Reflective Kai-tiakitanga:

Evaluation of a self-help acceptance and commitment therapy package for emotional eating behaviours

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Abstract

Obesity is a major health epidemic that, in spite of global efforts, continues to rise. One of the suspected causes of obesity is the prevalence of emotional eating. It is proposed that this emotional eating functions as a form of avoidance behaviour for negative affect and thoughts. Therefore, the goal of the present research was to explore the use of a self-help-based acceptance and commitment therapy (ACT) intervention as a means to decrease emotional eating and unhealthy eating behaviours. Eight participants completed a multiple baseline design with additional pre- and post-intervention measures. During this multiple baseline design, experiential avoidance and emotional eating behaviours were recorded. The participants completed the intervention over a period of three months. The focus of the intervention was to assist the participants in understanding the processes and concepts of acceptance and commitment therapy, as well as learning how to put these processes into practical application. Following the intervention, there was found to be a significant decrease in self-reported unhealthy eating behaviours and binge or compulsive eating, with additional decreases noted in experiential avoidance and psychological inflexibility. It is suggested that this decrease in binge eating could be the indirect result of the reduction of avoidance behaviour. These results provide promising support for the use of self-help-based ACT as a mechanism for the reduction of emotional eating behaviour, as well as other avoidance behaviours.

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Outline of Research

Throughout the western world, obesity poses a significant risk to health in both physical and mental health (World Health Organisation, 2018, February 16th). Obesity has numerous consequences including increased risk of heart disease, increased in risk of strokes and an overall decrease in quality of life, among many other consequences (Lang & Froelicher, 2006). One proposed major contributing factor to the development of Obesity is emotional eating as an avoidance mechanism for negative affect (Geliebter & Aversa, 2003). There have been a variety of therapies that have been developed for the treatment of emotional eating; one such therapy is acceptance and commitment therapy (ACT). ACT is traditionally delivered in a face-to-face modality; however, there have been self-help methods of ACT that have proven effective for a variety of mental health issues (Järvelä-Reijonen et al., 2018). This paper will explore the use of a self-help ACT-based intervention as a method to reduce emotional eating behaviour.

Literature Review

Obesity

Health issues of obesity

In spite of international efforts to reduce obesity, it continues to increase. The World Health Organisation has classified obesity as a global, general health epidemic (Lang & Froelicher, 2006). Indeed, Cecchini et al. (2010) report that, in some countries, obesity rates are as high as 50%. Obesity has been linked to serious health problems such as the development of Type 2 diabetes, heart

disease, high blood pressure and increased risk of strokes (Wellman & Friedberg, 2002). Furthermore, being overweight has been indicated to increase one's risk of developing issues with the reproductive system, early development of osteoarthritis at a young age, and gallstones, along with the increased risk of coronary heart disease and hyperlipidaemia (Lang & Froelicher, 2006). Since 1975, obesity has nearly tripled worldwide. In 2016, 39% of adults were considered to be overweight, with 13% of those individuals considered to be obese (World Health Organisation, 2018, February 16th). Obesity affects not only adults but also children. In 1975, the rate of global obesity was recorded at 4%. This has increased at an astounding rate and, in 2016, the prevalence of global obesity in children was 18% (World Health Organisation, 2018, February 16th). Cecchini et al. (2010) reported that rates of obesity in some countries have been growing rapidly over a short timeframe. Some examples include China, Brazil and South Africa. In China, the obesity population has tripled (1.1% to 3.2%) from 1991 to 2006. In Brazil, between 1975 and 2003, the rates of obesity have tripled for men and doubled for women and, in South Africa, a third of women and a tenth of men are considered obese. Wellman and Friedberg (2002) reported that from 1980 to 1999, a 12% increase in obesity has occurred in the USA for adults between the ages of 20–74 years old. According to Wellman and Friedberg (2002), obesity has been documented as the seventh leading cause of mortality in the USA. Furthermore, this increase in obesity is not just a health issue but has a large impact financially as well.

Financial health consequences

Wellman and Friedberg (2002), reported that the total cost of obesity in the USA per year is around $100 billion, with additional indirect costs. Some examples of these indirect costs include 63 million doctors' visits and 90 million days with obese individuals being bedridden and needing to be cared for. Indeed, this is a huge increase in health cost from the numbers reported by Quesenberry, Caan, and Jacobson (1998) which reached about $45.8 billion in 1990. From this data, there has been around a $50 billion increase in health cost for obesity alone in the USA in only 12 years. In New Zealand (Aotearoa), healthcare costs for obesity were around $135 million in 1990, and this continues to increase (Swinburn et al., 1997). In 2006, the cost of obesity in healthcare had increased six times to a total of $648 million, which was approximately 4.4% of the healthcare total expenditure (Lal, Moodie, Ashton, Siahpush, & Swinburn, 2012). To attempt to understand more about this health cost, Quesenberry et al. (1998) conducted a study in the USA (i.e., California) designed to assess the relationship between BMI and the cost of inpatient (i.e., an individual who lives in the hospital while undergoing treatment) and outpatient (i.e., attending hospital for treatment but not staying there overnight) services. This data was collected from 17,118 patients. There was a significant association found between BMI and cost, in that a BMI of 20 – 24.9 was reflective of reducing cost when compared to those whose BMI was 30–34.9. There was a 25% cost increase between BMI for 20–24.9 compared to 30–34.9. Furthermore, for those individuals with a BMI 35 or greater, there was a 44% increase in cost for health services. This seems to illustrate a steep increase in health costs as BMI increases.

Mental health consequences

There are other consequences of obesity that affect the individual, not only physiological issues but mental health issues as well. Obese individuals are particularly prone to experiencing stigmatisation in society. Research has shown that, over the past decade, the amount of discrimination due to obesity has increased by 66%, this is based the National Survey of Midlife Development in the USA, with a sample size of 1,136. This survey included information regarding demographics, health information (i.e., weight, and height), and other aspects such as psychological health, socioeconomic status, substance abuse, among others. (Andreyeva, Puhl, & Brownell, 2008). This discrimination can, and has, caused imbalances and bias in employment (e.g., lower wage), healthcare, and education facilities (e.g., schools, universities, etc.). One major possibility for this discrimination is the perceived association that individuals who are obese will be lazy, unmotivated, lack self-discipline, and so on. Unfortunately, generally speaking, in Western society this discrimination goes unchallenged and, therefore, injustice affects those individuals who are obese (Puhl & Heuer, 2009). Wellman and Friedberg (2002) reported that, in societies that emphasise slim physical appearance as being an attractive trait, obese individuals tend to experience many issues with stigmatisation. This is particularly prevalent in Western society; such examples include America, the United Kingdom and Australia. These biases can extend into the media and even into personal relationships with loved ones, such as friends and family. Ebneter, Latner, and O'Brien (2011) further explored the prevalence of this stigmatisation. They explored the relationship between just world beliefs (e.g., people's fortunes and misfortunes are deserved, and that the world is a fair place) and the stigmatisation towards individuals who are

experiencing obesity or other eating disorders. 447 participants read four brief paragraphs relating to individuals experiencing anorexia nervosa, bulimia nervosa, binge-eating disorder or obesity. Following this, the participants completed questionnaires regarding stigma attitudes, just world beliefs and causal beliefs. The results demonstrated that individuals with stronger just-world beliefs were associated with having greater stigmatisation towards eating disorders. Interestingly, participants with personal experience, or who knew individuals who experienced an eating disorder, did not have lower stigma scores than those who had no relation. This stigma poses a large risk to obese individuals' mental and emotional health. Therefore, when developing an intervention for obesity, stigmatisation management should be considered (Puhl & Heuer, 2009). This is important, as a growing body of literature has indicated that stigmatisation regarding weight can lead to increased vulnerability to depression, low self-esteem, poor body image, maladaptive eating behaviours (i.e., creating a vicious cycle) and avoidance of exercise, especially in public (Puhl & Heuer, 2009). Furthermore, Puhl and Heuer's (2009) research challenged and seemed to disprove the societal notion that stigmatisation leads to positive changes regarding healthy eating behaviours for those suffering from obesity. Instead, they suggested that the stigmatisation may negatively impact the individual in making positive life changes surrounding weight loss. Therefore, it is of great importance to explore potential interventions for obesity, due to its large impact on society and the individual.

Possible interventions

General interventions for obesity tend to focus on setting goals and influencing the individual's motivation. A variety of weight-loss strategies have been developed, such as modification of diet and exercise routines. Diet modification is where the diet of the individual is changed to reduce the number of calories consumed. An increase in exercise is designed to increase the number of calories used and thus reduce weight gain. There are two general methods for a change in exercise. The first is an exercise program which is designed to specify certain exercises that the individual should do and how long to do them for (e.g., running, swimming, etc.). The second method is a change in lifestyle, which focuses on the individual increasing the exercise in their general lifestyle rather than focusing on a specific program (e.g., using the stairs, walking short distances rather than travelling in the car, etc; Lang & Froelicher, 2006).

In addition to these two interventions, there have been a variety of therapy ideas that have been used as interventions for obesity. One such example is Social Cognitive Theories, which are based on changing the thought patterns of the individual and thereby improving motivation (Ajzen, 1985). More recent examples included The Health Action Model, which focuses on the improvement of physical health, increasing exercise and modification of diet, and the Self-Regulation Models, which emphasise checking in with yourself to regulate behaviour (Teixeira et al., 2015). Teixeira et al. (2015) outlined that previous behavioural models are effective in producing a positive change in obese individuals. This is likely due to the modification of specific behaviours that have a large effect on lifestyle (e.g., diet, physical exercise, etc.). These behavioural

treatments are usually used in combination with other methods of obesity treatment (e.g., diet, exercise, etc.). Behavioural strategies normally revolve around eight main aspects. These are: self-monitoring (e.g., recording one's diet and activity), stress management (i.e., teaching strategies to deal with stress), control of stimuli in the environment, focus on problem solving (e.g., task orientation), managing the reinforcement surrounding the behaviour, cognitive restructuring (i.e., changing the way an individual thinks in terms of negative emotions and outcomes), social support and teaching strategies to reduce or prevent relapse. These behavioural strategies are effective, as they can be altered and shaped to fit the individual (Lang & Froelicher, 2006). These behavioural models seem to create a positive behavioural change for the individual when the intervention is in effect. However, generally, this change is seen to revert after the intervention is finished and, in some cases, the patient does not seem to maintain the new healthy lifestyle; thus, they tend to gain back some of the weight that they lost (Anderson, Konz, Frederich, & Wood, 2001). Anderson et al. (2001) conducted a meta-analysis assessing weight decrease following weight loss programmes over the course of five years. Their results demonstrated that, as more time lapsed, the individuals maintained less of the weight that they initially lost. For example: at one-year follow-up, participants maintained 44% of the weight they had lost, compared to 21% at the five-year follow-up. Moreover, maintaining health is a long, on-going process that requires self-regulation and behavioural change, and, thus, is difficult for some individuals to sustain. Therefore, since these therapies do not seem to maintain the behavioural change, it is important to analyse the development of obesity to understand its function.

Development of obesity

One potential reason for the development of obesity is the cost of what is considered to be a healthy diet. Healthier diets cost as high as 100% more compared to unhealthy diets. Associations have been observed between high-energy, low-nutrient diets and an increase in the development of Type 2 Diabetes, heart risks and obesity (Caprio et al., 2008). To add to this problem, high-energy, low-nutrient diets have been found to be less expensive than high-nutrient diets (Andrieu, Darmon, & Drewnowski, 2006). Andrieu et al. (2006) explored the relationship between the cost of diet and amount of nutrients gained from a sample of 1,985 adults over the age of 15 in France. They were instructed to record their diet over the course of seven days; additionally, their socio-economic status was recorded. They were then divided into groups based on the rating of energy in their diet and the cost of that diet. Those in the low-cost diet group had high energy input, the highest food density and the lowest cost, with the least number of vitamins and minerals consumed. Whereas those in the high-cost diet group had a lower energy diet, less food density, but a much higher consumption rate of vitamins and minerals (e.g., a 147% increase in vitamin C, and a 128% increase vitamin D). However, they paid 165% more than those in the low-cost diet. This reduction of vitamins and minerals associated with low-cost diets is also present in the review by Darmon and Drewnowski (2008). In their review, they highlighted the difference in fruit and vegetable consumption between those of low socio-economic status (SES) and high SES in seven countries throughout Europe. The results showed that, on average, men and women with high SES consumed twice as much fruit and vegetables as did those of lower SES.

Therefore, the cost of food may represent a barrier to a healthy diet for those who are considered obese. Furthermore, previously it has been suggested that diets that are high in energy encourage overeating. The tastiness of food could affect consumption rate, in that foods that are high in energy and low in nutrient value tend to be highly tasty. Additionally, more energy-dense food is usually eaten to gain nutrients when compared to food that is low in energy but high in nutritional value (Darmon & Drewnowski, 2008). Moreover, research has shown that the cost of energy-rich but nutrient-poor food has increased by only 30% over the last 20 years, compared to the cost of fresh food, which has increased by more than 100% (Caprio et al., 2008). While this does seem to indicate obesity is heavily influenced by the cost of a healthy diet, there may be other mechanisms present that contribute to the development of obesity.

One such factor is the idea of eating developing as a psychological coping mechanism. Emotional states of an individual have been found to influence eating behaviours (e.g., from excessive eating to no eating; Geliebter & Aversa, 2003). Overweight individuals reportedly eat more during negative emotional states. Additionally, underweight individuals reportedly eat less during negative emotional states (Geliebter & Aversa, 2003). It is, therefore, important to understand the function of this emotional eating behaviour in the context of obesity.

Emotional Eating

The idea that emotions can alter the preference of food or taste (i.e., sensory properties) before or after consumption has long been suggested (Gibson, 2006). To explore this relationship, Macht, Gerer, and Ellgring (2003) conducted

a study with 38 women (i.e., 19 overweight and 19 normal weight) between the ages of 18–40 years. The participants were given samples of food that differed in energy levels (i.e., low, medium and high), and were then asked to rate their emotional state following the consumption of different samples. Generally, negative emotions (e.g., sadness, fear, anger and shame) were rated higher following the consumption of greater energy food compared to low energy level foods. Furthermore, this result was more prevalent in those individuals that were considered to be overweight.

Development of emotional eating behaviour

Emotions influencing eating behaviour and vice versa is further supported in research by Braden, Musher-Eizenman, Watford, and Emley (2018). In their study, 189 adults that were overweight or obese completed a variety of questionnaires designed to measure emotional eating (i.e., the Emotional Eating Scale), eating behaviours (i.e., the Eating Disorders Examination Questionnaire), psychological well-being (i.e., the Symptom Checklist-90-Revised), and emotional regulation (i.e., the Difficulties in Emotion Regulation Scale). Eating in response to depressive symptoms was closely associated with the development of an eating disorder, emotional regulation issues, and poorer psychological well-being. The outcome of the results suggested greater eating when experiencing depression and anxiety based on the results of the emotional eating scale.

Western world issue

This idea of negative emotions predicting an increase in eating behaviours is seen in multiple contexts throughout the western world. Paans et al. (2018) investigated how the intensity of depression affected different eating styles

over four European countries (i.e., The Netherlands, United Kingdom, Germany and Spain). High intensity of depression generally tended to predict high rates of emotional eating. Additionally, the high intensity of depressive symptoms predicted less cognitive restraint (i.e., controlling behaviour with thoughts) regarding eating behaviours. Of particular interest, the same relation was found between emotional eating and depression among all the European countries of this study.

Weight and consumption of food during different emotions

Further investigation by Geliebter and Aversa (2003) explored the relationship between emotions and rates of eating behaviours across individuals who were considered to be over, normal, and underweight during both positive, and negative internal events. The 45 participants (15 overweight, 15 normal weight and 15 underweight) completed an Appetite Questionnaire regarding eating behaviour during positive and negative emotions. The overweight group showed higher rates of eating during negative emotions. In contrast, overweight individuals reported eating less during positive emotions. These results should be considered in the context of self-report as this data is not objective. Nevertheless, this indicates that overweight individuals tended to eat more during negative internal events. The results from Slochower, Kaplan, and Mann (1981) further supported eating in response to negative internal events; they found when individuals were experiencing stress, the rate of eating increased; this is particularly notable (i.e., two and a half times as much food) for individuals who are considered overweight or obese.

Mechanisms

Biological theory

Consumption of foods that are high in energy and fat have been shown to improve mood and decrease the effect of stress, through the opioidergic system (i.e., altering endorphins in the body) and the dopaminergic neurotransmission, which affects the amount and intensity of dopamine in the brain. In fact, eating palatable food when hungry activates the neural system in a similar manner to when an individual abuses drugs (Gibson, 2006). However, documentation by Evers, Marijn Stok, and de Ridder (2010) state that negative emotions lead to a release of hormones that act to reduce appetite. Changes also occur in the gastric system with the presence of negative emotions, which resemble the symptoms that occur when an individual is satiated. From a biological standpoint, it is strange that the presence of negative emotions causes an increase in eating behaviour. Therefore, some other type of learning may be occurring that alters this biological functioning.

Classical conditioning

One hypothesis for this learning is proposed by Bongers, van den Akker, Havermans, and Jansen (2015). They suggest that emotional eating may occur through the process of classical conditioning. They propose that emotional eating is a product of the conditioning between negative emotions and the appetitive response. This idea was tested by inducing either a negative or neutral mood in the participant. Following this, one neutral stimulus, in this case, a green vase (CS+), was paired with the unconditioned stimulus (i.e., food) that elicited the unconditioned response (i.e., salivation). While another stimulus, in this case, an

orange vase (CS-), remained unpaired. This process occurred in both the neutral and negative mood conditions. There was found to be no difference in salivation level between the two mood conditions with regards to the CS+ and the CS-. From these results, they hypothesise that the emotions act as a conditioned stimulus for the unconditioned response, rather than the external CS+ (i.e., the green vase).

Bongers, de Graaff, and Jansen (2016) further expand upon this association between emotions and emotional eating. They conducted a study to explore whether individuals who were considered to be emotional eaters would overeat in response to negative emotional cues, or other cues as well. The participants of the study were 42 females with an age range of 19–27 years. Initially, the participants completed the Dutch Eating Behaviour Questionnaire, to identify those who were considered to be emotional eaters. Following this, the participants completed four conditions; these were a negative mood induction, positive mood induction, food exposure and control condition. For the positive and negative mood conditions, the participants listened to a piece of music that was either designed to elicit a negative or positive reaction, depending on the type of music. For the control condition, the participants completed a puzzle instead of listening to a piece of music. After each condition, the participants completed a taste test, before the consumption of food (i.e., food exposure). The results show that those who were considered to be emotional eaters reported higher food intake in all conditions compared to those who were considered to not be emotional eaters. From these results, the authors suggest that emotional eating may be more complicated than negative emotions simply eliciting eating behaviour.

Evers et al. (2010), proposed another idea for the development of emotional eating. They report eating during positive emotions may act to increase positive affect. This is likely due to the rewarding value of the food stimuli (e.g., taste, smell, texture, etc.) as an unconditioned reinforcer (Shettleworth, 1978). Therefore, if an association was to develop between positive emotions and eating, then, if the individual was experiencing negative emotions, they may engage in eating behaviour, in an attempt to produce positive emotions and thereby avoid the negative emotions.

Emotional regulation theory

This regulation of emotions could be a mechanism for the development of emotional eating. Emotional regulation has been defined as the ability of the individual to recognise, understand and accept their emotions. This process also involves the conscious control of emotions (Sainsbury et al., 2018). The issues arise when an individual is unwilling to accept the internal emotions and, thus, attempts to control their internal environment. The individual can use a variety of methods to try and control these internal emotions, some of which can be harmful (e.g., self-harm, overeating or emotional eating, drug taking, sleep deprivation, social isolation, etc.). In other words, these behaviours can act as avoidance mechanisms for unwanted emotions (Thompson, 1991). When considering this theory in the context of emotional eating, the situation could be as follows: the difficulty with emotional regulation could lead to an increase in eating as an avoidance mechanism, with the aim being to suppress the emotions. To explore this idea, Sainsbury et al. (2018) assessed the relationship between difficulties in emotional regulation and weight gain, meaning a lack of emotional regulation

would predict weight gain. There were 2000 participants over the age of 18 who took part in the research. These participants, who had previously lost weight and regained it completed an online survey regarding weight loss and eating behaviours. Half of the sample (43% of men and 58% of women) attributed their weight regain to at least one issue with emotional regulation. Participants that regained weight due to difficulty with emotional regulation regained most of the weight that they lost (99.1% of the weight they lost). Furthermore, individuals who had difficulty emotionally regulating and poorer weight management confirmed using more dietary strategies. While this is a self-report study, it does seem to suggest that emotional regulation may play a large role in weight gain following weight loss.

Emotional eating and negative affect

Evers et al. (2010) further suggested that emotional eating becomes a maladaptive strategy for dealing with negative feelings and thoughts. To test this hypothesis, 71 participants (50 females with an average age of 21) were shown a video clip specifically designed to elicit some form of negative emotion. Beforehand, the participants were divided into two groups. One group was told to use an adaptive coping strategy of cognitive reappraisal, that is, the process of altering the antecedent in order to modify the function of the behaviour and, thereby, the consequence. The other group were instructed to use a suppression strategy that was focused on suppressing the emotions. Both the participant groups were then given access to a sweet high energy food (e.g., chocolate) after the video. Participants in the suppression condition consumed significantly more chocolate than those in the reappraisal condition.

This line of thinking is expanded on by Spoor, Bekker, Van Strien, and van Heck (2007). They hypothesised that emotional eating occurs as a response to a combination of negative affect and coping. Their study explored whether emotional eating occurred with emotional orientated coping, (i.e.,which is defined as attempting to control/regulate negative emotions by engaging in behaviours with the function of distraction or avoidance; Endler and Parker 1994), or avoidance and whether the amount of emotional eating would increase with the addition of negative affect. The participants for this study were 125 women who were experiencing an eating disorder, as well as 132 women from the general community to act as a control group. The participants completed a variety of questionnaires regarding affect (the Positive and Negative Affectivity Schedule), coping (the Coping Inventory for Stressful Situations) and emotional eating (the Dutch Eating Behaviour Questionnaire). Emotional orientated coping and avoidance were correlated with emotional eating, while negative affect did not seem to have a significant effect on emotional eating more than emotional coping and avoidance. This held true for both samples; however, it was more obvious for those that were experiencing an eating disorder. One limitation to consider is that only women participated in this study and, therefore, this may not generalise to the entire population.

However, a combination of concepts starts to paint a picture that emotional eating is caused by a lack or deficit of mechanisms to handle these negative internal events. Additionally, negative feelings themselves are not necessarily responsible for emotional eating. Rather, emotional eating acts as an avoidance strategy.

Avoidance

According to behavioural psychology, avoidance is classified as a form of negative reinforcement in which the behaviour has the perceived function of removal of an aversive stimulus. This removal of the stimulus, in turn, maintains the behaviour (Iwata, 1987).

Types of avoidance

There are two main types of avoidance; these are signalled and unsignalled avoidance. Signalled avoidance is when a stimulus is presented and, following the stimulus, an aversive event occurs which results in an avoidance response. In this case, the avoidance behaviour is signalled by the stimulus associated with the aversive event. This process requires previous learning history of exposure to the consequences with the avoidance response initially not occurring (Dymond & Roche, 2009). For example, if an individual has previously called you fat, which caused feelings of sadness and rejection, then you may avoid that individual in the future (Badia & Culbertson, 1972). In contrast, unsignalled avoidance refers to when an aversive stimulus occurs in the absence of a cue, and therefore the response to prevent the aversive stimulus may occur frequently, even if the aversive stimulus is not present (Badia & Culbertson, 1972).

Experiential avoidance

Further expansion of the idea of avoidance theory for emotional eating is the process of experiential avoidance. The term experiential avoidance (EA) is used to describe when the individual tries to avoid unwanted negative internal events (e.g., thoughts, feelings, memories, and body sensations) by using

strategies, which may include distracting with primary reinforcers (i.e., food, drugs, social interaction, etc.), suppressing thoughts or removing themselves from situations with potentially aversive events (Hayes, 2004). From a behaviour analysis perspective, experiential avoidance is defined as avoidance behaviour that can potentially be harmful, which occurs in multiple contexts through the transfer of stimulus functions with derived relations (Hayes, 2004), this will be expanded on later in the literature review. These derived relations can be in the form of internal events, or external events (Fletcher & Hayes, 2005). Experiential avoidance has been linked with a decrease in quality of life and the development of psychological disorders such as eating disorders, depression, anxiety, PTSD, addiction, among others. (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996).

