busy, too tired, or too preoccupied with other things, like our emotions (stress, irritation, anxiety, etc.). This is what we call "mindless eating". The opposite of mindless eating is mindful eating. Mindful eating is being totally focused on each sensation that happens while eating; chewing, tasting, swallowing, and savouring each bite. Mindful eating can help you to be more aware of your hunger and fullness, eat less food, reduce binge eating, increase the pleasure you get out of eating, and of course, reduce emotional eating.

When engaging in mindful eating, remember to:

- Slow down and focusing on all of the sensations associated with food and eating.
- Notice the appearance, small, texture, taste, etc.
- Connect mindful eating back to emotional eating. This is relevant to emotional eating, because when we engage in emotional eating, we are rarely mindful of what we are eating, how it tastes, and whether or not we are enjoying it. By learning to eat more mindfully, we can question whether or not emotional eating is actually satisfying, and if we realize that it is not, we can choose another behaviour to engage in.

Establishing Habits and Staying Committed

All of the techniques that have been taught up to this point will be most effective if it is practiced routinely such that they become a habit. Decreasing emotional eating and improving health goes beyond today's workshop. The skills you have learned today can be used indefinitely. There is no quick fix solution to changing habits like emotional eating, which makes it important to focus on applying skills consistently over the long term to manage emotional eating going forward throughout your life.

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Ways to stay committed

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Values Summary Card

What are your values?

How does emotional eating relate to these? How is it inconsistent with your values?

What alternative behaviours can you engage in that are more consistent with your values?