Binge eating as experiential avoidance

One particular important eating disorder that is proposed to act as an experiential avoidance behaviour is binge eating disorder (BED). Kingston, Clarke, and Remington (2010) propose binge eating acts to reduce the intensity of negative affect and thoughts, by focusing on the sensations of eating, as avoidance or distraction behaviour. Of particular interest is that individuals report that, during binge eating, negative internal events decrease, but afterwards, feelings of guilt, regret, disgust and self-loathing arise (Arnow, Kenardy, & Agras, 1992). Pells (2005) investigated the role of emotional avoidance in relation to negative affect regarding the development of BED. The participants completed a negative mood induction, after which they provided self-report information about emotions and willingness to experience emotional, food-related and neutral pictures. Participants were then presented with emotional, neutral and food-related images,

and the amount of time that the individual spent looking at the image was recorded as an indication of their willingness to view the image. The participants recorded their food intake and mood over the next 14 days. Individuals with BED had the highest levels of emotional avoidance, fear of emotions and emotional eating. Additionally, individuals with BED self-reported more negative emotions in response to the emotional images. Furthermore, with the daily monitoring of food and mood, participants with BED reported higher levels of depression and anger episodes before and after meals and overeating episodes. These results indicate BED may act as an avoidance mechanism/strategy to reduce the exposure to aversive internal events.

Experiential avoidance and weight stigmatisation

Experiential avoidance has also been documented to serve a potential role in the development of self-weight stigmatisation (i.e., negative internalised views of self due to weight). To reduce the harm of this weight stigmatisation and the associated negative self-talk, it is suggested that individuals will engage in a variety of avoidance behaviours such as eating, avoiding dieting, avoiding social situations, and so forth (Niemeier, Leahey, Reed, Brown, & Wing, 2012). The theory is that the purpose of these behaviours is to escape the negative affect and that the function of the food is to act as a negative reinforcer. Some of these avoidance behaviours include the development of eating disorders (e.g., BED) and other body image issues, such as viewing the ideal body from the perspective of others or the media, leading to unrealistic expectations of an individual's body image. This could result in the potential development of negative thoughts and feelings surrounding body image (Palmeira, Pinto-Gouveia, & Cunha, 2016).

These studies indicated that experiential avoidance is an important aspect to consider from the perspective of treatment for eating disorders and issues surrounding weight. A variety of therapeutic strategies have been used as an intervention for experiential avoidance.

Interventions

Mindfulness

Mindfulness has been a proposed intervention for experiential avoidance. The concept of mindfulness involves the individual observing their environment with no judgements and, instead, viewing both their internal and external environment from a perspective of curiosity. This practice is done with both the external and internal environment (Tapper et al., 2009). From a behavioural viewpoint, the function of mindfulness behaviour is to act as a negative reinforcer for internalised events, in reducing the intensity but not decreasing the exposure. Additionally, mindfulness functions to view language as an objective means to describe an event, without placing judgement on that event (Hayes, Luoma, Bond, Masuda, & Lillis, 2006). Hooper, Villatte, Neofotistou, and McHugh (2010) assessed the efficacy of mindfulness as an intervention for experiential avoidance. This was measured both explicitly (i.e., using the Acceptance and action questionnaire and GHQ questionnaire) and implicitly, using a method known as the implicit relational assessment procedure (IRAP), which is designed to measure the implicit attitudes of an individual. The participants completed pre-intervention measures in the form of the IRAP and the explicit self-report measures, after which they completed the intervention, which was either a 10-minute brief of emotional suppression or 10 minutes of mindfulness training. After this, the post-

intervention measures were completed. Mindfulness decreased the rate of experiential avoidance in both the implicit and explicit data (i.e., attitudes) when compared to the suppression condition. Furthermore, previous research by Tapper et al. (2009) explored the effectiveness of mindfulness as an intervention for weight loss, specifically focusing on reducing avoidance behaviour (e.g., binge eating) and increasing physical activity. The participants completed a variety of questionnaires regarding eating behaviours and psychological flexibility (i.e., the Dutch Eating Behaviour Questionnaire, Emotional Eating Questionnaire, Binge Eating Scale, Acceptance & Action Questionnaire-II, Dietary Adherence, Brief Physical Assessment Tool, and the General Health Questionnaire-12) and a mindfulness intervention, consisting of three mindfulness workshops, each two hours long, over the course of three weeks. The mindfulness intervention increased physical activity and significantly decreased BMI. This decrease in BMI was likely caused by a reduction of binge-eating behaviour.

Acceptance and experiential avoidance

Increasing acceptance is another suggested intervention for experiential avoidance. Acceptance behaviour has been proposed to have a similar function to mindfulness, in that it increases exposure to negative internalised events through a reduction of avoidance behaviour while decreasing the intensity of these events. In essence, the function of acceptance behaviour is to act as a negative reinforcer. Furthermore, acceptance is a method for the individual to habituate to negative internalised events and, thus, increase exposure to these events (Hayes et al., 2006). Roemer, Orsillo, and Salters-Pedneault (2008) explored the effectiveness of an acceptance-based behavioural therapy intervention to decrease avoidance of

negative internal events with generalised anxiety disorder. The participants were split into two groups (i.e., 15 intervention and 15 control). The experimental group received four 90-minute sessions and twelve 60-minute sessions of therapy regarding mindfulness and acceptance. The therapy focused on increasing the participants' awareness with regards to understanding the process of habituating to negative internalised events and understanding the function of these events. The role of experiential avoidance was also explained, along with the importance of self-monitoring (i.e., mindfulness regarding present behaviour). Following this, clients were taught mindfulness strategies and techniques to identify values, with a major focus on the maintenance of these techniques. The acceptance-based behavioural treatment demonstrated a significant reduction in experiential avoidance by the intervention group when compared to the control group, based on the 16-item version of the Action and Acceptance Questionnaire (i.e., a self-report measure of experiential avoidance).

Cognitive reappraisal and experiential avoidance

A further method to reduce experiential avoidance is cognitive reappraisal. Wolgast, Lundh, and Viborg (2011) conducted research with the purpose of comparing the effectiveness of cognitive reappraisal and acceptance interventions for subjective distress and behavioural avoidance. Participants watched clips that were designed to elicit four different emotional responses (e.g., sadness, fear, disgust and neutral). Before watching the clips, participants were divided into three groups (i.e., cognitive reappraisal, acceptance and control). In the cognitive reappraisal group, the participants were encouraged to interpret emotional stimuli without judgement (i.e., just as information). In the acceptance

group, the participants were encouraged to just experience their emotions without actively trying to control them. In the control group, they were just told to watch the clips. Participants completed a variety of self-report questionnaires (i.e., the Positive and Negative Affect Scale, the Emotion Regulation Questionnaire, the Acceptance and Action Questionnaire, and the Avoidance Tendencies: Likert Scale 1–5). The participant's physiological response was recorded (i.e., skin conductance level and facial electromyography) to measure avoidance. The results showed significant decreases in avoidance in the acceptance and the cognitive reappraisal groups when compared to the control group. Additionally, there was found to be significantly less physiological emotional response for both the acceptance and cognitive reappraisal groups when compared to the control group.

The combination of these three elements (i.e., Mindfulness, Acceptance, and Cognitive reappraisal) should act as an effective intervention for experiential avoidance, specifically, for reducing avoidance behaviour such as BED and emotional eating. A therapy that combines these components, along with other elements, is Acceptance and Commitment Therapy (ACT).

Acceptance and Commitment Therapy

ACT is a new wave of behavioural therapy that is based on a behavioural understanding of language. The theory that underlies this therapy is Relational Frame Theory (RFT).

Relational frame theory

Relational frame theory is a behavioural explanation regarding the development of language and how certain types of stimuli become related through

associations. The idea behind this theory is that relations are formed between different stimuli based upon their function. These relations do not have to be explicitly learnt and can be arbitrarily applied. Additionally, the function of these stimuli can be altered based on their relation to other stimuli (Barnes-Holmes, Kavanagh, & Murphy, 2016). Here is an example to illustrate this idea: $1 is worth more than 1 cent, and $100 is worth more than $1; therefore, by relation one can derive that, $100 is worth more than 1 cent. In this example, the information that $100 is worth more than 1 cent is not explicitly taught, however, due to the relations between $100 and $1, and $1 and 1 cent, the relation that $100 is worth more than 1 cent becomes implicitly presented. This is termed derived relation, as the stimulus association arises through the other two associations, but is not directly taught.

The focus of RFT is the understanding of how these derived relations can alter the function of stimuli (Hayes, 2004). Here is another example to illustrate this: Jim is the older brother of Max. Max explicitly knows the association between an actual cat and the verbal stimulus of the word “cat,”. Jim has previously been scratched by a cat. When he goes to tell his mum, Jim’s mum says “be careful son cats can be scary and dangerous”. Jim now has formed an association between the cat and a fear response, that occurred from being scratched. Jim then tells Max that cats are scary, and he should be afraid of them and tells him about how the cat scratched him. There is now an explicit association formed between the verbal stimuli “cat” and “scary.” Through implicit relational frames, ‘scary’ becomes associated with all of the stimulus class of ‘cat’, meaning that the word cat is associated with ‘scary’, as well as an actual cat. Therefore, when given the opportunity to hold a cat, Max engages in avoidance

behaviour. It should be noted that this can be extrapolated to other stimulus classes that are associated with a cat as well, such as tigers, lions, and so on (Hayes et al., 2006).

In this context, the cat (i.e., a previously neutral stimulus), now functions as an avoidance stimulus for Max, even though Max has never actually been hurt by a cat. This avoidance behaviour develops implicitly, based on the new function of the verbal stimulus 'cat'. This is important in the context of experiential avoidance and cognitive fusion.

Experiential avoidance and RFT

From the perspective of RFT, experiential avoidance develops as a consequence of the transfer of functions across stimuli. That is the consequences of aversive stimuli (e.g., negative thoughts, feelings, etc.) transfer from one stimulus to another through the use of relational framing and the arbitrary context in which this framing occurs. An example to demonstrate this is proposed in Hayes (2004). In their example, thinking about a dead relative could be cued by arbitrary stimuli such as pictures, a depressed mood, a comment in a conversation, a wonderful view, or many other stimuli. Therefore, to reduce or remove these aversive internal events which cause some form of pain, the individual tries to avoid thinking about the negative event through suppression. This, in turn, causes the suppression to cue the avoided event (i.e., thinking about a dead relative), as the individual is increasing the strength of the underlying association (e.g., 'Don't think about x' becomes the context cue to think about the event; Hayes, 2004).

Cognitive fusion and RFT

Cognitive fusion is defined as previous rule-governed behaviour dominating the present external environmental contingencies; then the individual makes decisions based on these 'rules' rather than responding to the direct environmental contingencies (Hayes, 2004). In more simple terms, it is the process of being caught up in the internal events (i.e., thoughts, feelings, memories, beliefs, etc.), and then allowing these internal events to control behaviour, rather than responding to what is occurring in the external environment.

According to RFT, cognitive fusion develops from rule-governed behaviour occurring through derived relations (Hayes, 2004). Rule-governed behaviour is the behaviour that is controlled or maintained by verbal antecedents, in essence, following a verbal rule rather than experiencing the direct contact with the external environmental contingencies (Catania, Shimoff, & Matthews, 1989). As previously stated, these 'rules' generally maintain behaviour more than the direct contingencies; this is due to the difficulty of breaking down the relational network, and that engaging with the relational network by engaging in deriving relations can lead to useful outcomes, causing a form of automatic reinforcement. Additionally, through the process of transformation of stimulus functions, individuals will form relational networks they believe to support these rules, even inventing stimulus functions that are not actually present in the external environment, to support these associations (Hayes, 2004). One such example is given in Hayes (2004): if a fearful person constructs an internal fearful environment, they will respond as if this environment has been discovered rather

than invented. Then, because these relational networks are unsusceptible to the direct external environmental contingencies, even a small verbal stimulus can support this relational network of a ‘fearful internal environment’. Therefore, from a therapeutic perspective, reducing both experiential avoidance and cognitive fusion is important to consider.

The intention of Acceptance and Commitment Therapy

Acceptance and Commitment Therapy is a therapy model that has emerged from RFT. The idea of ACT is to increase psychological flexibility, which is defined in behavioural analysis terms as the generalised repertoire of the individual framing their own behaviour in terms of observing (i.e., the behaviour is ‘there’, and the individual is ‘here’) while differentiating between behaviour and the individual (i.e., “I contain the behaviour, it is only a small part of me”). This, in turn, results in a decrease in responding based on previously rule-governed derived relations, leading to the individual behaving in line with different rules (i.e., values) that have more concrete sources of reinforcement, such as tangible reinforcers and goals (Ruiz & Perete, 2015). In simple terms, it is a process designed to help the individual to objectively view their behaviour, and view themselves as a whole individual and not just as this one instance of the behaviour. Additionally, while highlighting what aspects of their lives are truly important to them (i.e., based on values), so they can act in a manner in line with these values (Hayes, Strosahl, & Wilson, 2011). This improvement in psychological flexibility can occur through teaching skills designed to increase observing behaviour from an objective standpoint, as well as not actively avoiding aversive internal events while building values that are important to the individual

as a reference point for their behaviour. There are six main processes that are used in ACT to increase psychological flexibility. These processes are acceptance, mindfulness (e.g., contact with the present moment), values, committed action, self as context, and cognitive defusion (Hayes et al., 2006).

Components of ACT

Acceptance

This is the process of the individual becoming aware of their negative internal events but not actively trying to engage in avoidance or trying to decrease the frequency of these events. Instead, the individual tries to experience events exactly as they are, rather than what they are perceived to be (Hayes et al., 2006). From a behavioural analysis, perspective acceptance is a process of exposure-based therapy, focusing on the idea of stimuli desensitisation (i.e., just feeling the feelings, rather than engaging in cognitive fusion).

Mindfulness (i.e., contact with the present moment)

This process involves the individual redirecting attention to the present moment, for both internal events (i.e., thoughts, feelings, body sensations) and the external environment (i.e., sights sounds, smells and touch; Fletcher & Hayes, 2005). The intention is for the individual to view behaviour or experiences from a non-judgemental viewpoint. In other words, mindfulness focuses on seeing events as just events, rather than as good or bad. This highlights the ‘self’ as an ongoing process with constantly changing psychological events. At the same time, the strength of language weakens regarding the effect on behaviour, by starting to alter the properties of the derived relations (Fletcher & Hayes, 2005). This process is also designed to view language as a method to objectively describe either

internal or external events without placing judgement on the event (i.e., neither good nor bad; Hayes et al., 2006).

Values

Values are measures of action of a particular behaviour. Values are defined as life directions and cannot be attained, but rather are continuous ongoing behaviours towards a certain outcome. Basically, values can be seen as personal attributes that the individual will never physically obtain; rather, they are a reference point for their behaviours. These values occur in different areas of life such as family, friends, health, spirituality, and so on. It is important to note that, by identifying these values, negative thoughts and feelings generally arise because of the barriers surrounding behaving towards these values. Therefore, acceptance of painful thoughts and feelings is vital for pursuing values. For example: if an individual has a value of courage, they will never be able to obtain 'courage'; however, their behaviour can reflect this value, in that they will face challenges that result in painful thoughts and feelings, even if they are difficult or scary. An application of this value might be if the individual finds public speaking scary but has to present a speech for class. Acting with their value of courage, they would still speak in front of people even though they were scared.

Committed action

Committed action focuses on the setting of realistic goals that are in line with the individual's values. This refers to taking behavioural action that moves the individual's behaviour further towards their values. This component involves traditional applied behavioural analysis techniques, such as behavioural contracts and goal setting (i.e., short-, medium- and long-term goals; Hayes, 2004).

Furthermore, any type of behaviour change programme can be implemented here (e.g., exposure therapy, counter conditioning, shaping, behavioural contracts, etc.). With this process, there is also a focus on the setting of realistic goals that are in line with the individual's values, with the additional aim to decrease situational barriers to a goal by the use of direct action. Additionally, these goals start small or very short term to facilitate the reduction of punishment (i.e., the individual failing the goal) and to increase reinforcement instead (i.e., the individual achieving the goal or gaining a tangible reinforcer), which is more likely to lead to an increase in the frequency of the committed action behaviour (Hayes et al., 2006). An example is proposed in Fletcher and Hayes (2005): if an individual values intimacy, then one step towards committed action may be to express emotions to individuals with whom they have close relationships.

Self as context

This refers to two ideas. The first is considering behaviour and internal thoughts in relation to the environment; there is no judgement placed on the behaviour, rather, that the behaviour is linked to the environment presently being experienced. This environment can be based on the individual's physiology at that given point in time (Hayes, 2004). For example, if you are experiencing negative internal events when carrying out a task (e.g., "I'm no good at this task, why am I bothering?") consider the context of the environment in regards to physiology, such as whether you had enough sleep, how your blood sugar is, whether you have just had a fight with someone important to you, and so forth. The second concept is the idea of differences in perspective taking and becoming consciously aware of this perspective taking behaviour. This perspective-taking is designed to

illustrate to the individual that regardless of time and space, you have always been 'yourself' even when you are looking back at the 'then' perspective from a memory, it is still you looking back at the memory. Alternatively, you could think about the future from a 'there' perspective, but again you are still the individual doing the thinking behaviour. In this way, it is possible to communicate to clients their emotions, thoughts, feelings, bodily sensations, and so on are constantly changing; however even through all those different emotions 'you' remain. In this way, the clients are taught the process of noticing that they are engaging in the behaviour of observing something, whether that be emotions, thoughts, feelings, memories, among other things. This allows the clients to develop the idea that though all these things change they themselves as observers remain constant, this process of observing is known as the observer self (Hayes, 2004). This observing process is designed to help the individual with acceptance and defusion (Hayes et al., 2006).

Cognitive defusion

The idea behind cognitive defusion is to change the function of private events through the transformation of stimulus functions. This is done primarily by changing the context in which these private events occur (e.g., giving the private event a colour, shape, tone, image, etc. Fletcher & Hayes, 2005). From an RFT point of view, cognitive fusion is when, through the process of derived relations, thoughts often function as true and meaningful. For example, the thought, 'I am bad,' is understood the same as the individual being bad, instead of viewing this as merely a thought (i.e., just information that is not necessarily true). From the perspective of RFT, the goal of cognitive defusion is to alter the verbal relations

through the process of transformation of functions of stimuli, by altering the context surrounding these relations (Hayes, 2004). For example, if an individual experiences the thought of, 'I'm not good enough,' they acknowledge that thought by stating that, "I am having the thought that I am not good enough." The very nature of this exercise places the individual into the role of the observer; thus, thoughts are interpreted as just being information rather than linked to the identity of the individual. Additionally, the individual could sing, "I'm having a thought that I'm not good enough," to the tune of Jingle Bells. This would act to change the context of this verbal stimulus (Hayes et al., 2006).

Acceptance, Mindfulness, Values, Self as Context and Cognitive Defusion are designed to be used in combination, with the intention of improving psychological flexibility. This development of increasing psychological flexibility has led to ACT being used as an intervention for a variety of mental health issues including obesity, binge eating disorder, depression, and anxiety, among many others.

ACT with Health

ACT with body image and obesity

Fard et al. (2016) suggested that the negative self-talk surrounding body image is based on an evaluation regarding the body (e.g., body dissatisfaction) in relation to other people. They explored the use of ACT as an intervention for both obesity and body image. There were 30 individuals (i.e., 15 in the control and 15 in the experimental group) that participated in the study. The experimental group received eight sessions of ACT, each 90 minutes long. These eight sessions consisted of explaining and teaching the six components of ACT and emphasised

understanding the psychological processes underlying unhealthy eating behaviours. The results indicated significant decreases were observed regarding obesity (BMI) and body image dissatisfaction, from self-report measures following the eight sessions of ACT. It should be noted, however, that the measures and procedures were not well documented. Regardless, this research does indicate that ACT decreased body image dissatisfaction and obesity for obese individuals.

ACT and risk of obesity

Lillis, Hayes, Bunting, and Masuda (2009) assessed the effectiveness of teaching ACT to individuals who were at risk of being considered obese. The participants were 84 individuals who had recently completed a weight-loss programme in the last six months. It was of interest to note that participants had, on average, tried to lose weight 35 times. There were two conditions; the control condition and the experimental condition. For the experimental condition, the ACT participants completed a 1-day ACT workshop (six hours long) and an ACT workbook, while for the control condition they were placed on a waitlist. Both groups completed a variety of measures before and after the intervention including the General Health Questionnaire, Obesity-related Quality of Life Scale, Weight Stigma Questionnaire, Acceptance and Action Questionnaire, and weight as recorded in pounds converted to BMI. Additionally, the participants completed an exercise regarding holding their breath for as long as possible, as a measure of willingness to experience the negative events without actively engaging in avoidance. Those who completed the ACT condition demonstrated less psychological distress, better quality of life and lower levels of weight-related

stigma compared to the control condition. This difference was maintained at the three-month follow-up. Additionally, those in the ACT condition showed greater weight loss related to BMI. At the three-month follow-up, ACT participants had not only maintained their weight loss but had on average lost an additional 1.6% of their body fat. This is compared to the control group, which gained 3% body fat. Furthermore, the authors report that the results showed a change in psychological distress, quality of life and effect of stigma, which could not be related to loss of weight. Therefore, it is suggested that this change occurred due to ACT.

ACT and food cravings

ACT has also been explored as a potential intervention for food craving behaviour. Forman et al. (2007) contrasted the effectiveness of CBT and ACT in relation to food cravings. 98 individuals with a mean age of 19 and a BMI of 24 were randomised into either a control, CBT or ACT group and given 30 minutes of instructions based on the techniques from that therapy. Following this, they were given a box of chocolate to carry around for 48 hours and told not to eat any or as few as possible. The participants completed two questionnaires (i.e., the Food Craving Questionnaire-State Version and the Power of Food Scale), and a self-report questionnaire designed by the researchers, before and after the experiment. Additionally, consumption of chocolate was measured. Individuals who had high food cravings showed both reduced cravings and consumption in the ACT group when compared to the CBT group. However, with those who reported low cravings, little to no effect was observed in the ACT group. To expand on this research, Forman, Hoffman, Juarascio, Butryn, and Herbert (2013)

explored the use of acceptance intervention based on ACT compared to a traditional CBT intervention for individuals who are considered to be obese. There were 48 individuals with an age range of 18–59 with a BMI over 25, who completed some questionnaires (i.e., the Food Craving Questionnaire-Trait version and the Emotional Eating subscale). Additionally, their consumption of sweets and ratings of craving were recorded both before and after the intervention. Participants completed either a two-hour acceptance workshop or a two-hour workshop that was standard cognitive content, based on CBT. Participants were then given access to a sweet box that they carried around for 72 hours while trying not to eat any sweets. Individuals in the acceptance-based intervention reported lower craving ratings and fewer consumptions of sweets. Furthermore, a decrease was observed in emotional eating with individuals who reported high emotional eating levels.

The results of this review indicate that ACT could be an effective intervention for obesity, body image issues, and cravings/emotional eating behaviours. In addition, ACT may also effectively maintain these behavioural changes following the intervention.

Cost of the intervention

While ACT has been suggested to serve as an effective therapy for a range of mental disorders, one major issue is the cost of a psychologist that can deliver ACT. For example, Hammond et al. (2012), reported that, on average, a graduate therapist charges £141 per hour, which approximately translates to NZ$273 for the treatment of depression and anxiety. If considered over the course of 10 sessions, then the therapy will cost roughly NZ$2700 for the total

intervention. This begins to paint a picture of the financial cost of therapy, and for many individuals, this cost is not an option. Furthermore, when examining the ranges of prices that therapists or psychologists charge per hour in New Zealand, the average tends to be around $100–$150 per session. For example, Change it psychology states that an initial session for an individual will cost $255 and any follow-up session is $185 (Change it psychology, 2017). Wellington Psychological Associates offers a similar going rate of $180 per hour. While these places do offer subsidies for individuals who cannot afford to pay these amounts of money, these drop the cost to roughly $60–$80 per session. Furthermore, some therapies such as ACT can last up to 40 weeks with 37 hours over those 40 weeks (Levin, Pierce, & Schoendorff, 2017); that costs around $4,440, assuming that each therapy session costs $120. For an individual who earns minimum wage, they would bring in an income of roughly $29,336 per year (Employment New Zealand, 2018). The cost of therapy, in this case, would be roughly 20% of their overall income for the year. Therefore, there is a need to explore more cost-effective options for individuals who are not in a financial position to afford this therapy but lack the psychological tools to help them build a meaningful life. One avenue that could be explored is the use of self-help guides that are designed to teach individuals psychological techniques.

Self-help guides

Self-help is defined as an intervention that the individual can do by themselves, based on evidence-based psychology (Cavanagh, Strauss, Forder, & Jones, 2014). It has been proposed that there are four forms of self-help; these include: pure self-help, mainly (guided) self-help, self-help with minimal contact

with a therapist or psychologist and self-help in combination with a therapist (French, Golijani-Moghaddam, & Schröder, 2017). Furthermore, self-help can be accessed using a range of methods including books, internet, mobile applications, and online manuals. The intention is to give the individual the opportunity to learn psychological techniques that are designed to increase the overall quality of life (Cavanagh et al., 2014).

Advantages of self-help

Cost of self-help

There are many barriers for individuals who are seeking professional psychological help. As previously outlined, the cost of therapy is quite high, and therefore, there may be a struggle for some individuals to afford these therapies. Furthermore, individuals who face financial barriers to therapy have been reported to be at a greater risk for the development of psychological disorders (Järvelä-Reijonen et al., 2018). Therefore, if the individual can gain the same or similar outcomes from self-help methods instead, this would be a cost-effective method to offer to individuals in this situation, as it would reduce cost barriers and probably provide access to those who needed it.

Time available with the therapist

Interaction time available with the therapist is another potential barrier for individuals seeking treatment. Clients generally spend one hour with a therapist, where they can learn and develop psychological techniques and then practise the techniques with guidance. This is generally the only time that the client can receive detailed feedback from the therapist. This limits the time that

the client is able to progress with the therapy and, thereby, limits their ability to be able to learn new techniques or take on new information (French et al., 2017).

Ability to learn at own pace

Self-help methods, whether pure or guided, could serve as effective alternatives for this situation. These methods could allow the individual to learn at their own pace, as the intervention will be constantly available to them. The individual can also gain some guidance regarding information and techniques. Then, if they need clarification, they will be able to book an appointment with a therapist (Levin et al., 2017). Furthermore, with these self-help methods, the therapist will be able to guide the client through the therapy without actually having to be constantly present (Levin et al., 2017).

While self-help methods may be a useful alternative, these will only be effective provided that they produce similar results to the traditional face-to-face therapy or, at the very least, produce some form of meaningful change. Therefore, a review of the effectiveness of these self-help methods with regards to Mindfulness and ACT as interventions will be explored below.

Uses of self-help interventions

Self-help and mindfulness

Cavanagh et al. (2013) investigated the efficacy of a mindfulness-based, self-help intervention for psychological distress. One hundred and four students (92 female, 12 males), with a mean age of 24, completed baseline questionnaires regarding mindfulness (Five Facet Mindfulness Questionnaire), stress (Perceived Stress Scale), depression and anxiety (Patient health questionnaire for depression

and anxiety), and an engagement-experience questionnaire. Participants were then randomised into an experimental (n = 54) or waitlist condition (n = 50). The experimental condition consisted of an online (i.e., internet) mindfulness intervention for two weeks which consisted of information regarding mindfulness, audio practices and a self-reflective journal. Following the intervention, the participants completed the post-intervention measures. Mindfulness was shown to increase in the experimental group but not in the control group. A decrease was also observed for perceived stress and symptoms for anxiety and depression for the experimental group. Two potential limitations are the bias of the sample, with 92 females and 12 males, and the lack of follow up after the intervention; therefore, it was not possible to see if these results could be maintained.

To further explore the efficacy of self-help, Cavanagh et al. (2014), conducted a meta-analysis to analyse self-help methods across a range of studies that utilised acceptance and mindfulness strategies. Some of the measures used in the studies included the Mindfulness Attention and Awareness Scale, the Freiberg Mindfulness Inventory, the Kentucky Inventory of Mindfulness Skills, the Five Facet Mindfulness Questionnaire, the Acceptance and Action Questionnaire, the Chronic Pain Acceptance Questionnaire and the Tinnitus Acceptance Questionnaire. Some studies reported therapist support; however, this was less than a regular therapy intervention and was considered to be guided self-help. Eight studies used internet-based intervention, five used books, and two used audio-based recordings. The results of the meta-analysis indicated that mindfulness and acceptance self-help interventions significantly improved mindfulness and acceptance skills, while simultaneously decreasing depression and anxiety symptoms. Furthermore, these methods seem to produce similar

results as face-to-face therapy. This study assessed both mindfulness and acceptance methods; therefore, mindfulness by itself may not be responsible for this change.

Taylor, Strauss, Cavanagh, and Jones (2014) investigated the effect of a mindfulness-based cognitive therapy (MBCT) self-help intervention, in the form of a book. There were 79 individuals with a mean age of 28 years who were randomised to either the experimental (n = 40) or waitlist condition (n = 39). The intervention lasted a period of eight weeks. The intervention had eight chapters which were based on the MBCT, as well as a CD with audio-based mindfulness practices. The participants completed the measures pre-and post-intervention, and at 10 weeks follow-up. These measures included the Depression and Anxiety Scale, Satisfaction with Life Scale, Five Facet Mindfulness Questionnaire, and the Self-Compassion Scale. A significant decrease was observed in depression symptoms and anxiety following the intervention. Additionally, satisfaction with life was shown to improve significantly, with improvements to both mindfulness and self-compassion.

Self-help and ACT

Self-help has also been utilised in the context of ACT, Fledderus, Bohlmeijer, Pieterse, and Schreurs (2012) explored the use of a guided self-help intervention based on ACT, for individuals who were experiencing depression symptoms. Three hundred and seventy-six participants were assigned to either an ACT intervention with minimal email contact (n = 125), an ACT intervention with extensive email contact (n = 125) or a waitlist condition (n = 126). In the email conditions, the email support was provided by five master's students who

received two days of training regarding ACT from a clinical psychologist. The participants in the experimental conditions were given a self-help book based on ACT. This book consisted of nine modules surrounding the six components of ACT, with an emphasis on understanding avoidance strategies, cognitive defusion, increasing contact with the present moment and becoming aware of values. The participants completed a variety of measures at pre- and post-intervention, with the experimental group also completing measures again at a three-month follow-up. These measures included the Center of Epidemiological Studies Depression Scale, Hospital Anxiety and Depression Scale, Subjective fatigue subscale, Mental Health Continuum, Acceptance and Action Questionnaire, and the Five Facet Mindfulness Questionnaire. There was a significant reduction in depression symptoms and experiential avoidance in both the self-help conditions. Also of interest was the lack of difference in outcomes noted between the two experimental conditions (i.e., the ACT intervention with minimal email contact and the ACT intervention with regular email contact). There are two main limitations to address, however. First, their sample was mainly comprised of highly educated individuals; therefore, these results may not generalise to the overall population. Second, the email support was not provided by trained therapists, and having fully trained therapist support may alter the results.

Räsänen, Lappalainen, Muotka, Tolvanen, and Lappalainen (2016) explored the use of self-help ACT intervention to improve overall psychological wellbeing by testing the efficacy of a guided, internet-based ACT intervention (iACT). Participants (i.e., 58 females and 10 males with a mean age of 24), were randomised into either the iACT (n = 33) or waitlist (n = 35) condition. The

intervention consisted of a five-week online program, based on the components of ACT, with an added emphasis on the development of skills and strategies regarding stress, anxiety and depression; this was available as a written, audio, or video format. Those in the intervention condition also received two face-to-face interviews with a coach before and after the intervention. This intervention lasted for a period of seven weeks. For the experimental group only, the participants completed measures before and after the intervention with a 12-month follow-up. These measures included the Mental Health Continuum, the Perceived Stress Scale, the Beck Depression Inventory, the Life Satisfaction and Self-Esteem (Finish Descriptive Visual Rating Scale), the Acceptance and Action Questionnaire, the Five Facet Mindfulness Questionnaire, and the Orientation to Life Questionnaire. A decrease was observed in depression symptoms and an increase in life satisfaction in the iACT group. Additionally, participants in both conditions reported a decrease in both stress and depression. One important limitation to consider in these findings, however, is that the guided support (i.e., in this case, two face-to-face meetings, with weekly feedback) was performed by inexperienced psychology students. Therefore, under the guidance of professional psychologists, different results may be observed.

Self-help and body issues

Self-help ACT interventions have also been used in the context of body issues. One such example is Levin, Potts, Haeger, and Lillis (2018), who designed a pilot study to explore the efficacy of a guided self-help ACT intervention (i.e., coaching and self-help book) for weight self-stigma. There were 13 participants between the ages of 18–70 who completed a variety of tasks for the intervention;

these included an initial meeting in person, reading the self-help book, completing journal exercises and engaging in coaching phone calls. The self-help book focused on the processes of ACT with an emphasis on weight loss, body stigmatisation, negative body image and self-compassion. The measures for the study were completed pre- and post-intervention. These measures included a Weight Stigma Questionnaire, Dutch Eating Behaviour Questionnaire – Emotional Eating, Weight Control Strategies Scale, Global Health Scale, Patient Health Questionnaire, Acceptance and Action Questionnaire, Valuing Questionnaire, and Motivating Factors for Weight Loss questionnaire, and weight as measured in pounds. Following the intervention, a decrease was observed in weight self-stigmatisation, emotional eating behaviours and depression symptoms, with improvement observed in quality of life and weight management behaviours as well. Furthermore, an average decrease of 4.18 pounds across the seven-week intervention was observed, indicating ACT self-help could serve as a potential intervention for weight management and weight stigmatisation.

Further exploration of ACT self-help methods as a potential approach for weight and body issues is explored in research by Järvelä-Reijonen et al. (2018). They examined the effect of a self-help ACT intervention in comparison to face-to-face therapy for unhealthy eating behaviours (i.e., emotional eating), obesity and as a method to decrease psychological distress. Participants were 219 individuals of whom 85% were females, with a mean age of 49 years and an average BMI of 31. Using two methods, either a face-to-face group session or mobile application (self-help), the participants completed a variety of measures at pre- and post-intervention and follow-up at eight months. These measures included the General Health Questionnaire, Intuitive Eating Scale, Three-Factor

Eating Questionnaire, Health and Taste Attitudes Scale, ecSatter Inventory (for eating habits), Regulation of Eating Behaviour Scale, Index of Diet Quality, Alcohol Use Disorders identification test, Perceived Stress Scale and BMI. After these measures, the participants were randomised into the two experimental groups and a control group. Each of the two interventions covered the same material just using a different modality. The face-to-face group had six group sessions that were led by a psychologist. These sessions were approximately 90 minutes long with about 6–12 individuals attending. The mobile group had one group session where they were instructed on how to use the mobile application and given access to the application. Each of the conditions focused on understanding and implementing the components of ACT, teaching ACT skills, with a minor emphasis on relaxation, mindful eating and increasing physical activity. The intervention for each condition lasted for a period of eight weeks. The rate of eating due to physical body sensations instead of emotional reasons decreased for both groups (i.e., face-to-face and mobile application). Additionally, both groups demonstrated a decrease in uncontrolled eating and food acceptance. Using food as a reward decreased in the mobile application group but not the face-to-face group. This study suggests that an ACT-based self-help intervention in the form of a mobile application can function as a potential intervention for unhealthy eating behaviours and attitudes.

This review shows self-help methods have been utilised for a variety of psychological disorders with promising results. However, it is unclear if these results are from the self-help or the guidance of the therapist/supporter. Therefore, the following review will explore the efficacy of self-help in contrast with guided self-help.

Comparing types of self-help interventions

Guided self-help vs face-to-face

The presence of the therapist has been proposed to be a major component in the treatment procedure of self-help methods. To explore this Lappalainen et al. (2014), analysed the effects of a face-to-face ACT intervention, compared to the internet ACT intervention in a guided self-help manner for decreasing depression symptoms. The participants were 38 individuals with a mean age of 44 who were randomised into two conditions, the face-to-face group (n = 19) and the internet-based group (n = 19). For the internet-based group, the participants were initially interviewed by the therapist regarding their history and taught how to use the programme. The internet-based intervention had six modules, with each module focusing on one of the components of ACT. There was a variety of information that was either written, audio or visual, with additional exercises and weekly journal entry for the participants to complete. For the face-to-face condition, the therapists were 18 master's students with a mean age of 26. There was a total of six sessions, each lasting approximately 60 minutes. Throughout these sessions, the therapists were instructed to focus on values-based action and identifying verbal and emotional obstacles to the values-based action. The therapist also helped the clients with practising ACT skills and exercises. These therapists were all given access to an ACT book for therapists as a guide to follow throughout the sessions. The intervention lasted a period of six weeks and participants completed the measures pre- and post-intervention with an additional follow-up stage, after six and 18 months. These measures included the Becks Depression Inventory, Symptom Checklist (i.e., for measuring psychopathological symptoms), General Health Questionnaire, Acceptance and Action Questionnaire, Kentucky Inventory

of Mindfulness Skills, White Bear Suppression Inventory and the Automatic Thoughts Questionnaire. A significant decrease in depression symptoms from post-intervention to 18-month follow up was observed in both groups. However, for depression, the face-to-face group demonstrated less improvement than the internet-based group. In terms of overall life satisfaction, both groups seemed to have produced significant improvement throughout the whole study, with additional improvements found in psychological flexibility and mindfulness. One limitation to consider in this study is the lack of formal diagnosis of the participants. Additionally, the participants in the face-to-face condition were not recorded; thus, it was not possible to monitor the interaction between the client and therapist or standardisation regarding the implementation of the ACT model in the face-to-face session. Furthermore, the therapists in this research were not experienced and, instead, were trained students, which could account for the differences in the results between the two conditions. The results of this study suggest that an ACT-based, self-help intervention may serve as an effective alternative to face-to-face interactions with a therapist, though the type of self-help method may have an impact on the effect of the intervention.

Indeed, these self-help methods generally occur in two varieties, pure self-help and guided self-help. Guided self-help refers to the individual gaining access to the self-help method (e.g., books, application, internet programme, etc.) and being able to engage with the self-help independently while receiving minimal guidance from the therapist (Cuijpers, Donker, van Straten, Li, & Andersson, 2010). Pure self-help refers to an intervention or treatment method constructed from evidence-based psychology without the presence of the therapist (Cavanagh et al., 2014; Gellatly et al., 2007).

Pure self-help in vs guided self-help

To explore the effectiveness of different self-help methods, French et al. (2017), conducted a meta-analysis to assess the efficacy of ACT-based self-help methods for depression, anxiety and psychological flexibility. Thirteen studies were reviewed with a sum total of 2590 participants, being roughly 1269 in the intervention and 1133 in the controlled conditions, with the final 188 "to conditions not under review"(French et al., 2017, p. 363). The range for the sample size of the studies was 24–503. Of the 13 studies, seven had participants from the clinical population (i.e., either mental or physical health issues), while the other six were from a non-clinical population. All the studies reviewed had either passive control or active control groups, along with the experimental groups. Some of the measures of the studies included depression symptoms, psychological flexibility, level of anxiety and psychological distress. Computer-based interventions (i.e., eight studies) and book-based interventions (i.e., five) were used as the methods of self-help. The duration of the interventions was between 3–12 weeks. The results indicate that greater engagement with a clinician demonstrated better outcomes. However, the method of the self-help did not seem to have an effect on the results. There were significant changes observed in the measures (e.g., decreasing depression and anxiety, etc.,); however, there were only small effect sizes found, with none exceeding 0.42. Nevertheless, of main importance is that the method of self-help did not seem to greatly affect results. A possible explanation for these effect sizes could be from the lack of reduction of symptoms. The intention of ACT is not to reduce the occurrence of symptoms, but rather focus on the acceptance of these symptoms and the feelings or thoughts behind them. To support this, there was found to be a significant increase in

psychological flexibility following the self-help interventions (French et al., 2017). It should be noted, however, that this review only covered 13 studies, and that only published papers were analysed; therefore, this review may suffer from publication bias.

Previous research by Carter and Fairburn (1998), demonstrates a lack of significant differences between the two methods (i.e., guided self-help and pure self-help). Their study explored the use of self-help CBT as a potential intervention for binge-eating disorder, with a comparison between pure self-help (PSH) or guided self-help (GSH). The participants (i.e., 72 women with a mean age of 40 years old, who had an average BMI of 31) were randomly assigned to one of the three conditions (e.g., GSH, PSH, or waitlist), for a period of 12 weeks. In the PSH condition, the participants were sent a copy of the *'Overcoming Binge Eating'* book. This book has two major sections. The first section is based on educating the individual regarding the processes underlying eating disorders (i.e., binge eating disorder and bulimia nervosa) from a cognitive behavioural perspective. The second part of the book has six modules regarding how to change eating habits and other processes involved in these eating disorders. In the GSH, the participants meet with the facilitator for 25 minutes between six and eight times during the intervention and read '*Overcoming Binge Eating'* with the therapist. It should be noted that none of these facilitators had any form of clinical qualifications. They did, however, receive guidance from a clinical psychologist with the training of two previous pilot participants. The participants completed the measures before and after the intervention, and at six-month follow up. These measures included the Eating Disorder Examination, General Severity Index of the Brief Symptom Inventory (measuring general psychiatric disturbance),

Rosenberg Self-Esteem Scale and BMI. Significant decreases in binge eating were observed among individuals who were in the GSH or the PSH. GSH showed a slightly greater reduction, but these results were not significant. Additionally, there was an overall decrease in eating disorder behaviour in the GSH and the PSH groups.

The results of this review suggest the support for the use of self-help interventions for a range of psychological disorders. Additionally, there seems to be little difference based on the format of the self-help.

Research question

Emotional eating behaviours and obesity have been shown to strongly impact the lives of many individuals both physically and psychologically, while also having a large economic impact on both the individual and society. Therefore, greater emphasis is needed on developing cost-effective interventions for this group. Since research suggests that emotional eating is a form of avoidance behaviour, therapies focusing on reducing avoidance such as ACT have been indicated to serve as potential interventions for this group. Self-help methods seem to be an efficient method to widely disperse these proven effective therapies with promising results. Therefore, the intention of the present study was to expand on the research with ACT-based self-help as an intervention for unhealthy eating behaviours. This was conducted by testing the efficacy of a combination of a self-help ACT book (*The Happiness Trap*) and the supporting mobile application (ACT companion) as interventions for emotional eating behaviours, specifically focusing on a reduction in experiential avoidance.

Method

Participants

The participants took part in the research voluntarily. Posters (Appendix 10) with information about the research were displayed in health centres, universities (e.g., the University of Waikato and Te Wānanga ō Aotearoa) and hospitals. The researcher presented talks at Te Wānanga ō Aotearoa, and Te Kohao health centre. Further information was displayed on social media along with the recruitment poster. Applicants were disqualified if undergoing another psychological intervention for unhealthy eating behaviours, as it would be difficult to ascertain which intervention caused the change in behaviour.

Participants under the age of 18 were excluded. The participants needed no formal diagnosis and instead self-reported being overweight or engaging in unhealthy eating behaviours. This criterion for participation was assessed by a self-report measure of unhealthy eating behaviours and experiential avoidance in the pre-intervention journal entries, more details about this procedure will be discussed later in the Baseline section.

Initially, a total of 22 people were interviewed and they completed the baseline phase. However, of those 22, one participant was unable to take part in the research, as they did not meet the criteria for participation. Of the remaining 21 participants, only eight choose to move into the baseline phase; the other participants did not reply to the messages of the researcher regarding the meeting for starting the intervention phase. Therefore, the participants remaining consisted of six females and 2 males. The age range of these participants was 18 – 52, with

an average age of 33. Of the eight participants, six individuals identified themselves as European, one as European/Māori, and one as Māori/Pacific Peoples. It should be noted that those participants who were students at the University of Waikato, received up to a four percent course credit for participating in the research.

Materials

A consent form, information sheet, demographic questionnaire, *The Happiness Trap* book (Harris, 2008), and the ACT companion mobile application (Harris & Berrick, 2015) were used in this research.

Consent form

The consent form (Appendix 10) informed the participant about the study and let them know they could withdraw at any time without penalty.

Information sheet

The information sheet (Appendix 7) covered what was required of the participant during the study, with detailed information about the research. Additionally, it outlined the timeline of the research. The researcher's and supervisor's details were present on the sheet, along with contact options for the participants, to be used if they were experiencing psychological distress during the intervention. These contact options included Depression Help Line, Youth Line, Mental Health Services within the Waikato District Health Board, depression.org.nz and Lifeline.

Demographic questionnaire

The demographic questionnaire (Appendix 8) was a five-item questionnaire to record the gender, age, ethnicity, marital status and level of education of the participant.

The Happiness trap book

The Happiness Trap (appendix 12) is a book, written by the author Russ Harris. It has 287-pages with 33 chapters. The intention of the book is to provide self-help methods to the reader in the form of self-help Acceptance and Commitment Therapy. The book emphasised to the reader how to apply the processes of ACT in their daily lives, through a range of exercises. The book also detailed and described the components of ACT (i.e., Acceptance, Committed Action, Values, Self as Context, Cognitive Defusion, and Mindfulness) and explained how the individual can apply these components in their life, with a focus on living a life of meaning and value (Harris, 2008).

ACT companion mobile application

The ACT companion is a mobile application developed by Berrick Psychology, it is designed to complement the *Happiness Trap* (Harris & Berrick, 2015). It featured three main sections, these are "*Be* P*resent, Open Up,* and *Do What Matters*". The *Be Present* section is focused on mindfulness skills and has 11 exercises. Nine of these were audio mindfulness practices, following which the participants entered qualitative data regarding their experience during the exercise. The *Open Up* section focused on acceptance and practise of defusion techniques. It had 13 exercises in which the participant practised a range of

acceptance or defusion techniques. After which the participants provided either qualitative and quantitative data regarding their experience using the techniques, and reported how useful they found the technique. The *Do What Matters* sections emphasised the development of values and a plan for committed action. It had 12 exercises, again with a combination of qualitative and quantitative data regarding the development of values, identifying possible obstructions for behaving in line with these values, and ideas for goal setting towards values. There were reminders that can be set from each of these sections for practising the techniques. Overall, the activities in the sections focused on giving the user an opportunity to practise and solidify the techniques explained in *The Happiness Trap*. It should be noted that none of this data was available to the researcher due to the confidentiality policy of Berrick Psychology.

Feedback questionnaire

The feedback form was a seven-item questionnaire (Appendix 11). Five of the questions focused on how useful the participant found the Happiness Trap and the ACT companion mobile application. Also, it asked whether they noticed any change in their behaviour following the intervention. This was rated on a Likert Scale, one through to five (1 = not at all, through to 5 = extremely). The final two questions gave the participant the option to record any subjective information about likes and dislikes regarding the intervention, and what aspects of the intervention could be improved.

Measures

Multidimensional experiential avoidance questionnaire (MEAQ)

The MEAQ (Appendix 1) is a 62-item self-report questionnaire, that assesses experiential avoidance using six subscales: Behavioural Avoidance, Distraction/Suppression, Procrastination, Distress Aversion, Repression/Denial, and Distress Endurance. Each of these subscales is rated on a Likert Scale (1 = strongly disagree to 5 = strongly agree). This questionnaire has been demonstrated to have a Cronbach's alpha ranging from 0.91 – 0.93, representing excellent reliability (Gámez, Chmielewski, Kotov, Ruggero, and Watson (2011).

Valuing questionnaire

The valuing questionnaire (Appendix 2) is a 10-item self-report measure, which analyses the rate of value progression and value obstruction. Value progression referred to the self-report score that demonstrated the extent to which an individual was engaging in behaviours that were orientated towards their values, this section had five of the ten questions. Conversely, value obstruction referred to the self-report score that reflected that amount that an individual engaged in behaviour that decreased value orientated behaviour, this section also had five questions. These value progression and value obstruction scores were measured using a Likert scale of 0 – 6 (0 = this statement is not true at all, through to 6 = this statement is completely true). For example, a value progression statement is, "I worked toward my goals even if I didn't feel motivated", in comparison to a value obstruction statement, "Difficult thoughts, feelings or memories got in the way of what I really wanted to do". The participant scored

each of these statements using the Likert scale and the sum total of each set of five questions was calculated to give a measure of value progression versus value obstruction. This measure has been demonstrated to have a Cronbach's alpha ranging from 0.91 – 0.93, representing excellent reliability (Smout, Davies, Burns, & Christie, 2014).

Acceptance and action questionnaire (AAQ)

The AAQ (Appendix 3) is a seven-item self-report questionnaire with the intention to measure psychological inflexibility, specifically the levels of experiential avoidance, cognitive fusion, and action in the face of emotional barriers. This was measured by reading a statement and reporting the level of truth of this statement on a scale of 1 to 7 (1 = never true, through to 7 = always true). The calculation for measuring psychological flexibility was accomplished by adding the sum of the items; higher results means greater levels of psychological inflexibility. Cronbach's alpha of the AAQ is 0.88, thus showing good reliability (Wolgast, 2014).

Compulsive eating scale (CES)

The CES (Appendix 4) is an eight-item self-report questionnaire designed to measure and predict emotional eating and avoidance behaviours, with food functioning as an avoidance mechanism. This concept is measured using the frequency that the individual engages in unhealthy eating behaviours from a through e score (a = never, through to e = more than once a week). The CES shows a Cronbach's alpha of 0.85, signifying good reliability (Mostafavi et al., 2016).

General health questionnaire (GHQ)

The GHQ (Appendix 5) is a 28-item questionnaire with a Cronbach's alpha of 0.93, indicating excellent reliability. These 28 items are split into four subcategories: somatic symptoms (e.g., the intensity of a sensation that an individual experiences from an event, particularly with a focus on the sensations felt regarding their body such as pain, nausea, dizziness etc.), anxiety/insomnia, social dysfunction (e.g., how much do internal experiences, such as thoughts and feelings affect social interaction) and severe depression (Kashyap & Singh, 2017).

Weekly journal entry

The journal entry (Appendix 9) developed by the researcher was a self-report measure with five items designed to measure the frequency of experiential avoidance, the frequency of unhealthy eating behaviours, and how useful the individual was finding *The Happiness Trap* intervention.

Design

This study used a single-subject design, with multiple baseline ABA across participants. There was continuous data collection using journal entries, with additional pre- and post measures also recorded. The first stage (A) was the baseline phase, which lasted for approximately two weeks. The second stage (B) was the intervention phase, which lasted three months, and the last phase (A) was the post-intervention stage (i.e. follow-up) to record changes in the participant's behaviour, which lasted roughly two weeks. Additionally, the study also utilised a pre- and post-test design. At the end of the baseline phase, the participants completed pre-intervention measures during the second meeting with the

researcher. At the termination of the intervention, the participants also completed post measures and this occurred at the third meeting with the researcher. The participants started participation at different points during the study. It should be noted that two of the participants completed the intervention over six months rather than three months. This was due to complications that were, unfortunately, outside of the researcher's control.

Procedure

The first step of the procedure was for the researcher to meet the participant. During this meeting, the participant gave some background information regarding their relationship with food, and their view of themselves in terms of their body image. The researcher then presented a diagram of the ACT model to the participants and gave a brief explanation of the processes involved in ACT, in order for the participant to have some understanding of the intervention before continuing. The participants also read the information sheet and had the opportunity to ask any questions. The participants kept this information sheet, as it had contact details of the researcher and the supervisors. Once the participant understood what would be involved in the research, they completed the consent form, during which again, they had the opportunity to ask any questions. After this initial discussion, the participants were started on the baseline phase.

Baseline

Participants received access to an online folder, which had the weekly journal entries. These entries were forms regarding the rate of experiential avoidance and unhealthy eating behaviours the participants engaged in from the previous day. The participants completed these journal entries three times a week

(i.e. Monday, Wednesday and Friday). Once the participants had completed four to eight journal entries, the researcher inspected these journal entries for the criteria of participation in the research.

The criteria were an average of two instances of experiential avoidance or two instances of problematic eating, over the baseline journal entries. There were between four to eight journal entries, in order to gain reliable baseline data. If the participant had a consistent rate of problematic eating or experiential avoidance that was, on average, higher than two instances before completing all eight-journal entries, then they started the invention before having to complete all eight-journal entries. Once the participant met the criterion to start the intervention, they met with the researcher again. During this meeting, the researcher administered the battery of tests (i.e., the MEAQ, VQ, AAQ, CES, and the GHQ) to the participant, and the participant filled in the demographic questionnaire. Following the completion of these tests and the demographic questionnaire, the participants received a copy of *The Happiness Trap* from the researcher, and were informed that this was theirs to keep; additionally, the researcher downloaded the ACT companion for the participant.

Once the application had been downloaded, the participant set up an email and password for their sign-in; the researcher also typed in an access code that gave the participant access to the application, at no cost for six months. The researcher also gave the participants a brief demonstration regarding how the mobile application functioned. During this meeting, the participant's weight and height were also recorded. However, if the participant did not feel comfortable having their weight and height measured in the presence of the researcher, then

they were able to report this information subjectively. If the participant wished this information to be recorded subjectively, then they wrote this information on a piece of paper and presented this data to the researcher, who recorded the information with the participants' other data. If the participant did not want to provide this data then they were not required to do so.

Intervention

The participants completed the intervention over the course of a three-month period. This consisted of reading *The Happiness Trap* (i.e., the 33 chapters) and completing the exercises on the mobile application (i.e., 36 exercises). The researcher spoke to the participants and encouraged them to complete all the chapters in *The Happiness Trap* and all of the exercises in the 'ACT companion'. This would mean that they would complete roughly four chapters of *The Happiness Trap* per week, and roughly one exercise from the mobile application every two days. During this time, the researcher had little to no contact with the participant other than email reminders that were sent out on the day the journal entry was due, or one or two days following the incomplete journal entries. The researcher also contacted the participants to organise times for the post-intervention meeting.

Post-Intervention

After three months of the intervention, the participant met with the researcher again to complete the post-intervention phase. This involved the researcher meeting with the participant again. At the meeting, the participant once again completed the battery of tests (e.g., the MEAQ, VQ, AAQ, CES and the GHQ) and completed a second weigh-in. For the weigh-in, the participants

received the same options, as they had for the pre-intervention; they were not required to supply their weight or height, or were able to give this information to the researcher subjectively. Following the completion of the tests and the second weigh-in, the participant completed a seven-item questionnaire regarding how effective they found the intervention, and how easy it was to understand.

The researcher then thanked the participant for their participation in the research. Additionally, the researcher asked the participants if they would mind completing the journal entries for another two weeks (i.e. six journal entries) for the follow-up phase. If the participant did not want to complete the follow-up journal entries, then their data was summarised, and a graph of their data sent to them, so they could review it. If they did wish to complete the follow-up phase, then the researcher waited for the follow-up data. Once the participant provided this data, the researcher analysed this data and sent this to the participants in the form of graphs. The researcher then gave the participants the opportunity to review their information.

Data Analysis

Initially, all of the participant's data was collected and recorded for the pre and post measures (i.e. the battery of questionnaires), and the journal entries for experiential avoidance and unhealthy eating behaviours. Following this, line graphs were constructed for each participant’s journal entry data, (i.e. both unhealthy eating behaviours and experiential avoidance). This was done to show trends in the journal entry data. Then, the totals for pre-intervention and post-intervention were calculated for all of the battery questionnaires. This was done with the data from each participant, to show any differences between pre- and

post-intervention. Averages were then calculated for each dependent measure across all of the participants' data. The details of each calculation for the measures are given below.

AAQ: The calculation for assessing total psychological inflexibility was completed, by adding the total of all the responses based on the Likert scale questions (i.e. 1 – 7). This was then compared to the maximum value of 49 to determine psychological inflexibility with high values, indicated high psychological inflexibility. This calculation was completed for each participant.

CES: The total indication of compulsive eating behaviour was calculated by adding the total responses based on the Likert scale questions (i.e. 1 – 5) and then comparing this to the highest possible score of 40. Lower scores indicated a lower rate of compulsive eating behaviour/binge eating behaviour. Again, this was done for each participant.

GHQ: The results of the GHQ were calculated using a Likert scale of 0 – 1, where each question had two possible outcomes, either one or zero across the four possible answers. The first two answers were recorded as 0 and the second two answers were recorded as one; refer to Kashyap and Singh (2017) for more details. There were four main sections of the GHQ each with a total of seven questions, resulting in a total of 28 questions. Each participant's total score for the GHQ was calculated across all four sections and compared to the total of 28. Lower scores indicated higher general health.

MEAQ: The MEAQ had 61 questions measured on a Likert scale from 1 -6. The results were calculated by adding up the total number of responses for

each question. There was a total of six sections in the MEAQ. The total of each of these sections was calculated by adding the sum of the values of the questions in each section. It should be noted that two questions were reverse items, meaning the result was calculated by subtracting seven away from the score (e.g. 2 – 7 = -5). This was done for question 23 and question 30. Once these calculations had been recorded, the total across five of the sections was calculated, by adding the total sum of these sections. These sections were Behavioural Avoidance, Distress Aversion, Procrastination, Distraction & Suppression, and Repression & Denial. The sixth section was Distressed Endurance, which was subtracted from 77. The result of this equation was then added to the sum of the five other sections, to give a total measure for overall experiential avoidance. This is clearly demonstrated in the following equation: (Behavioral Avoidance + Distress Aversion + Procrastination + Distraction & Suppression + Repression & Denial) + (77 - Distress Endurance). Higher totals indicated higher rates of experiential avoidance. The maximum total that was possible for the MEAQ was 317.

Values Questionnaire: Results for value progression and value obstruction were calculated by adding the total of the two columns together. Each column represented either five of the value progression questions or five of the value obstruction questions. The maximum available for each column was a total of 30. For each column (i.e. measure) higher scores indicated either a higher rate of progression or obstruction respectively.

Journal entry data: For the journal entry data with both unhealthy eating behaviours and experiential avoidance, an average was calculated for both the baseline and intervention phases. This was done using the last four points of

baseline and the last four points of the intervention, respectively. Therefore, the averages were calculated for phase (i.e. baseline and intervention) across the final four points of each phase.

BMI: Six participants supplied BMI data, from these data, averages were calculated for BMI across the six participants. Additionally, a graph was constructed with both the individual and mean BMI data from pre- and post-intervention.

Following all these calculations, graphs of the participant's data and means were constructed for each of the dependent measures between pre- and post-intervention. Descriptive measures were also calculated for each dependent measure, again across both pre- and post-intervention.

Results

Journal Entry Results

The following section will report the results of unhealthy eating behaviour and experiential avoidance behaviour journal entries, which were recorded on a daily basis three times a week (i.e., Monday, Wednesday, Friday)

Unhealthy eating behaviours

Figures 1, 2 and 3 display the trend in data for the participants' self-reported unhealthy eating behaviours across successive journal entries during both the baseline and the intervention phase. These journal entries were recorded three times a week (i.e., Monday, Wednesday and Friday), and showed the self-reported unhealthy eating behaviours for the previous day; therefore, this should be noted when interpreting results from the graph. A general decrease was observed in unhealthy eating behaviours for participants 1, 3, 4, 7 and 8, from baseline through the intervention. This change was much less obvious for participants 3 and 8. Participants 2, and 6 showed little to no difference regarding the rate of unhealthy eating behaviours from baseline through the intervention, whereas participant 5 demonstrated an increase in these behaviours from baseline through the intervention.

During the baseline phase, most participants reported less than 5 unhealthy eating behaviours per day, except for participants 5, 7 and 8, who demonstrated higher rates of unhealthy eating behaviours per day, with maximums of 5, 10 and 6 respectively. Participant 3, on average, showed the lowest rate of unhealthy eating behaviours during both the baseline and

intervention phase. Throughout the intervention, participants 5, 7 and 8 demonstrated the highest unhealthy eating behaviours with rates of 8, 8 and 6 respectively. At least once during the intervention, all participants reported zero occurrences of unhealthy eating behaviours throughout the day, with the exception of participant 5, who always reported at least one occurrence of unhealthy eating behaviour per day. One occurrence of 0 unhealthy eating behaviours was observed for participant 2; while participant 3 had the most occurrences of 0 unhealthy eating behaviours, with a total of 11 occurrences. During the intervention phase, for those participants that showed a change in behaviour, this change in behaviour generally occurred halfway through the intervention (i.e., approximately 46 days). This is particularly apparent when observing the data for participant 7. At the start of the intervention the behaviour did not greatly reduce; however, following data point 23, unhealthy eating behaviour gradually decreased.

Five of the eight participants took part in the follow-up phase; these were participants 1, 3, 6, 7 and 8. Participants 2, 4, and 5 did not participate in the follow-up phase. During the follow-up phase, only participants 1 and 3 demonstrated any type of continual decrease in unhealthy eating behaviours. It should be noted, for this follow-up phase, there were only two data points for participant 1 and six data points for participant 3. For participant 6, the two data points during follow up were similar in rate to those observed during the intervention. For participants 7 and 8, the follow-up data points were similar to the intervention and did not demonstrate a further decrease. In fact, for participant 7, there was an increase in reported unhealthy eating behaviours in follow-up compared to the end of the intervention phase.

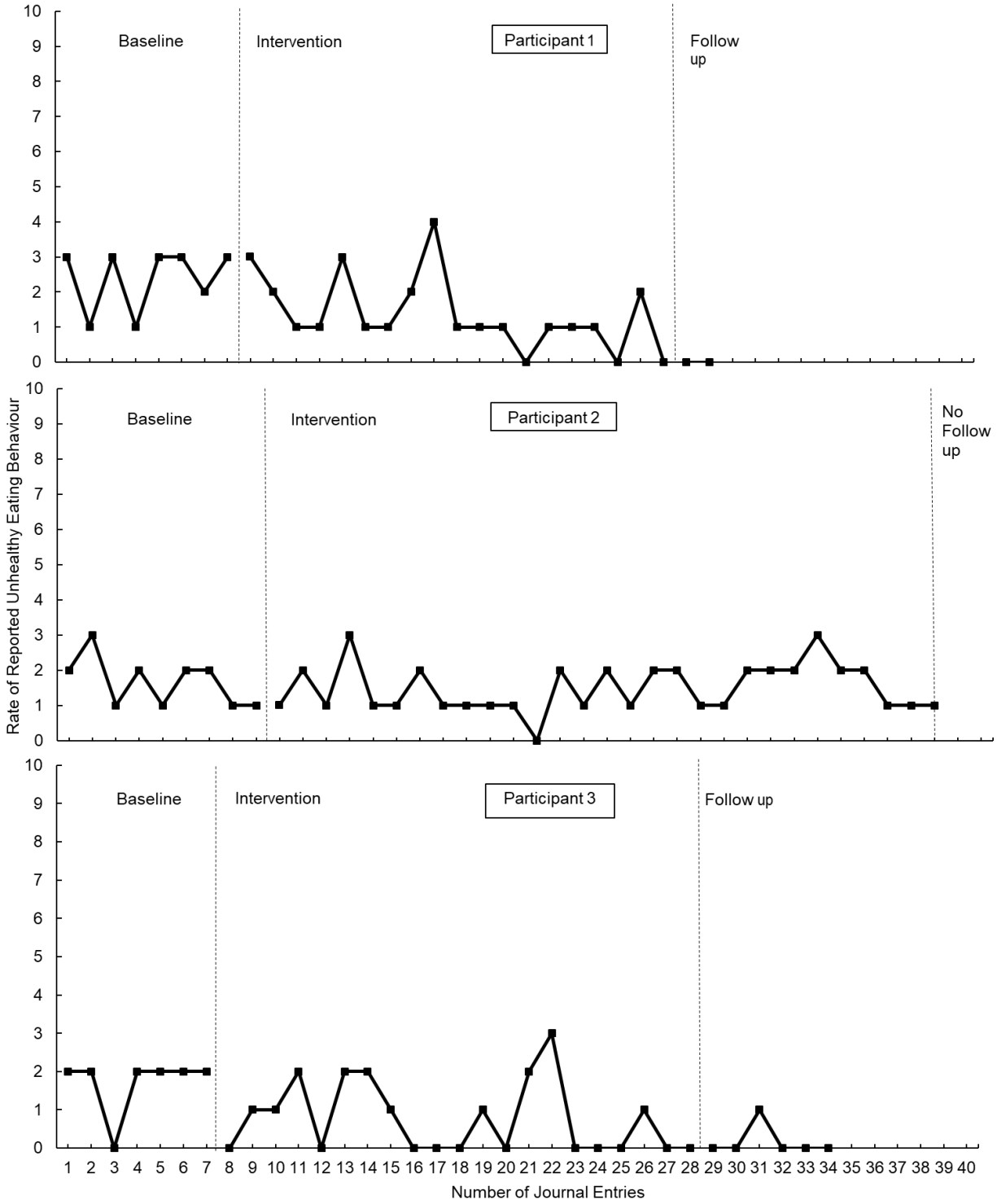

Figure 1. Reported unhealthy eating behaviours across successive journal entries, during baseline, the intervention and follow up for participants 1-3.

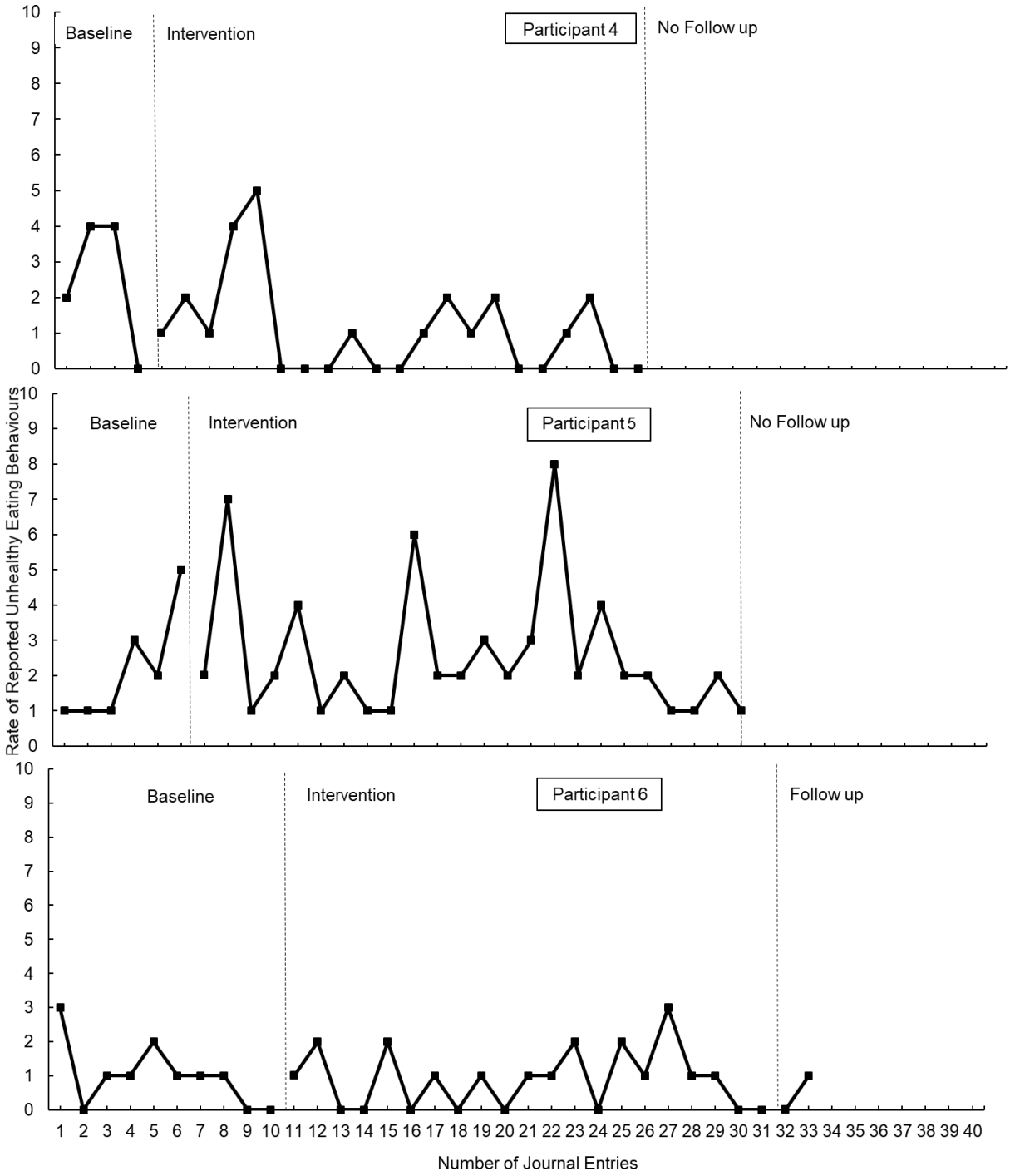

Figure 2. Reported unhealthy eating behaviours across successive journal entries, during baseline, the intervention and follow up for participants 4-6.

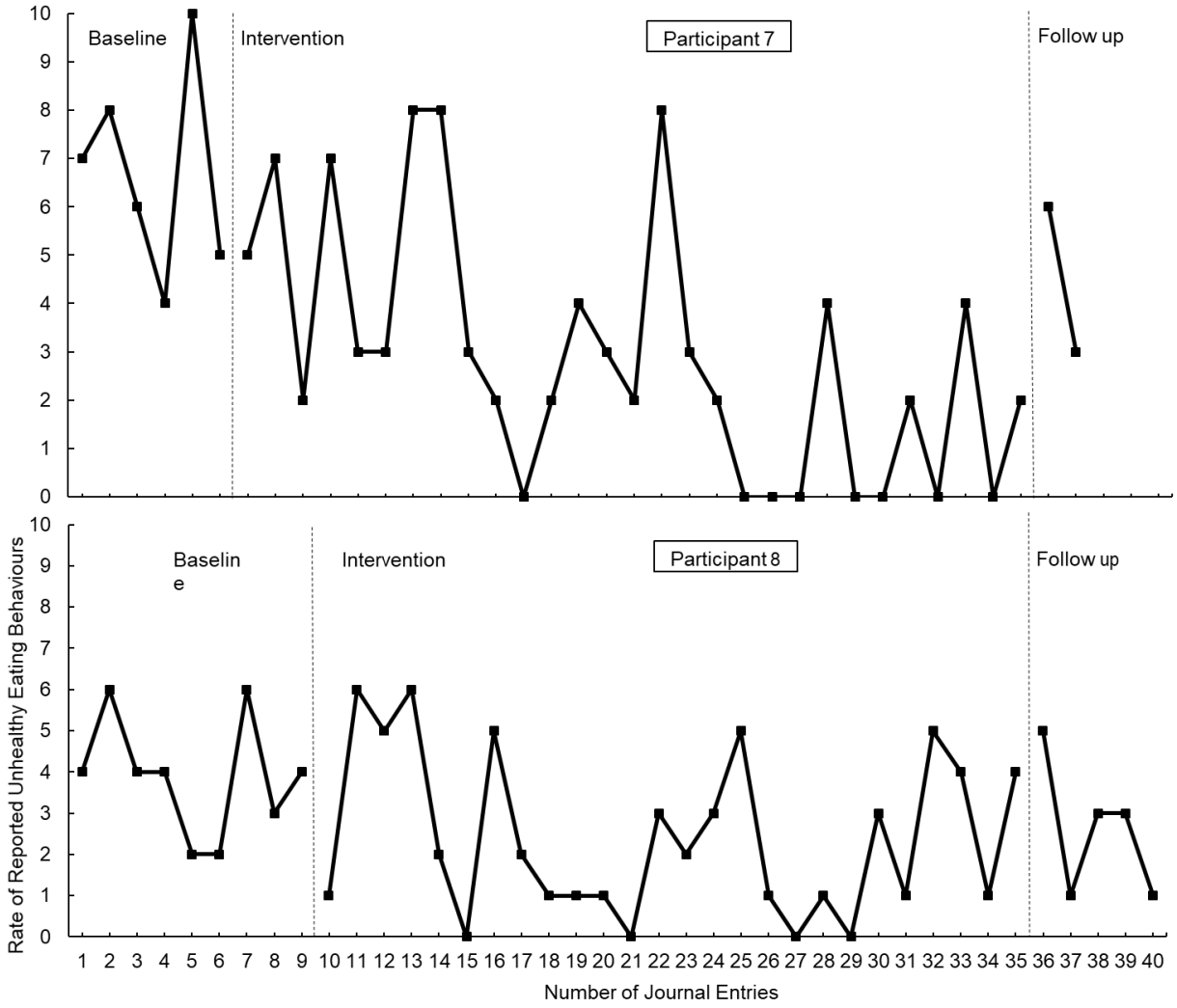

Figure 3. Reported unhealthy eating behaviours across successive journal entries, during baseline, the intervention and follow up for participants 7-8.

Experiential avoidance

Figures 4, 5 and 6 show the data trend for the participants' self-reported experiential avoidance across the successive journal entries for the baseline and intervention phase. Again, similar to that of the journal entries for self-reported unhealthy eating behaviours, there were three journal entries for self-reported experiential avoidance behaviours per week (i.e., Monday, Wednesday, and Friday).

The data from Figures 4, 5 and 6 demonstrates that for participants 1, 3, and 7 the rate of experiential avoidance decreased from baseline through to the end of the intervention. For some participants, this change was more obvious. For example, participant 7 showed a large decrease in experiential avoidance approximately halfway through the intervention; however, it should be noted that a spike in experiential avoidance behaviour occurred at the termination of the intervention for with the data for participant 7.

Some participants only showed slight decreases in experiential avoidance; one such example is participant 6's data, which showed a very little decrease from baseline to the intervention. Participants 2, 4, 5, and 8 showed little to no change in experiential avoidance, from baseline through the intervention. Participant 5 demonstrated a slight increase in experiential avoidance between the baseline and the intervention. Participants 1, 7 and 8 demonstrated the highest rate of experiential avoidance in the baseline, with 6, 9 and 5 occurrences per day respectively. The most occurrences (i.e., 15) of 0 experiential avoidance behaviours were observed in participant 4's data; the second highest being participant 6 with a total of 14 instances. It should be noted that the data for participant 4 shows no experiential avoidance behaviour during baseline; this is due to missing data values during baseline for data points two and three.

Furthermore, during the intervention, all participants demonstrated at least one occurrence of 0 experiential avoidance behaviours. Participants 1, 5 and 7 demonstrated the highest rate of experiential avoidance during the intervention phase, with rates of 10, 8, and 10 respectively. Some participants reported extended frequencies with 0 rates of experiential avoidance behaviour, such as

participants 3, 4, 6 and 7. When observing the data for the intervention, those participants that demonstrated a change in reported experiential avoidance during the intervention did not show a considerable change until halfway through the intervention. This was very easy to observe with the data for participant 1, in that, at the start of the intervention, experiential avoidance behaviour increased up to a maximum of 10 per day. However, as the intervention progressed, the rate of experiential avoidance gradually decreased.

Again, the same five participants that completed the follow-up for self-reported unhealthy eating behaviours also completed the follow up for self-reported experiential avoidance behaviours. These were participants 1, 3, 6, 7 and 8. Participants 2, 4, and 5 did not participate in the follow-up phase. At follow-up, participant 1 demonstrated 0 experiential avoidance behaviours; however, there were only two data points for this follow-up data. For participant 3, follow-up data was similar to that of baseline; however, there were four instances of 0 experiential avoidance behaviours compared to the one instance at baseline. Participant 6 showed little to no change from intervention to follow up; however, there were only two data points for their follow-up data. Participant 7 showed similar results at follow-up to the second half of the intervention, with no instances of experiential avoidance behaviour. However, similar to participants 1 and 6, participant 7 only had two data points for the follow-up phase. For participant 8, the data for follow-up appears to be similar to the baseline phase, with no occurrences of 0 experiential avoidance behaviours.

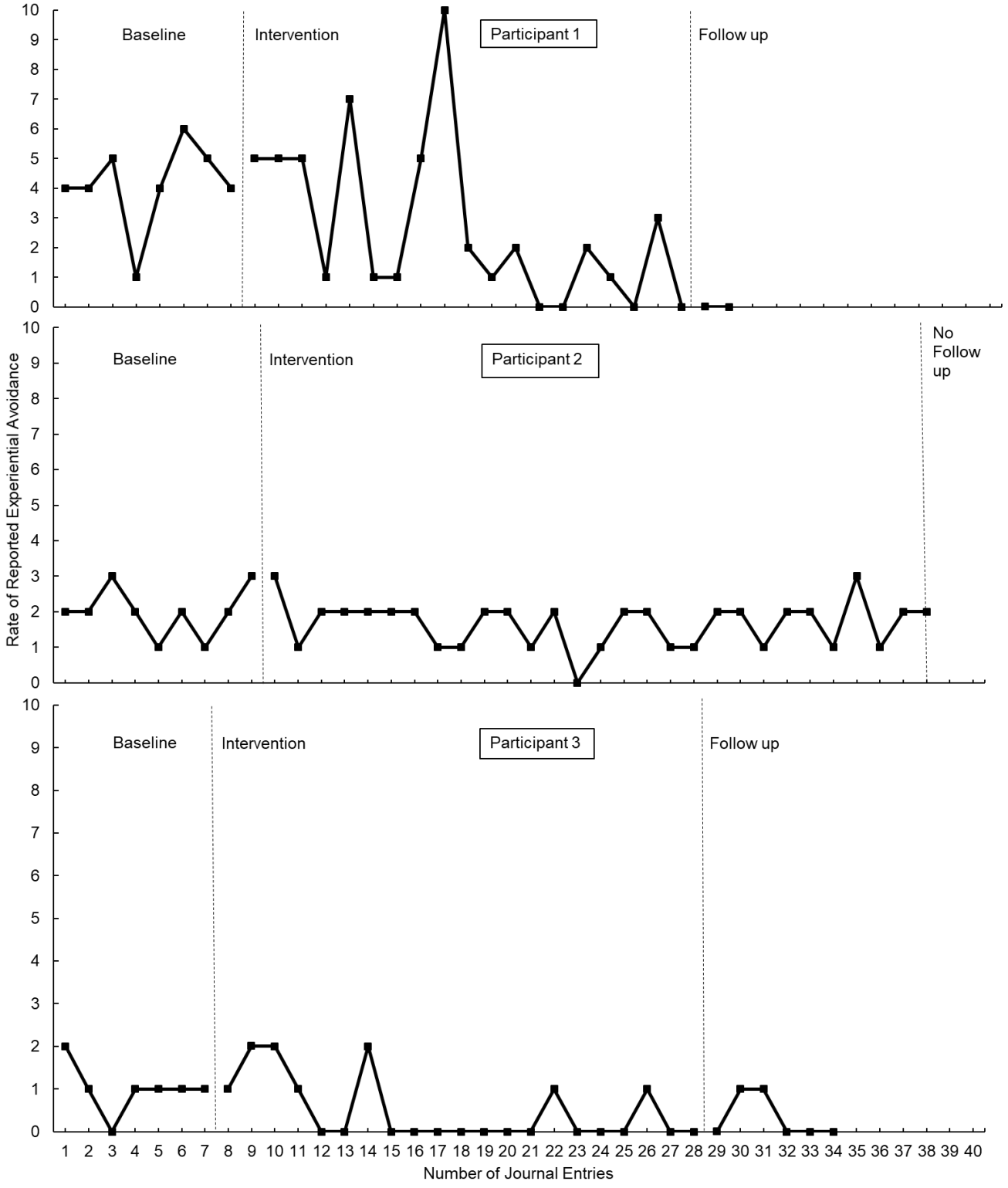

Figure 4. Reported experiential avoidance behaviour across successive journal entries, during baseline, the intervention and follow up for participants 1-3.

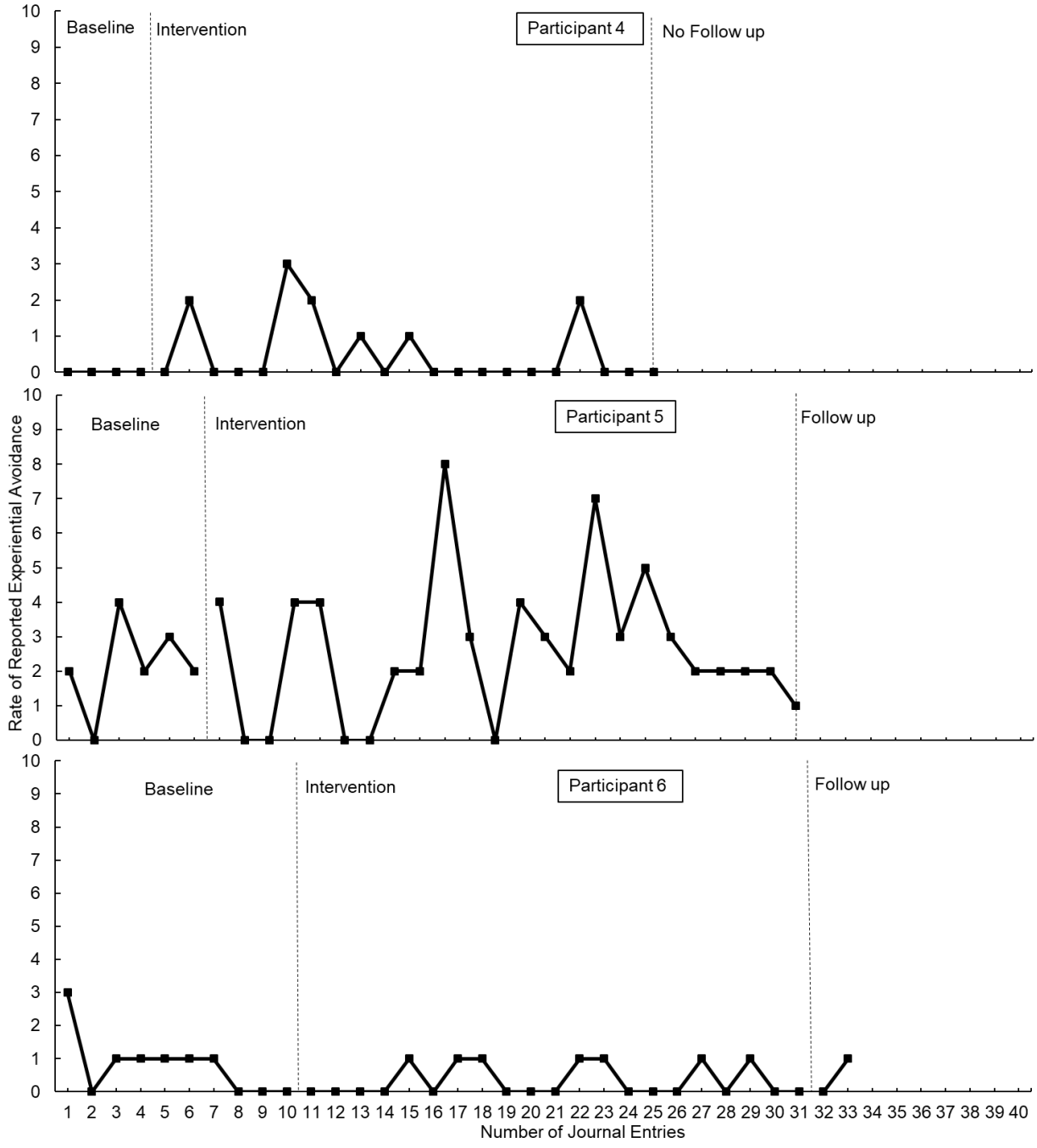

*Figure 5. R*eported experiential avoidance behaviour across successive journal entries, during baseline, the intervention and follow up for participants 4-6.

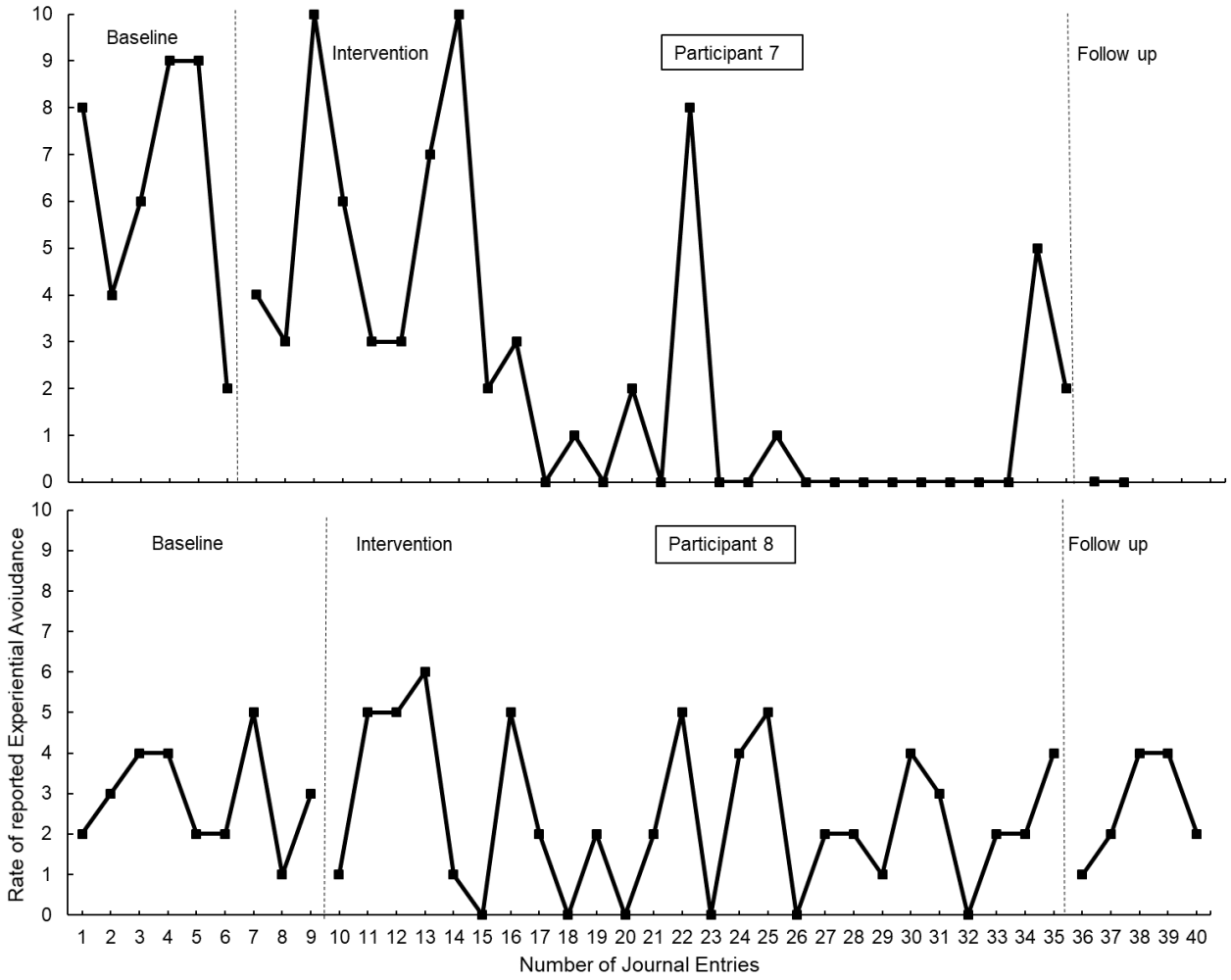

Figure 6. Reported experiential avoidance across successive journal entries, during baseline, the intervention and follow up for participants 7 and 8.

Table 1 below shows the total number of chapters that each participant completed throughout the course of the intervention. Based on the information in Table 1, the mean of chapters completed across the participants was 11. Participant 4 demonstrated the most chapters completed with a total of 20 chapters, while participant 2 reported the least chapters completed with a total of two.

Table 1.

The total number of chapters of the Happiness Trap that each participant.

Participant Number	Self-Report Chapter completed
1	9
2	4
3	11
4	20
5	12
6	9
7	10
8	14
Mean	11

Table 2.

The descriptive statistics for each of the dependent measures that meet the assumption of normality.

Pre-Intervention				
Questionnaire	Mean	SD	Min	Max
AAQ	27.50	5.93	18	34
CES	22.38	3.93	17	30
GHQ	6.75	3.99	3	14
MEAQ	188.88	30.26	134	228
Value Progression	19.75	2.55	15	23
Value Obstruction	16.00	5.78	3	19
BMI	33.10	3.69	26.8	36.2

Post-Intervention				
Questionnaire	Mean	SD	Min	Max
AAQ	16.50	6.55	7	25
CES	15.75	7.48	3	23
GHQ	4.38	5.93	0	16
MEAQ	142.50	43.34	74	193
Value Progression	22.75	3.11	17	27
Value Obstruction	9.57	6.63	1	23
BMI	33.8	7.82	25.9	41.90

This information from Table 2 will be compared and contrasted in the Questionnaire data section later on in the results section.

Normality Tests

Normality tests were conducted for each of the dependent measures. Results from the Shapiro-Wilk test indicate that the assumption of normality was met for all measures, with the exception of journal entry data regarding unhealthy eating behaviours and experiential avoidance, as well as BMI data; see Table 3 for the results of the normality analysis.

Table 3.

Normality Test Results for each of the Dependent Measures.

Dependent measure	Normality test	Test Statistic	P-value
AAQ	Shapiro-Wilk	0.23	0.56
CES	Shapiro-Wilk	0.22	0.36
GHQ	Shapiro-Wilk	0.18	0.87
MEAQ	Shapiro-Wilk	0.12	0.96
Values Progression	Shapiro-Wilk	0.26	0.34
Value Obstruction	Shapiro-Wilk	0.23	0.77
Journal entry (unhealthy eating behaviours)	Shapiro-Wilk	0.31	0.47
Journal entry (experiential avoidance)	Shapiro-Wilk	0.28	0.04
BMI	Shapiro-Wilk	0.39	0.001

For the journal entry data regarding experiential avoidance, unhealthy eating behaviours and BMI; the data observed was non-symmetrical. Therefore, a non-parametric sign test was conducted, as this does not require symmetrical data.

T-tests were conducted for the dependent measures that met the assumption of normality. The aim of these t-tests was to explore if there were

statistically significant differences between pre- and post-intervention means. The results of these t-tests are shown in Table 4.

Sign Test Results

For the self-reported experiential avoidance journal entries, an exact sign test was conducted to assess the median differences between pre- and post-intervention. There were two positive tiles, four negative tiles and two neutral tiles observed, according to the normal distribution generated. Two participants showed an increase in experiential avoidance, based on the journal entry data between baseline and the end of the intervention. Four participants showed a reduction from baseline to the end of the intervention, and two participants demonstrated no change. Furthermore, no statistically significant difference was observed in median data between baseline (*Mdn* = 2.38) and intervention scores (*Mdn*= 1.38) for the journal entry data regarding self-reported experiential avoidance, z = -0.408, p = 0.688.

Similarly, an exact sign test was used to explore any median differences between pre- and post-intervention data for self-reported unhealthy eating behaviours. Based on the normal distribution of the data, zero positive tiles, eight negative tiles and zero neutral tiles were observed. Eight participants showed a decrease in unhealthy eating behaviours from baseline to the end of the intervention. Moreover, a statistically significant difference was observed in the median data for journal entries regarding self-reported unhealthy eating behaviours between the baseline (*Mdn* = 2.62) and intervention scores (*Mdn* =1.00), z = -2.475, p = 0.012.

BMI data for participants 1, 3, 4, 5, 6 and 8, was shown to be non-symmetrical; therefore, an exact sign test was conducted to analyse for any potential differences in medians between the pre- and post-intervention data. The results for the sign test indicated that there were three negative tiles, two positive tiles, and one neutral tile. Three of the participants demonstrated a decrease, while two participants displayed an increase in BMI between pre- and post-intervention. There was found to be no statistically significant difference in median data for BMI from pre- (*Mdn* = 34.7) to post-intervention (Mdn = 34.45), $z = 0.00$, $p = 1.000$

T-test Across Participants

Dependent samples t-tests were conducted as a means to analyse differences between pre- and post-intervention data, using the dependent measures that met the assumption of normality. This information is displayed in Table 4 below.

Table 4.

T-test results for the dependent measures that met the assumption of normality.

Measure	Normality *p*-value	Mean Difference	SD	Standard Error	95% CI	Obtained *t*-value	Degrees of Freedom	*p*-value of t-test	Effect size
AAQ	0.56	-11.00	8.28	2.92	[-17.92, -4.08]	-3.76	7	0.007	-1.33
CES	0.36	-6.63	5.48	1.94	[-11.20, -2.05]	-3.42	7	0.011	-1.21
GHQ	0.87	-2.38	6.76	2.39	[-8.026, 3.28]	-0.94	7	0.353	-0.35
MEAQ	0.96	-46.37	34.34	12.14	[-75.08, -17.68]	-3.80	7	0.007	-1.35
Value Progression	0.90	3.00	3.63	1.28	[-0.03, 6.03]	2.34	7	0.052	0.82
Value Obstruction	0.06	-5.62	7.48	2.64	[-11.88, 0.63]	-2.13	7	0.071	-0.75

Note. The Measure names have been abbreviated for convenience. They represent the various questionnaires as follows: AAQ = Acceptance and Action Questionnaire, CES = Compulsive Eating Scale, GHQ = General Health Questionnaire, MEAQ = Multidimensional Experiential Avoidance Questionnaire.

Three of the dependent measures demonstrated significant differences between the means for the pre- and post-intervention data. These measures are the AAQ, CES, and MEAQ. These measures were significant, as the p-value for each measure is below 0.05. The other three dependent measures, the GHQ, value progression, and value obstruction did not show significant results between pre- and post-intervention. This was evident in that the p-values for these measures were above 0.05. However, it should be stated that value progression did approach significance with a p-value of 0.052. The effect sizes were reported using Cohen's *d* (Cohen, 1988). Four of the dependent measures demonstrated a large effect size, these are the AAQ, CES, MEAQ and value progression. This large effect size indicated a large difference between means of pre- and post-intervention data across these dependent measures, while the data from GHQ and value obstruction indicated a small and medium effect size, respectively.

Questionnaire Data

AAQ (Acceptance and action questionnaire)

Figure 7 represents the individual and mean data for pre- and post-intervention scores, across the eight participants, for the Acceptance and Action Questionnaire. The mean psychological inflexibility score at pre-intervention was 27.5, with 16.5 reported at post-intervention. It should be noted that higher results on the AAQ represent greater levels of psychological inflexibility.

Based on the trend seen in Figure 7, all participants' scores on the AAQ decreased from pre- to post-intervention, with the exception of participant 5, who demonstrated an increase in psychological inflexibility from pre-intervention (i.e., 19) to post-intervention (i.e., 21). This decrease in psychological inflexibility was

most evident with participants 8's data, with an observed psychological inflexibility score of 34 at pre-intervention, and 7 observed at post-intervention. In contrast participant 5 demonstrated the least variance in psychological flexibility between pre- and post-intervention with scores of 19 and 21 respectively.

For pre-intervention, participant 8 reported the highest score of psychological inflexibility, while participant 3 reported the lowest, with 34 and 18 respectively. At post-intervention, participant 6 demonstrated the highest psychological inflexibility score with an observed score of 25. Participants 3 and 8, conversely, had the lowest scores with an observed score of 7 reported for both participants. The participant that demonstrated the greatest change in psychological inflexibility was participant 8 with a difference of 27 observed between pre- and post-intervention. From the analysis of the t-test, participants

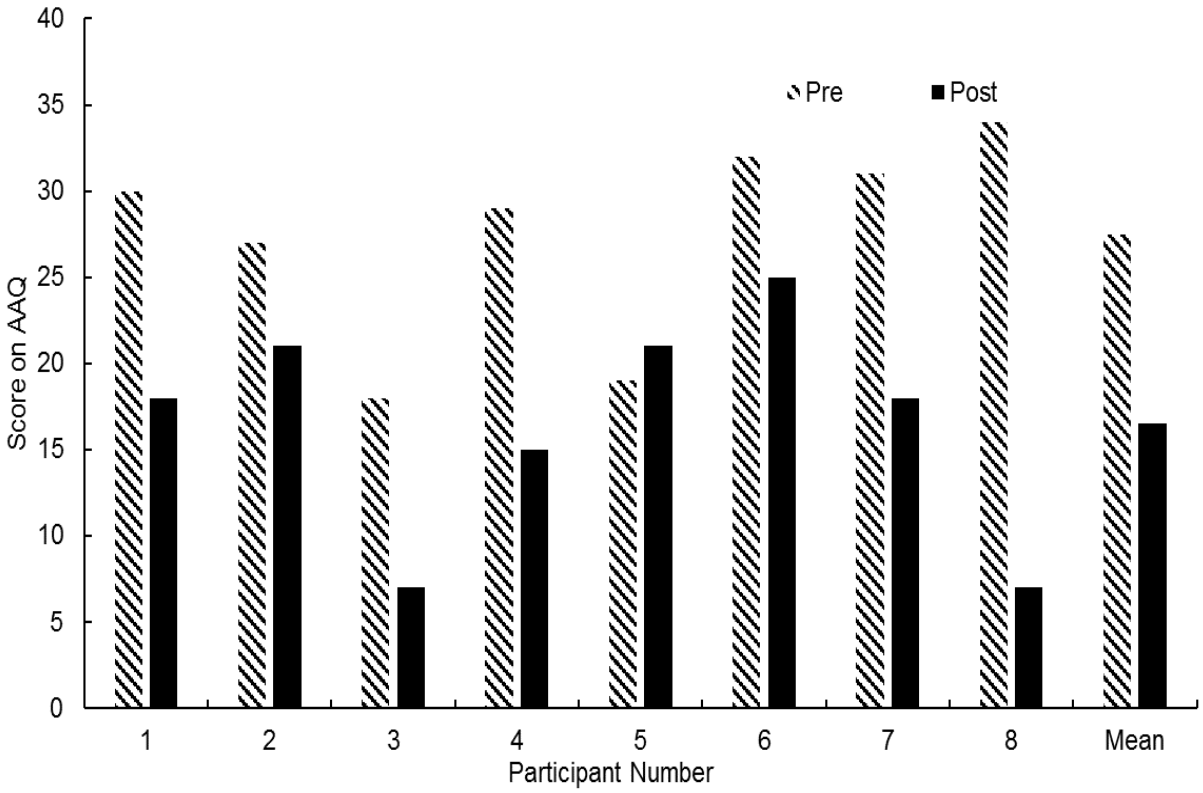

Figure 7. Pre- and post-intervention individual and mean data across participants for the Acceptance and Action Questionnaire.

reported higher psychological inflexibility on the AAQ at pre-intervention (*M = 27.50, SD = 5.93*) compared to post-intervention (*M = 16.50, SD = 5.93*), with a statistically significant mean decrease of -11.00; $t(7) = -3.76$, $p = 0.007$, $d = -1.33$.

CES (Compulsive eating scale)

Figure 8 displays the pre- and post-intervention individual and mean scores for the Compulsive Eating Scale across the eight participants. The mean score of compulsive eating behaviour was 22.38 at pre-intervention and 15.75 at post-intervention, across the eight participants. In general, the scores of compulsive eating decreased from pre- to post-intervention for all of the participants, with the exception of participant 5, in which no change was observed. High scores on the compulsive eating scale was an indicator of greater binge eating/emotional eating occurrences. Participant 2 showed little change in compulsive eating from pre- to post-intervention, with 23 at pre-intervention and 22 at post-intervention. Participant 7 demonstrated the greatest change in compulsive eating, from pre- to post-intervention with scores of 21 observed at pre-intervention and 6 observed at post-intervention. Participant 3 demonstrated a similar change in the degree of compulsive eating, with scores of 17 at pre-intervention to 3 at post-intervention. For the pre-intervention data, participant 1 showed the highest score and participant 3 showed the lowest, with 30 and 17 respectively. This trend continued to post-intervention as well, participant 1 reported the highest score of compulsive eating with a score of 23, compared to participant 3, who demonstrated the lowest score of with a value of 3. There was a statistically significant difference in CES scores from pre-intervention (*M = 22.38, SD = 3.93*) compared to post-intervention (*M = 15.75, SD = 7.48*). This

difference of -6.63 was observed to be statistically significant; $t(7) = -3.42$, $p = 0.011$, $d = -1.21$.

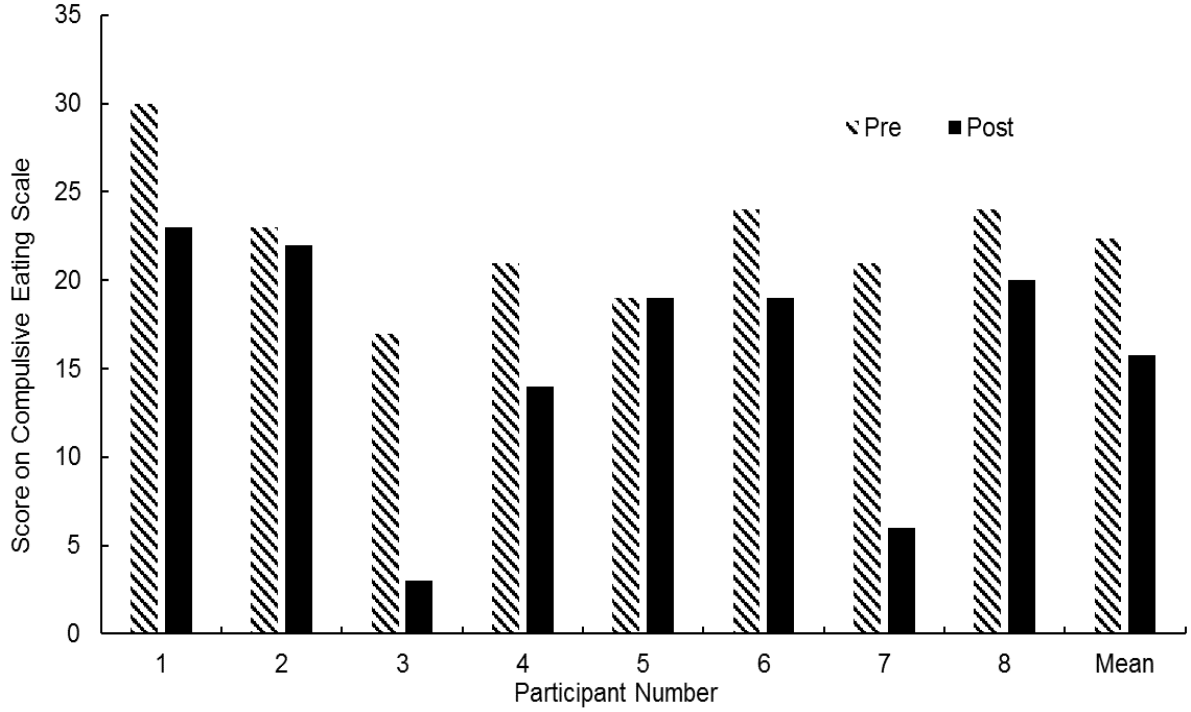

Figure 8. Pre- and post-intervention data for individual and means for the Compulsive Eating Scale across participants.

GHQ (General health questionnaire)

Figure 9 represents the pre- and post-intervention mean data and individual scores for the General Health Questionnaire, across the eight participants. High scores on the General Health Questionnaire represent low general health. The mean score for the pre-intervention data across participants was 6.75, while at post-intervention the mean score decreased to 4.38. Participants' data demonstrated a general trend of decreasing from pre- to post-intervention, with the exception of participant 4, 5, and 7, whose GHQ scores increased. This decrease indicated that overall general health decreased from pre- to post-intervention for these participants. Participant 5 showed the greatest increase in GHQ score, with 6 at pre-intervention to 16 at post-intervention.

At pre-intervention, participant 1 demonstrated the highest GHQ score (i.e., 14). In contrast participants, 3 and 4 demonstrated the lowest scores at pre-intervention with both reporting a score of 3. For post-intervention measures, participants 3 and 6 demonstrated the lowest score of 0, compared to participant 5, who demonstrated the highest score of 16. Participant 1 showed the greatest variation between pre- and post-intervention, with a difference of 12 observed, while participants 4 and 8 showed the smallest variance between pre- and post-intervention, with a difference score of 1 observed. There was found to be no statistically significant difference between the means for pre-intervention (*M = 6.75, SD = 3.99*) and post-intervention (*M = 4.38, SD = 5.93*) for the GHQ data; $t(7) = -0.94$, $p = 0.353$, $d = -0.35$.

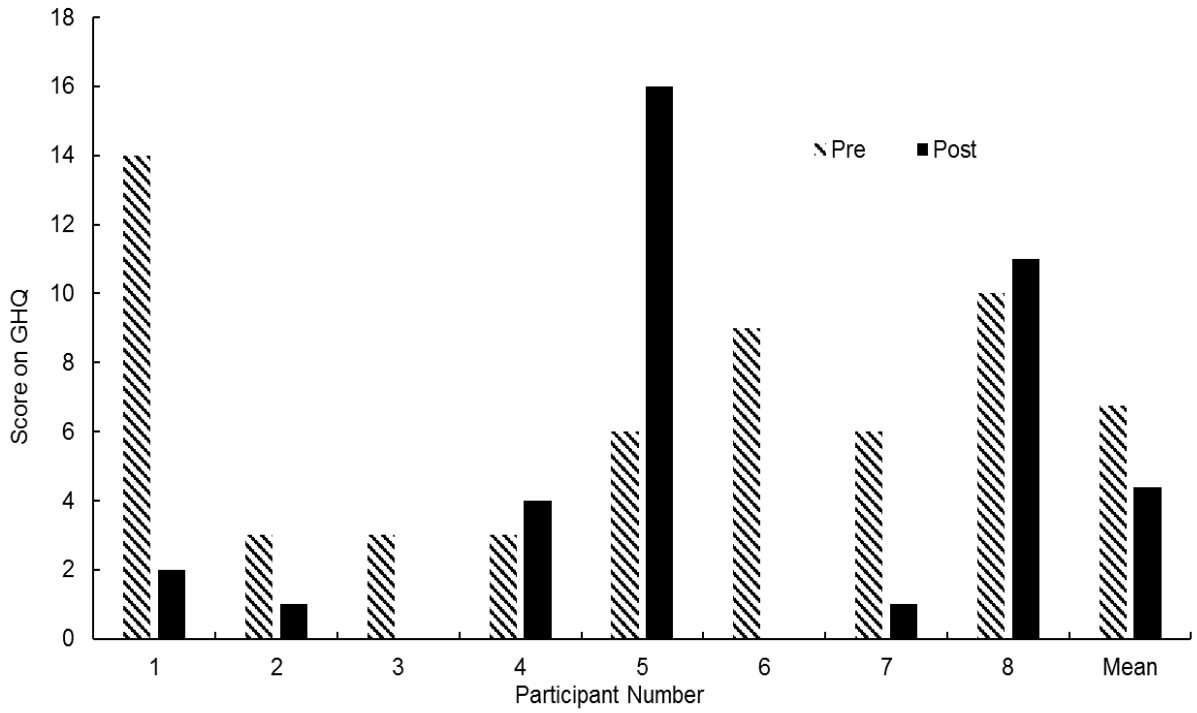

Figure 9. Pre- and post-intervention individual and mean scores on the General Health Questionnaire across participants.

MEAQ (Multidimensional experiential avoidance questionnaire)

Figure 10 displays the total individual and mean scores of the Multidimensional Experiential Avoidance Questionnaire, for pre- and post-intervention across participants. Higher scores on the MEAQ indicate higher levels of experiential avoidance. Figure 10 demonstrated a decrease in scores from pre- to post-intervention for all participants, with the exception of participant 5. Participant 5 showed an increase in experiential avoidance, with a score of 183 at pre-intervention to 193 at post-intervention. Participant 1 showed the greatest change in experiential avoidance, with a score of 212 at pre-intervention and 121 at post-intervention; this demonstrated a score difference of 91. The least reduction was observed with participant 6's data, with an experiential avoidance score of 204 at pre-intervention and 187 at post-intervention. For the pre-intervention data, participant 6 demonstrated the highest score of 228; while participant 3 demonstrated the lowest score of 134. Participant 5 demonstrated the highest score of avoidance with 193 observed at post-intervention, compared to participant 3 who demonstrated the lowest score of avoidance with 74 at post-intervention. The mean score of experiential avoidance at pre-intervention (*M* = 188.88, SD =30.26) was greater than at post-intervention *(M = 142.50, SD =*

43.34); this difference of -46.38 was found to be significant $t(7) = -3.820$, $p = 0.007$, $d = -1.35$.

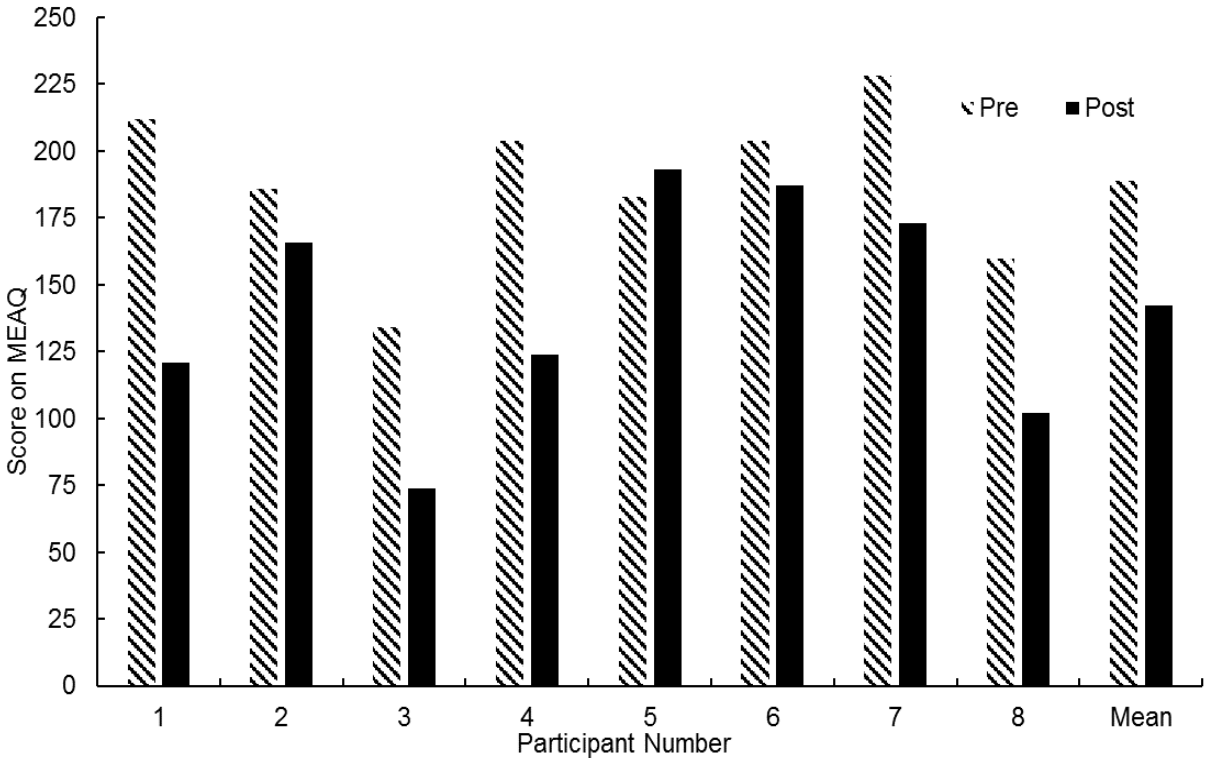

Figure 10. Total pre- and post-intervention individual and mean scores for Multidimensional Experiential Avoidance Questionnaire across

Figure 11 shows the score of each participant for the different sections of the MEAQ. The majority of participant scores, and the mean values for each section, with the exception of distress endurance, decreased from pre- to post-intervention. The mean values of distress endurance increased from 47.50 at pre-intervention to 52.75 at post-intervention. There were some exceptions to this trend; however; these were found in the data from participant 5 and participant 6. Participant 5 showed an increase in score from pre- to post-intervention for the behavioural avoidance, distress aversion, and procrastination sections. Participant 6 demonstrated an increase in repression and denial, with a pre-intervention score of 22 and a post-intervention score of 29.

For behavioural avoidance, participants 4 and 1 demonstrated the greatest change in scores, with both individuals showing a difference score of -18 between pre- and post-intervention. This was higher than the mean difference of 7.75. Participant 6 showed the least change in behavioural avoidance, with a difference score of 2 between pre- and post-intervention. Only participant 5 showed an increase in behavioural avoidance from pre- to post-intervention, with a score of 34 at pre-intervention and 37 at post-intervention. The mean behavioural avoidance score for pre-intervention was 33.88; this reduced at post-intervention to 26.13.

The data from the distress avoidance section demonstrated participant 4 displayed the biggest change, with a difference of -23 between pre- and post-intervention scores. The smallest change was observed in the data of participant 2, who displayed a difference of -2 between pre- and post-intervention. Similar to behavioural avoidance, only participant 5 showed an increase in distress avoidance from pre- to post-intervention, with a difference score of one (i.e., 40 at pre-intervention, and 41 at post-intervention). For the distress endurance section, the mean at pre-intervention was 42.75, compared to post-intervention, which decreased to 32. The mean difference between pre- and post-intervention for distress avoidance was the highest of all the sections at -10.75.

For the procrastination section, all participants demonstrated a decrease in score from pre- to post-intervention, with the exception of participant 5, who demonstrated an increase. Participant 3 showed the biggest change in procrastination from pre- to post-intervention, with a difference score of -13, compared to participant 1, who presented the smallest change with a difference

score of -2. Participant 5's procrastination score increased from 20 at pre-intervention to 23 at post-intervention. At pre-intervention, the mean for procrastination was 21.38, compared to 15.75 at post-intervention.

The results of the distraction and suppression section demonstrated that all the participants decreased in distraction and suppression scores from pre- to post-intervention. The participant with the greatest change from pre- to post-intervention was participant 8 with a difference score of -17, and participant 1 with a difference score of -16, compared to participant 7 who displayed the least change with a difference score of -1. The mean for distraction and suppression at pre-intervention was 27; this decreased to 19 at post-intervention.

All participants showed a decrease from pre- to post-intervention for the repression and denial section, with the exception of participant 6, who demonstrated an increase. The biggest change in repression and denial was observed in the data of participant 1, who displayed a difference of -18 between pre- and post-intervention, compared to participant 5, who showed the least change with a score of -1. Participant 6 showed an increase in repression and denial from 22 at pre-intervention to 29 at post-intervention. The mean score for repression and denial at pre-intervention was 34.38; this decreased to 25.13 at post-intervention.

The trend for distress endurance revealed that the majority of participants displayed an increase in distress endurance from pre- to post-intervention, with the exception of participants 2, 4, and 5. Higher scores on the distress endurance section demonstrated a higher rate of persevering when experiencing discomfort or distress (Hunt, Cooper, Hartnell, & Lissek, 2017). The participant who

demonstrated the biggest change in distress endurance from pre- to post-intervention was participant 1, with a difference score of 19, compared to participant 4, who showed the smallest change with a difference score of 0. Participant 5 showed the greatest decrease in distress avoidance between pre- (i.e., 44) and post-intervention (i.e., 37). The mean for distress endurance across participants at pre-intervention was 47.50; this increased to 52.75 at post-intervention.

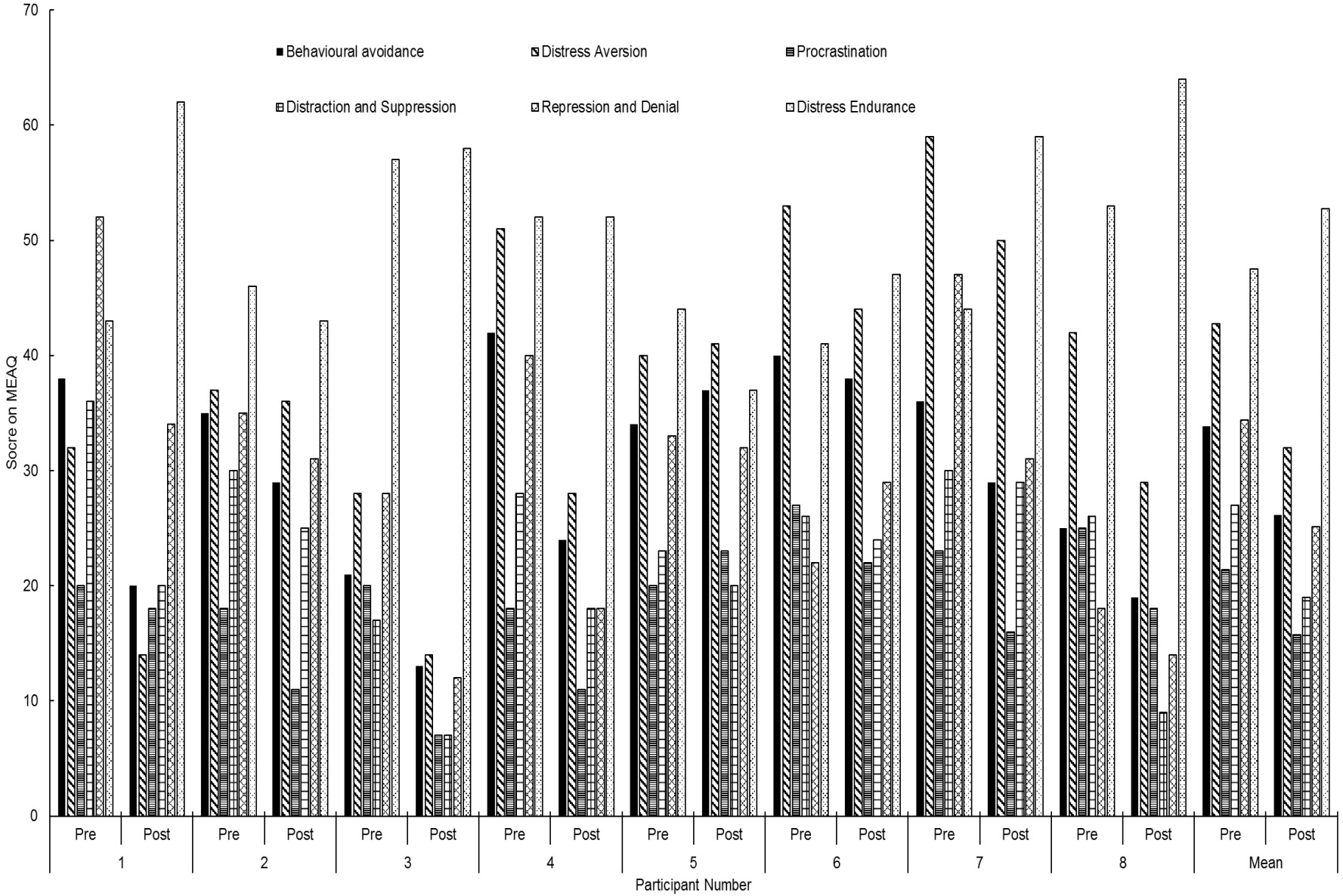

Figure 11. Pre- and post-intervention individual and mean data across participants for each section of the Multidimensional Experiential Avoidance Questionnaire.

Value progression

Figure 12 shows the individual and mean value progression scores at pre- and post-intervention across participants. The mean score of value progression at pre-intervention was 19.75; this increased slightly to 22.75 at post-intervention. Based on the trend of the graph, increases in value progression were observed for all participants, except for participants 5 and 6. Participants 5 and 6 showed a decrease in value progression from pre- to post-intervention of -1 and -2 respectively. Participant 7 showed the greatest variance of value progression scores between pre- and post-intervention, with progression scores of 18 at pre-intervention and 27 at post-intervention, while the lowest variation was seen for participant 5, with a difference of 2 between pre- (i.e, 23) and post-intervention (i.e., 22). With regards to the pre-intervention scores, participant 1 demonstrated the lowest progression score of 15, while participant 5 showed the highest score of 23. At post-intervention participant 7 demonstrated the highest value progression score of 27, while participant 6 demonstrated the lowest score of 17. There was found to be difference between the means of pre-intervention (*M = 19.75, SD =2.55)* and post-intervention (*M = 22.75, SD = 3.11)* that approached significance; $t(7) = 2.34$, $p = 0.052$, $d = 0.82$.

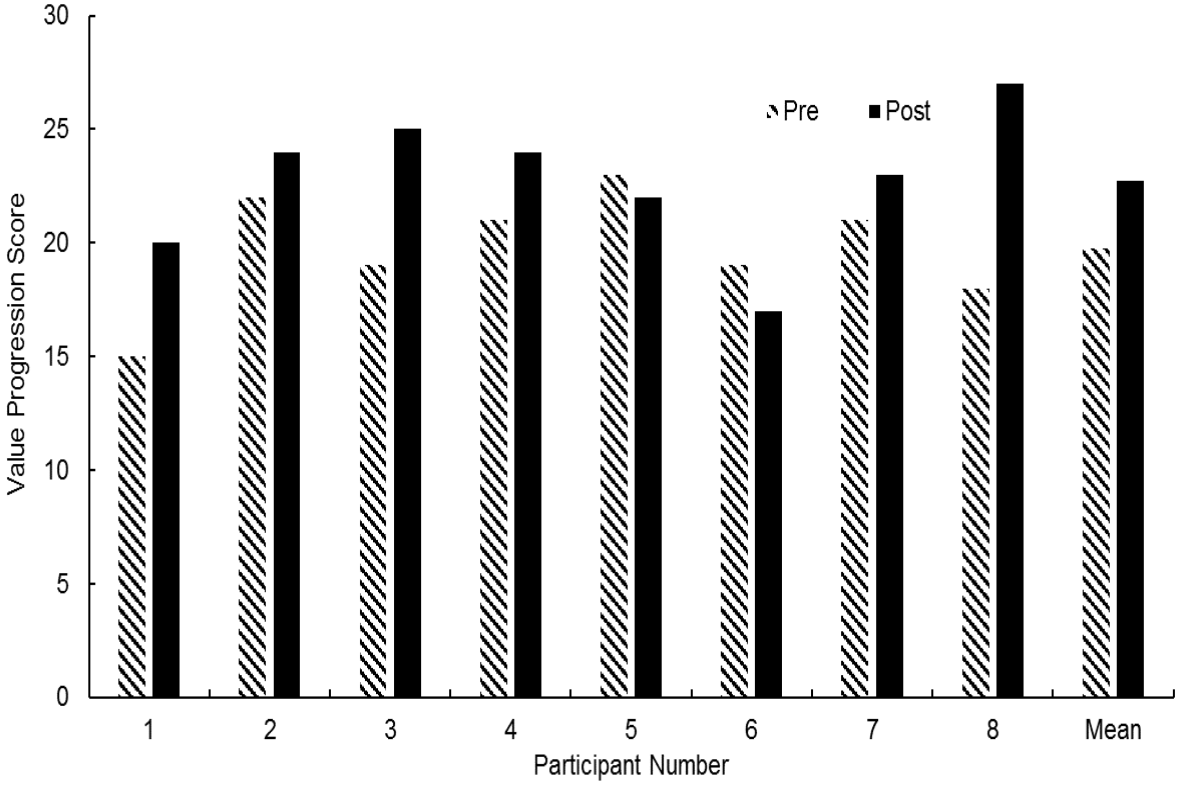

Figure 12. Value progression individual and mean data for pre- and post-intervention across participants.

Value obstruction

Figure 13 represents the value obstruction scores between pre-and post-intervention for individual and mean data across participants. The mean score for value obstruction at pre-intervention was 14; this decreased to 8.38 at post-intervention. On average, there was a reduction in value obstruction for the majority of participants; however, contrary to this trend, participant 5 demonstrated an increase in value obstruction. At pre-intervention, participant 5 showed a value obstruction score of 13, compared to 23 at post-intervention. Participants 1 and 8 showed the greatest change in value obstruction from pre- to post-intervention; both participants demonstrated a difference of -12 in obstruction scores. Similar results were also seen in the data from participant 7. At

pre-intervention their value obstruction score was 19, compared to 8 at post-intervention; this reduction demonstrated a difference score of -11. At pre-intervention, participants 1 and 7 showed the highest scores of value obstruction; with a score of 19, compared to participant 3 who demonstrated the lowest score of 3. Participant 5 showed the highest value obstruction score at post-intervention, with a score of 23, compared to participant 3 who showed the lowest score of 1. No statistically significant difference was observed in the means of value obstruction scores from pre-intervention (*M = 16, SD =3.69)* to post-intervention (*M = 9.57, SD = 6.63*); $t(7) = -2.13$, $p = 0.071$, $d = -0.75$.

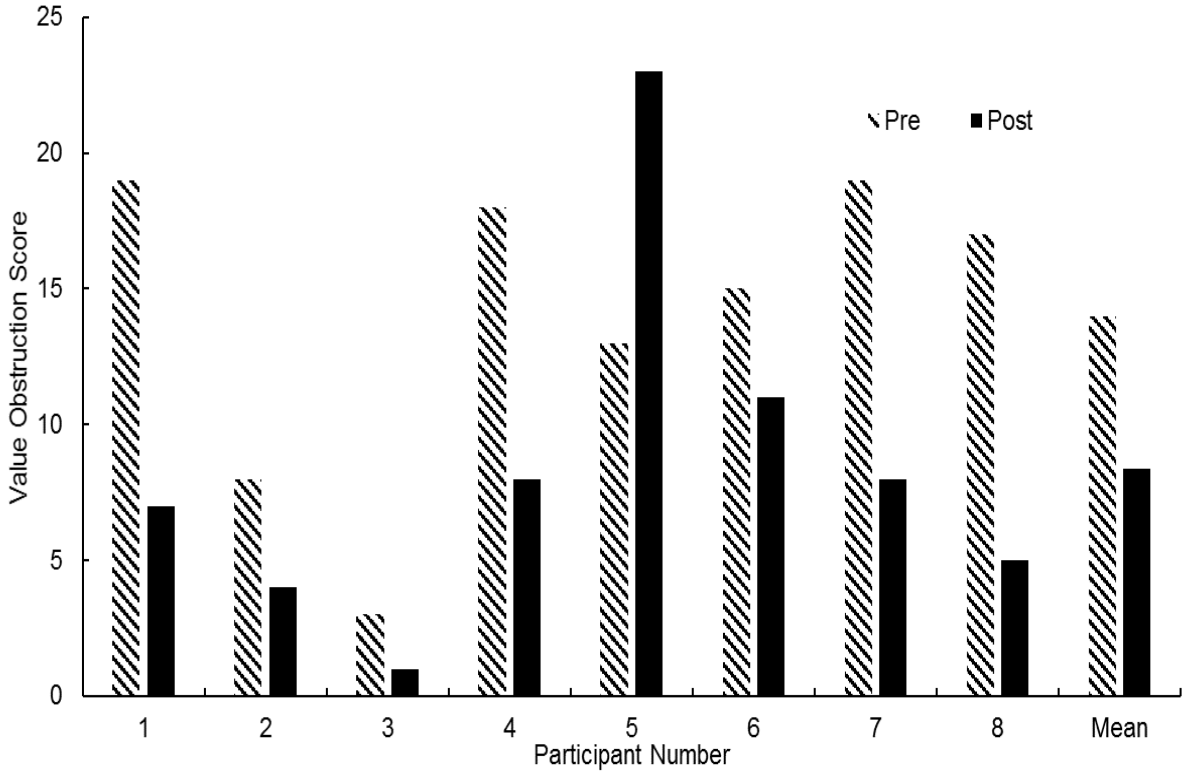

Figure 13. Value obstruction individual and mean data for pre- and post-intervention across participants.

BMI (Body mass index)

Figure 14 represents the individual BMI values for participants 1, 3, 4, 5, 6, and 8, as well as the mean data, between pre- and post-intervention. The mean

value for BMI at pre-intervention was 33; this increased to 33.8 at post-intervention. Based on Figure 14, three of the six participants (i.e., participants 3, 4 and 6) demonstrated a decrease in BMI between pre- to post-intervention. In contrast, participants 5 and 8 demonstrated an increase in BMI from pre- to post-intervention, while participant 1 demonstrated no change between pre- and post-intervention. Participant 8 demonstrated the greatest change (i.e., increase) in BMI from pre- to post-intervention, with a BMI of 36.2 at pre-intervention, and 41.9 at post-intervention. Participant 8 showed the highest BMI at pre- and post-intervention, with a BMI of 36.2 and 41.9, respectively. Participant 4 showed the greatest reduction of BMI from pre- to post-intervention, with a BMI of 35.7 at pre-intervention and 34.7 at post-intervention.

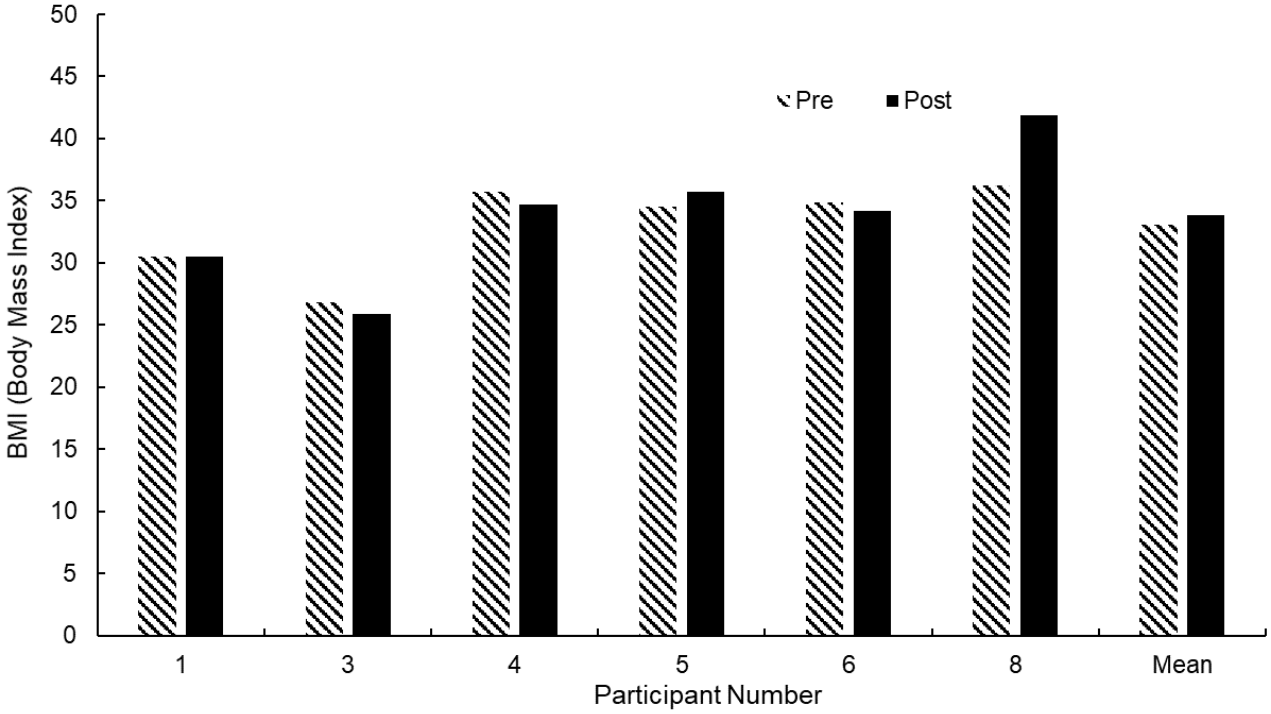

Figure 14. Individual and mean BMI data for pre- and post-intervention with participants 1, 3, 4, 5, 6 and 8.

Journal entry (unhealthy eating behaviours)

Figure 15 displays the self-reported journal entries for unhealthy eating behaviour across participants, for the pre-intervention and post-intervention data. The pre-intervention data was the average of the final four baseline entries, while the post-intervention data was the average of the last four journal entries of the intervention phase. The mean for the self-reported unhealthy eating behaviours at pre-intervention was 2.75; this decreased to 0.98 at post-intervention. All of the participants demonstrated a decrease in self-reported unhealthy eating behaviours from pre- to post-intervention. At pre-intervention, participant 7 showed the highest score of 6, compared to participant 6 who reported the lowest score of 0.5. At post-intervention participant 8 demonstrated the highest score (i.e., 2), in comparison to participants 3 and 6 who demonstrated the lowest score at post-

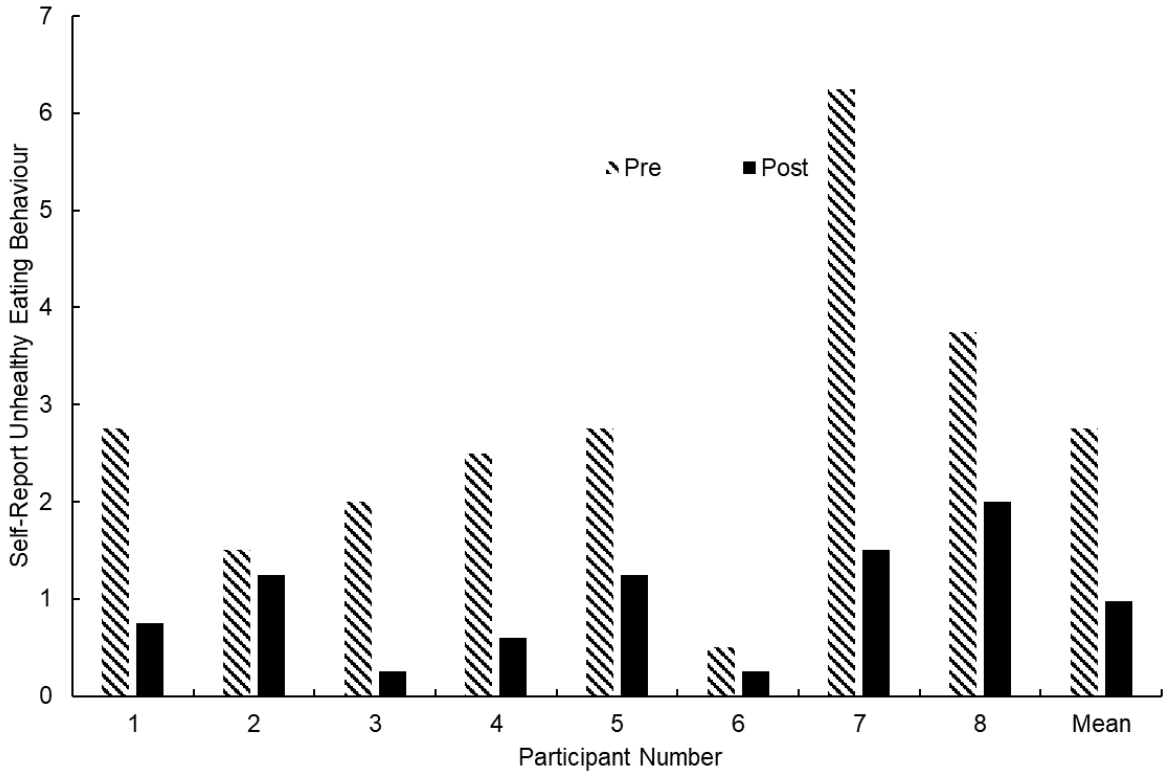

Figure 15. Pre- and post-intervention individual and mean data across participants for self-report unhealthy eating behaviour.

intervention both with both having displayed scores of 0.25. Participant 7 showed the greatest reduction of self-report unhealthy eating behaviour between pre- and post-intervention, with a score of 6.75 and pre-intervention and 1.5 at post-intervention.

Journal entry (experiential avoidance)

Figure 16 presents the pre- and post-intervention scores for self-reported experiential avoidance behaviour, across the participants. Similar to the data from Figure 15, the pre-intervention scores were averaged over the final entries from the baseline phase, while the post-intervention scores were the average from the last four entries of the intervention phase. The mean for self-reported experiential avoidance at pre-intervention was 2.45; this decreased to 1.31 at post-intervention.

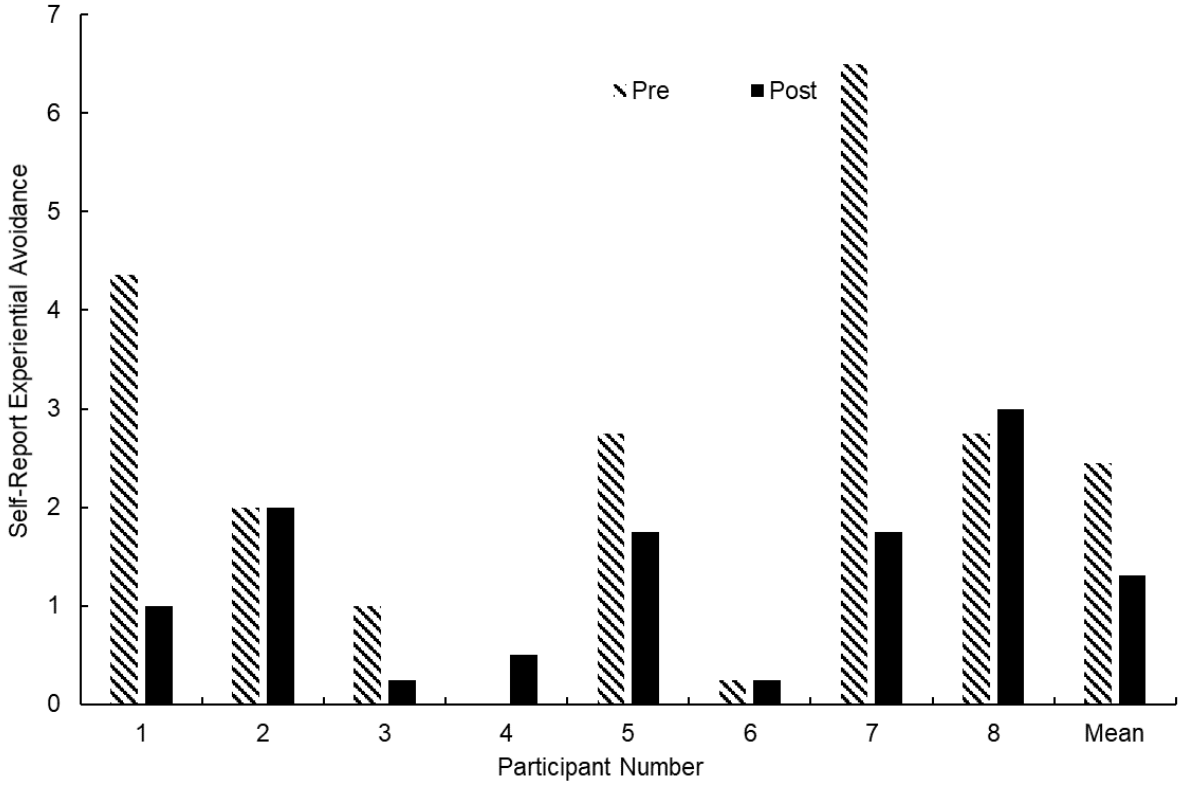

Figure 15. Pre- and post-intervention individual and mean data across participants for self-report experiential avoidance behaviour.

Four of participants demonstrated a decrease in self-reported experiential avoidance from pre- to post-intervention; these were participants 1, 3, 5 and 7. Participants 2 and 6 demonstrated no change from pre- to post-intervention, while participants 4 and 8 revealed an increase between pre- and post-intervention.

Similar to the self-reported unhealthy eating behaviours results, participant 7 presented the highest score of self-reported experiential avoidance at pre-intervention with a score of 6.5. At post-intervention, participant 8 demonstrated the highest score of 3. Comparable to the data displayed in Figure 15, participant 7 demonstrated the greatest decrease in self-reported experiential avoidance with a score of 6.5 at pre-intervention and 1.75 at post-intervention, showing a decrease of -4.75.

Discussion

General Results and Explanation

The goal of the present research was to evaluate the efficacy of a self-help ACT-based intervention as a method to decrease experiential avoidance and emotional eating/compulsive eating. The hypothesis was that the combination of the Happiness Trap and the companion mobile application (i.e., ACT companion) would produce a reduction in experiential avoidance and emotional/compulsive eating.

Experiential avoidance

Reductions in both experiential avoidance and emotional/compulsive eating were observed across the means of the participants between pre- and post-intervention. At pre-intervention, the mean experiential avoidance across participants was 188.88 compared to 142.50 at post-intervention, as measured by the MEAQ. Furthermore, all the participants' scores for experiential avoidance based on the data of the MEAQ decreased from pre- to post-intervention with the exception of participant 5. The different data for participant 5 could be due to a lack of engagement with the intervention. This is a possibility as this engagement data was not directly recorded. With the other participants, this reduction in experiential avoidance could be connected to the emphasis of ACT on teaching techniques designed to decrease avoidance behaviours and to bring about awareness of the processes that underpin the avoidance behaviour. Indeed, defusion, mindfulness, and acceptance are all core components in ACT.

Furthermore, the Happiness Trap places a great emphasis on teaching these techniques, such as realising when the reader is experiencing experiential avoidance, defusing from their thoughts/feelings, and seeing these only as information that is useful as a means to guide behaviour towards values. While the Happiness Trap places an emphasis on teaching these skills, the ACT companion mobile application emphasises putting these skills into practice. Therefore, it is not possible to know with complete certainty which of these factors is the cause of the reduction in experiential avoidance.

One aspect that should be mentioned when discussing experiential avoidance is the observed differences between the means of the pre and post measures and the baseline and intervention measures. The baseline and intervention measures from the journal entries did not reveal any statistically significant differences between the means. Conversely, significant differences were observed in the means of the MEAQ data from pre- to post-intervention. This difference could be due to a lack of internal validity of the journal entries regarding self-reported experiential avoidance.

For this measure, experiential avoidance was recorded by asking participants about the amount of experiential avoidance they exercised during the previous day. Misinterpretation of the term ‘experiential avoidance’ by the participants may have resulted in inaccurate reporting of the information. This could mean that the recordings of each measure (i.e., journal entries and MEAQ) may have recorded different constructs. Additionally, some participants were inconsistent with experiential avoidance journal entries, this led to missing data points, which, possibly, impacted the mean results across participants. Another

possible explanation is that participants were able to complete the journal entries at their leisure. Therefore, they may have completed a bulk of the journal entries at once. This would mean that the data would not be a true reflection of their experiential avoidance on a day by day basis. Based on these hypotheses it is likely that the MEAQ provides a more accurate representation of experiential avoidance, with detailed results across multiple facets of the construct.

Emotional eating behaviours

This reduction in experiential avoidance is interesting when considering the results from the compulsive eating scale in that there was a significant reduction in the mean compulsive eating between pre- and post-intervention across participants. This is important to note as the CES was used to measure self-reported binge eating/emotional eating behaviour. The fact that a statistically significant difference was observed in the mean scores from pre- to post-intervention, supports the use of the Happiness Trap and ACT companion as possible effective interventions for reducing binge eating behaviour. In fact, results for the CES indicate that the scores regarding reported compulsive eating decreased for every participant from pre- to post-intervention with the exception of participant 5 who demonstrated no change. It is possible that the reduction in experiential avoidance indirectly caused a decrease in binge eating behaviour. This could be due to binge eating acting as an avoidance behaviour for negative affect and thoughts. Therefore, participants' avoidance behaviour may have decreased through the understanding of experiential avoidance and emphasising the development of techniques to aid acceptance as explained in the Happiness Trap.

Another reason for this change in compulsive eating could be the opportunity that the participants had for learning about acceptance and defusion behaviours and becoming increasingly aware of the avoidance behaviour cycle. This could have led to a decrease in binge eating/compulsive eating behaviour. The avoidance cycle occurs when an event/stimulus triggers an emotional response and then the individual engages in avoidance behaviour (i.e., binge eating behaviour) with the goal of reducing or escaping this emotional response. Through relational framing, this avoidance behaviour becomes linked with internal events (i.e., negative thoughts). Therefore, a reduction in avoidance behaviour could be due to the lower intensity emotional response from engaging in acceptance and defusion. In this way, the acceptance and defusion behaviours could act as alternative modes of behaviour to the avoidance behaviour as a method to reduce the intensity of the emotional response. The ACT companion mobile application may have provided the individual with the necessary opportunity to practice and gradually build acceptance, skills; when the individual was in a neutral emotional state and in an environment that lacks punishers or negative consequences of engaging in the acceptance behaviour.

Another explanation for the reduction of reported emotional eating behaviour could be the concept of mindfulness. If participants were mindful when eating, then they may have discovered that in fact, they were not hungry and recognised that they were using eating as an emotional avoidance tactic. By reading the Happiness Trap and practising mindfulness the participants may have inadvertently begun to alter their rule-governed behaviour surrounding the presence of the stimulus of food from being an avoidance tactic (i.e., negative reinforcer for the negative affect or negative emotion) into a positive reinforcer.

Furthermore, the results of the journal entries regarding unhealthy eating behaviour also indicated a decrease in unhealthy eating behaviour for five of the eight participants. Participants 2, 5 and 6 did not register such reduction in unhealthy eating behaviour. According to the self-reported journal entries, there was a significant reduction in the mean unhealthy eating behaviours from pre- to post-intervention. The self-reports were recorded daily and, therefore, could provide more consistent data regarding unhealthy eating behaviour. However, the validity of this measure has not yet been tested.

One reason for the differences recorded between these two measures (i.e., CES and journal entries of unhealthy eating behaviour) with regards to participants 2, 5 and 6 could be that the term ‘unhealthy eating behaviour is vague and was not clarified for each of the participants. It was left to the participants to decide whether their behaviour in eating was unhealthy. So, some of the participants may have understood this in terms of consumption of food that was perceived as unhealthy or in terms of larger or smaller portion sizes or not eating rather than using food as avoidance. It needs to be stated that this measure was designed by the researcher and, therefore, the validity of the measure has not been assessed. However, the significant difference reported from pre- to post-intervention could have been the result of a reduction of avoidance behaviour, thus the reduction of negative affects or thoughts may be a function of the reduction in eating behaviour.

BMI

Based on the results of the CES and the journal entries regarding unhealthy eating behaviour, it is of interest to compare the pre- and post-

intervention BMI of the participants. The mean for BMI data at pre-intervention was 33 compared to 33.8 at post-intervention with no statistically significant differences observed. Of the six participants who provided BMI data, only half of the sample (i.e., three) registered any decrease in BMI between pre- and post-intervention. Two participants showed an increase and one participant did not register any change. This leads to the conclusion that the intervention did not produce a significant change in BMI, which indicates that there may be more mechanisms besides emotional eating and experiential avoidance at play in weight loss. However, it should be noted that this data was collected from only six of the eight participants, as some participants did not feel comfortable supplying this data. Furthermore, these BMI data do not record the trajectory of weight gain before the intervention. It is possible that before the intervention the participants were experiencing a greater rate of increase in weight and that rate decreased after the intervention. Moreover, these BMI data were self-reported and, therefore, may not be an accurate measure of BMI.

Value data

Another aspect that is of interest to discuss is the results of value progression and value obstruction. Value progression data was seen to increase from pre- to post-intervention in case of seven of the eight participants, and this change was found to approach significance. One reason for its not achieving significance could be the order of the content in the Happiness Trap book. The first part of the Happiness Trap details the understanding of the process of mindfulness and experiential avoidance, and the latter part leads to the understanding of values and value orientated behaviour.

Because the period of the intervention was short and significant information regarding the participant's engagement with the intervention was lacking, it is possible that the participants did not reach that segment of the intervention regarding value orientated behaviour and, therefore. may have lacked the skills to put the intervention process into practice. However, there was a change observed in value progression that did approach significance, which could have been on account of the participants engaging in the exercises in the ACT companion that were aimed at imparting skills to increase value orientated behaviour and the understanding of how to put these skills into practice.

It is interesting to note that the analysis of the value obstruction data shows that self-reported value obstruction score at pre-intervention was 14 relative to 8 at post-intervention, across participants. However, this change was not significant. The small sample of eight participants could be a reason for the insignificance of the findings regarding value obstruction. All the participants except participant 5 showed a decrease in value obstruction data. It is possible that with a large sample a significant finding may result.

Another reason for the lack of significance of these findings could be the short time frame of engagement with the intervention that the participants were given. Even though value progression and value obstruction showed a decrease, it is possible that the participants were still experiencing avoidance behaviour, but to a lesser degree. Therefore, the participants may have noted a decrease in value obstruction with the addition of mindfulness, acceptance, and defusion, but may still have been engaging in some form of avoidance behaviour that, possibly, led

to value obstruction. This, in turn, could have resulted in the lack of significance regarding a decrease in value obstruction.

Furthermore, the reported decrease in value obstruction could be the result of obstruction behaviours manifesting as avoidance behaviours. The decrease in experiential avoidance behaviour could indirectly decrease value obstruction behaviour through a combination of acceptance and cognitive defusion. The behaviours (i.e., acceptance and defusion) could aid the participants in accepting emotional responses that were acting as barriers for the value orientated behaviour and allow them to defuse from these thoughts and emotions, leading to a reduction in value obstruction behaviour.

Psychological flexibility

Indeed, the results of the AAQ from pre- to post-intervention support the idea that the mean for psychological inflexibility decreased significantly from pre- to post-intervention. In fact, all participants demonstrated a decrease in psychological inflexibility except participant 5.

Engagement with the intervention

One possible reason for this reduction in psychological inflexibility is that the participants are using the techniques and skills explained in the Happiness Trap. It would be expected that the further through the participants were with the intervention the greater improvement they would demonstrate in terms of a decrease in psychological inflexibility. Indeed this seems to be the case for the data from participants 2, and 6, as they reported completing 4 and 9 chapters respectively of the Happiness Trap, which was lower than the mean number of

chapters (i.e., 11) and showed the only a small change in psychological inflexibility, with both of the participants scoring below the mean. However, this measurement of engagement might not be extremely accurate. This is evident in the data from participant 5, who reported completing 12 chapters (i.e., the third highest of the eight participants), but demonstrated the least change in psychological inflexibility, with their psychological inflexibility score showing to increase. Therefore, this method of engagement may not provide accurate data for the engagement with the intervention.

Comparing to Previous Research

Self-help

The results of the present research agree with that of Järvelä-Reijonen et al. (2018), in that the combination self-help ACT intervention (i.e., Happiness Trap and ACT companion) yielded promising results for reducing experiential avoidance and unhealthy eating behaviours. The present research utilised a multiple baseline design, therefore, this design could provide more complete information about the rate of unhealthy eating behaviour and experiential avoidance over time. However, this data was subjective and the internal validity of these measures has not been tested. Levin et al. (2018) study also support the results of the present research regarding a decrease in emotional eating following a self-help ACT intervention. Their results are similar to the present research in terms of a decrease in experiential avoidance. However, Levin et al. (2018) also found a decrease in BMI, which the present study did not find. This will be discussed further below.

The present study also found a decrease in psychological inflexibility. This is similar to the results of Räsänen et al. (2016) who reported a decrease in psychological inflexibility and an increase in the overall wellbeing following a guided self-help ACT intervention. Since the manner of intervention for all these studies was not the same, it is unclear as to what aspects make the intervention effective.

Given that each of these studies, including the present research, used different methods for the self-help ACT intervention and a variety of different measures for recording unhealthy eating behaviours and psychological inflexibility, yet they reported similar findings of reduction in unhealthy eating behaviours and psychological inflexibility. It indicates that the processes of ACT show potential for generalising across a range of self-help modalities. The intention of ACT is to increase psychological flexibility through an understanding of the six main principles and practising a variety of techniques regarding acceptance, defusion and mindfulness. Therefore, if the mode of intervention communicates these ideas to the participant or the client, then it is likely that they will be able to put those ideas into practice to achieve a reduction in psychological inflexibility and an increase in value orientated behaviour.

The combination of both the book, Happiness Trap, and the mobile application-based intervention used in the present study may have shown greater effectiveness in reducing experiential avoidance and psychological inflexibility. This could have been due to the mobile application giving the participants the opportunity to observe and track their progress regarding avoidance and value orientated action, with additional reminders of goals and to practice defusion and

acceptance techniques. These reminders may have served as stimuli for the exercise of mindfulness and value orientated behaviour. Indeed, as Räsänen et al. (2016) found, the use of internet-based ACT intervention does seem effective in improving quality of life and decreasing experiential avoidance. This behavioural change may arise from having constant access to intervention. Therefore, if individuals started to experience negative affect and other undesirable thoughts and feelings, they would have the option of accessing the mobile application and utilising the practices of defusion, mindfulness and acceptance.

ACT (obesity and food cravings).

The findings from the literature survey would indicate that a reduction in emotional eating would lead to a decrease in BMI. However, the present study did not record any significant decrease in BMI from pre-to post-intervention. In fact, some participants showed an increase in BMI. This is contrary to the research by Lillis et al. (2009) who observed a decrease in BMI and psychological inflexibility following a 1 day ACT workshop. This difference between the findings of the present research and that by Lillis et al. (2009), could due to the difference in methodology of intervention. The present study relied on the participants' self-reported information on which chapter of the book the participants had completed and the feedback sheet in which they recorded how useful they had found the intervention. Therefore, an independent record of how much the participants engaged with the follow-up was not made. Also, the BMI was recorded from self-reports of the participants; therefore, these results of BMI may not be fully objective. Conversely, Lillis et al. (2009) conducted a 1-day workshop with a workbook with a three-month follow-up. Therefore, in the

workshop, the participants may have engaged more with the intervention and could be taught techniques and strategies, which they could implement when experiencing negative affect or thoughts. Moreover, during the workshop, the participants could have the opportunity to practice the techniques and ask questions to clarify their doubts regarding the processes involved to solidify their understanding. The participants in the study by Lillis et al. (2009) had also completed a weight loss programme before the intervention and, therefore, may have developed positive habits regarding eating and exercise.

Further evidence of this difference in BMI is seen when comparing the present research to that by Fard et al. (2016). Their study also utilised an ACT intervention for obesity, which demonstrated a decrease in BMI. Their study consisted of eight 90-minute face-to-face sessions. This design for their study probably offered the participants the opportunity to practice techniques and skills and receive some feedback. Also, the participants could also be challenged regarding fusion with thoughts and beliefs about themselves. This would mean that they could be taught strategies and techniques to decrease cognitive fusion and experiential avoidance, that could result in a decrease in emotional eating, which would facilitate a decrease in BMI. The differences regarding the BMI between the two above studies and the present research seems to be due to a deficit in recording engagement with the intervention and the lack of an objective method for recording BMI data.

In the present research, self-reports of emotional eating behaviours showed a decrease over the course of the intervention period in both the results from the journal entries and CES. This is concept is similar to the reduction of

food craving explored by Forman et al. (2007). Their study found that individuals with previously high craving (craving defined as a strong desire for a specific food, which is generally associated with anxiety, dysphoric mood, and decrease in quality of life) (Forman et al., 2007, p. 2) demonstrated a significant decrease in food craving following a 30-minute ACT intervention.

While these results from the present research and that by Forman et al. (2007) are not explicitly the same, based on the literature there does seem to be a link in that both display a reduction in eating behaviour following an ACT intervention. This decrease considered from the perspective of food being an avoidance mechanism for negative affect and thoughts. Therefore, it interesting that both of these measures demonstrated a decrease in food craving following a self-help ACT intervention, which provides further support for the self-help ACT interventions for decreasing avoidance behaviour with regard to eating. However, as previously stated in the present study, the term unhealthy eating behaviour was not specifically explained to the participants by the researcher, and therefore it is unclear as to what interpretation of this concept the participants had while making the journal entries to record this parameter. However, the results of the CES do seem to support the research by Forman et al. (2013).

Avoidance theory

When assessing the overall results of the MEAQ from a theoretical point of view, it can be observed that all components of the MEAQ other than distress endurance decreased from pre-to post-intervention, in combination with

compulsive eating behaviour. This does seem to indicate that eating behaviour does function as a form of avoidance behaviour, whether it be behavioural avoidance, procrastination, suppression or denial/repression. Therefore, with the emotional eating behaviour being accepted as avoidance behaviour, the hypothesis of binge eating/emotional eating behaviour being a function of experiential avoidance appears to be the most probable hypothesis, (Kingston et al., 2010).

Moreover, in the present study, the AAQ was used to measure psychological inflexibility with a focus on experiential avoidance. Based on the research by Roemer et al. (2008), it was expected that changes in acceptance behaviour would decrease avoidance behaviour and thus decrease reported emotional eating behaviour. The results of the present research support the concept that higher rates of reported emotional eating observed at the baseline and pre-intervention, along with higher rates of experiential avoidance, suggested a low level of acceptance. In comparison, the results observed at post-intervention that is lower rates of experiential avoidance associated with lower rates of emotional eating behaviours suggested a higher level of acceptance. This furthers the idea that acceptance (i.e., a reduction in experiential avoidance) did lead to an indirect change in reported emotional eating behaviour. This could reflect the findings of Hayes et al. (2006) in that the function of the acceptance behaviour is to reduce the intensity of the negative affect or thoughts, and this is maintained through the reduction of the intensity of these events. This rise in acceptance behaviour possibly leads to increasing the exposure of the individual to the negative affect and, thereby, leading to a reduction in avoidance behaviour.

Values data analysis

Another interesting idea to evaluate is the improvement of overall wellbeing following the self-help ACT intervention. The results from the value progression data indicate that all participants except for participant 5 showed an improvement in self-reported value progression from pre-to post-intervention. However, this change was not significant. This is contrary to results found by Lillis et al. (2009), where a 1-day ACT workshop produced improvements in quality of life and psychological distress. This lack of significant change may have been caused by the small sample size of eight participants.

For the present study, the mobile application had exercises in setting goals for value orientated behaviour, with additional reminders about goals and the values underlying these goals. These reminders may have caused the participants to experience a small increase in value orientated behaviour from an improvement in goal setting. However, as previously mentioned, the value development section in the Happiness Trap are explained at the end of the book. Therefore, the participants may not have reached that stage in the course of the intervention. Therefore, they may not have engaged with the process of understanding those values and, therefore, showed a lack of significant improvement in value orientated behaviour.

It should be noted that this reduction of experiential avoidance could also reflect a decrease in value obstruction, which could lead to a small increase in value orientated behaviour. The value obstruction data seems to support this idea because value obstruction decreased for all participants with the exception of participant 5 from pre-to post-intervention. It is possible that this improvement in

the quality of life reflects a decrease in experiential avoidance. This seems to be in line with the research by Lappalainen et al. (2014) as they found that a self-help ACT intervention increased the quality of life, and caused a decrease in psychological inflexibility.

Limitations

The present study does indicate that a combination of the Happiness Trap and the ACT mobile companion application did result in a significant decrease in emotional eating behaviour through the indirect reduction of experiential avoidance. However, there are some limitations that need to be addressed when discussing these results. These are outlined below.

Control over environmental contingencies

The first and foremost limitation was that by the nature of the study; it is uncertain whether the intervention alone was the only cause for the reported change in behaviour. Although it was not possible to control for all external environmental contingencies governing the participants' behaviour, the design of the present study provided the advantage of minimising the effects the external environmental contingencies on the collected data and enabled the clear observation regarding behavioural change in each participant. Since measures of experiential avoidance and unhealthy eating behaviours were recorded frequently (three times a week), the trends, if any, regarding the effectiveness of the intervention were easily observable in the data entered by the participants. Also, the multiple-baseline design included a baseline measure which provided data prior to the implementation of the intervention (i.e., a control), which allowed for a clear comparison between the baseline data trend and that of the intervention.

Furthermore, the timeframes of the baseline and intervention phases were varied among the participants in an attempt to control the effects of external variables and to account for the influence of chance factors in assessing the effectiveness of the intervention. Therefore, through a combination of these advantages, the design of the present study allowed a clearer representation of the change in the individual's behaviour to emerge through the experiment. However, the use of even this design has not remedied the variety of limitations in the control over various environmental contingencies in this present study.

First, the only criterion for choosing a participant in this study was that the participants must be experiencing issues of emotional eating behaviour. The existence of this issue was not clinically tested; it was self-reported by the participants. Those who were currently undergoing psychological intervention for emotional eating behaviour were excluded. However, there was no control over the other activities of the participants such as participation in weight loss management programmes, diet plans, therapy for other issues (i.e., depression, anxiety, etc.). Also, other changes in the participant’s lives may have influenced the changes in emotional eating, such as moving into a new neighbourhood, changing job/career, having kids, among others. Therefore, it is not possible to claim with any certainty that the current intervention was the only factor responsible for the change in the emotional eating behaviour.

Engagement with the intervention

The second major limitation was the inability to measure the participant’s engagement with the intervention. The participant’s access to the intervention was not monitored as such monitoring may cause the participants to drop out of the

program for the apprehension that the confidentiality of their sensitive information such as their thoughts, feelings, viewpoints, and so on would be compromised. These concerns over confidentiality prevented the monitoring and recording of the frequency or times the participants engaged with the intervention materials (i.e., the book and mobile application).

The only measures that were recorded were the total journal entries and the number of chapters that the participant had read. It is a possibility the participants may have reported reading a certain chapter but would have neglect to put the contents of that chapter into practice. Therefore, recording the chapter they had read might not have justified the assumption of their engagement with the material. The participant bias may have tempted the participants to provide false data regarding the number of chapters they had read. Even other factors such as embarrassment, shame, frustration, and so on may well have prompted the participants to report false data regarding the chapters finished. To account for the participant bias and these other factors, the participants were clearly informed they were not being evaluated based on the number of chapters they had completed. However, despite this, participant bias cannot be ruled out completely.

Furthermore, due to the privacy policy of Berrick Psychology, all the data that the participant recorded on the ACT companion was completely confidential and inaccessible even to the researcher. This confined the participant's recorded content regarding the completion of exercises or practising of techniques/skills within the app. However, after the termination of the intervention, the researcher collected the participants' feedback on the usefulness

of the mobile application and the Happiness Trap. Though, this feedback also may be affected by participant bias.

No objective behavioural measure

A further limitation is the lack of an objective behavioural measure for recording emotional eating. The journal entries for emotional eating were created by the researcher, therefore this measure may not possess strong internal validity. The compulsive eating scale has been demonstrated to have good internal validity and reliability placed at 0.85 as measured by Cronbach's alpha. However, this too is not an objective measure of emotional eating as it relies on the self-reporting by the participants. Since there was no gold standard objective measure for emotional eating in this research, one cannot be certain that the construct of emotional eating behaviour was measured.

Internal validity with journal entries

As previously mentioned, the journal entries regarding emotional eating and experiential avoidance could be imprecise measures. The term used in the journal entry was 'unhealthy eating behaviour' rather than 'emotional eating behaviour' because it was uncertain if the participants would clearly understand the concept of 'emotional eating'. Participants may have attributed the term 'emotional eating' to eating while experiencing any type of emotion rather than eating for emotional regulation. The use of 'unhealthy eating behaviour' may be criticised as being imprecise and, therefore, open to several different interpretations. It could have led the participants to conflate the term to include a variety of ideas such as unhealthy food, large portions of food that may be considered unhealthy or small portions of unhealthy food like chocolate, and

home-cooked meal as against takeaway food. This idea of measuring differing constructs might be relevant to the journal entries regarding experiential avoidance behaviour. The participants were explained the concept of experiential avoidance in detail at the initial interview and shown a video to illustrate the concept. The participants were also given the opportunity to ask questions to clarify their understanding of experiential avoidance. However, the participants may still not have clearly understood the meaning of experiential avoidance, a possibility that could result in their reporting a different measure.

Duration of the intervention

Another limitation is the short duration of the intervention. The intervention lasted for three months. This period may have been inadequate for the participants to understand and implement all the six components of ACT and led to their learning only certain aspects or skills from the first sections of the Happiness Trap (i.e., acceptance, defusion and mindfulness), and overlooking other components such as committed action and value progression. Such partial learning and implementation in the current research are evident from the significant decrease in the pre-and post-intervention means of experiential avoidance, which contrasts with the lack of significant results in value progression.

Moreover, the lack of follow-up on the present study is another limitation regarding the duration of the research. As the intervention focused on learning and practising the processes involved in ACT, so it would be expected that these changes in behaviour would sustain beyond the termination of the intervention. The sustenance of the results of this study over time has not been measured.

However, due to the lack of time, long-term follow up (i.e., for 3 months, 2 years, 5 years, etc.) to assess the long-term impact of the present intervention was not possible.

Two simultaneous interventions

The combined use of the Happiness Trap and the ACT companion mobile application in the intervention seemed to result in a decrease in emotional eating and experiential avoidance. It was a two-part intervention. Therefore, it is difficult to attribute the change in behaviour to any one part of the intervention with any certainty. The Happiness Trap book emphasises understanding and learning the processes of ACT, and the ACT companion mobile app focuses on practice and implementation of the techniques. The Happiness Trap book and the ACT companion mobile application, which is designed specifically to complement the contents of the book together form a treatment package. Therefore, it is unclear whether using either one or the other alone would result in an effective intervention for decreasing emotional eating behaviours.

Applications

While this current research is not without limitations, it does present a case for the intervention decreasing self-report emotional eating behaviours, through the indirect reduction of experiential avoidance. This has many applications both for future research and for the modern-day world.

Cost effective intervention

Probably the first and foremost outcome of this research is the potential for a cheap and effective intervention to change emotional eating behaviours. As

previously mentioned, traditional acceptance and commitment therapy costs on average around $150 (NZ) per session and the course of 10 sessions costs $1500 and a 40-sessions course would run to a high cost of $6000. The intervention proposed in this study could provide an effective alternative for changing emotional eating behaviours that comes at less than half the cost of a single session of traditional therapy. The present intervention could provide an effective alternative for many individuals and families who may find traditional therapy for emotional eating unaffordable. Furthermore, due to the nature of the intervention individuals could work through it at their own pace and schedule up a meeting with the therapist whenever a component or technique requires more understanding or practice.

Presence of the therapist

The present intervention may offer an option for the participant to optimise the time spent with the therapist. Traditional ACT involves the individual and the therapist working together through the current barriers that the client is experiencing in living a fulfilling life. The therapist and client then work through the processes of ACT with a major focus on teaching the client about the processes of ACT and about how to put the process into practice. There may be many aspects to cover in the space of one hour, and some clients may find it difficult to grasp some of these concepts quickly enough and prolong the intervention. This could be a limitation for a client who is financially restricted. The present intervention may provide an effective solution to the issue of timeframe because the client has the opportunity to learn and understand the processes of ACT, which enables the client to use the time spent with the therapist

optimally to put the processes into practice using a variety of techniques and skills.

Moreover, the timeframe available to meet with the therapist may prove as another limiting factor that the present intervention could address. There are many practical limitations for therapist-client meetings. The client's hours at work may not be suitable for such meetings for some clients who work at night and need the day for sleep and rest. With the present intervention, an individual in such a situation may not need to meet the therapist regularly. They could use the self-help intervention at times that suit them to understand the processes that enable them to live in a more value orientated manner.

Current intervention and guided self-help

In the manner described above, this intervention could be utilised with guided self-help. Therapist's guidance while using the present intervention could yield promising results for rapidly decreasing experiential avoidance. Initially, the individual could attend traditional face-to-face therapy at which point the therapist could provide the individual with the aids for the current intervention (i.e., The Happiness Trap and the ACT companion mobile application) and encourage the client to engage with the intervention outside of the therapy room. This would be beneficial on two counts. The present intervention could allow the client time to solidify the concepts and processes discussed during the therapy and also prompt the client to practice the techniques, which should speed up both the skills acquisition and provide a better understanding of the processes involved in ACT. For the therapist, it would provide more time for discussing new concepts, techniques and the current barriers for value orientated action. For example, if the

client is able to practice techniques such as mindfulness, and defusion, the client may be more willing to start with other behavioural activation tasks such as setting goals.

Widespread use of a self-help intervention

In conventional therapy, locating the therapist in the vicinity of the client is important because frequent interactions between the two are expected. Consider a client living on a farm in rural New Zealand/Aotearoa. This would limit the availability of a therapist. Furthermore, the client's lifestyle may restrict the interactions; in that their lifestyle might require the client to travel a long distance to meet the therapist. On the other hand, the present intervention provides a mechanism for widespread dispersal of ACT. It offers an effective alternative to clients who are in the situations described above. Also, since the present intervention seems to be is effective even over a relatively short period of time of three months, the client is likely to experience the desired behavioural changes within a short time period. This change in behaviour will likely encourage the client to continue using the techniques.

Teaching mental health techniques

ACT has been shown to be a useful intervention with a variety of mental health issues (such as depression, anxiety, negative body image, etc.). Therefore, exploring an inexpensive, effective and widespread intervention for these mental health issues is of utmost importance. The intervention was used in the present study to bring about change in self-reported emotional eating behaviour. However, as it is effective and inexpensive, it could serve as a potential treatment package for some of these other mental health issues. Though these mental health

issues have different underlying processes; however, from a behavioural psychology standpoint, many may have similar fundamental reasons or functions. As the above literature review shows, one shared aspect that some of these mental health issues possess is the presence of avoidance behaviours. The present self-help ACT intervention may prove effective for treating these mental health issues, especially with the use of ACT for developing the techniques and skills to reduce avoidance behaviour and increase value orientated behaviour. This could make a variety of mental health techniques available to the clients and enable them to improve overall wellbeing.

Weight management programs

Using the intervention as a method to teach mental health techniques of weight management is extremely important. The evidence revealed by the literature review shows that many individuals struggle to maintain the weight loss achieved through weight management programmes and leads people into trying diet plan after diet plan. This has been mentioned in the study by Sainsbury et al. (2018). They noted that 11% of participants were into their 10th or later attempt at losing weight. Indeed, when assessing the weight loss intervention programs of the past, there seems to be a lack of focus on developing positive mental health techniques. Therefore, by introducing a supplementary self-help ACT-based intervention into these weight management programs, the clients can be taught strategies and techniques to reduce avoidance behaviour (i.e., emotional eating and binge eating) and explicitly identify and understand values. This can facilitate the clients to move towards living a value orientated and meaningful lifestyle while learning to recognise and understand the processes involved in avoidance

and negative affect. This, in turn, could enable individuals to reframe their thought patterns about their weight and their eating habits from negative to neutral/positive.

Younger audience

Another possible application for the present research is for a younger audience, specifically in areas such as schools, and even in Juvenile Detention Centres. These are important areas with a large number of youths who are going through difficult changes in their lives. This is particularly important in Aotearoa where the rate of teen suicide has been increasing from 2001. The background of these suicides involves abuse, dysfunctional family homes, and children not living with their biological families, and so forth (Beautrais, 2001). It is of vital importance to implement strategies with the aim of developing supportive mental health frameworks for these young people in order to form positive habits that will help them in their adulthood. The present intervention may aid in the development of positive mental health skills such as defusion, mindfulness and acceptance, which may direct them towards a more value orientated life. However, this information may need to be presented in a different format to make it more relatable and palatable for this population.

Different cultural contexts

Similarly, the present intervention could be useful with individuals from different cultural contexts. ACT has been shown to be an effective intervention for a variety of mental health issues. This is particularly important to consider in the context of the Māori population. The Māori population are reported to show greater rates of depression, anxiety, personality disorders, and alcohol

abuse/alcohol dependence than non-Māori individuals (Sachdev, 1989). Therefore, the present intervention could provide an effective and widely applicable method for developing positive mental health techniques especially focused on substance abuse in this population. It is possible that substance abuse serves a similar purpose as emotional eating by functioning as a type of avoidance behaviour. However, it is important to consider modifying the intervention to suit this population in a way that would make the intervention relatable by incorporating aspects and principles from a Māori perspective. This modification will be addressed in the future research idea section below.

Future Research

Based on the limitations of the present research there are several potential future research ideas, these will be explored in the future research ideas section below.

Objective behavioural measure for emotional eating

The present study used a self-report questionnaire and weekly journal entries to measure the changes in emotional eating. This does not serve as a perfectly objective behavioural measure. Creating a stage where the negative affect can be engineered and, thereafter a quantity of food could be made available and measuring the consumption of this food, could serve as a potentially more objective behavioural measure. This is possible in conjunction with the present intervention and research design. For example, similar to the study by Bongers et al. (2016), the participants could watch a video clip designed to elicit negative affect (e.g., a funeral, emotional scene from a childhood movie, etc.). Following this, the participant would be offered a meal and their consumption

would be measured. This procedure could be completed at pre-and post-intervention and be repeated at a follow-up session. It should be noted that this procedure may have to be adjusted to suit the learning history of the individual participant. Therefore, having a variety of different materials (e.g., videos, stories, memories etc.) to elicit the negative affect could provide multiple methods for eliciting the desired emotional response. This would offer multiple measures of emotional eating behaviour in order to provide more robust means for the measurement of emotional eating.

Multiple intervention timelines

During the present research, most of the participants completed the intervention in three months; however, as previously stated two participants took six months to complete the intervention. One possible idea worth considering is that the participants could complete the intervention in different timeframes. For example, the participants could be divided into three groups with each group completing the intervention over a different time frame (e.g., three months, six months and a year). This would facilitate the investigation into the differences caused by different timeframes such as whether a longer intervention produces a more significant reduction in emotional eating behaviour, and whether different timeframes cause differences in the speed of altering the trends of emotional eating behaviour. Also, increasing the number and the frequency of follow up sessions may prove beneficial (e.g., every two months over the course of a year) to assess more accurately whether the change in behaviour has persisted. This could also help to assess whether a short timeframe produces results similar or the same as a longer intervention. In that case, using the shorter time frame could

cause the intervention to be more efficient and reduce the time and money resources used for the intervention.

Larger sample size and online intervention

Even though this study utilised a single subject multiple-baseline design in an attempt to produce meaningful results with a small sample size, having a larger sample of participants could produce more generalisable outcomes. Furthermore, having a population of different age groups and ethnicities would be more representative of the overall population. Also, making the entire intervention available online will leave the researcher with the option of monitoring the frequency of the participants' engagement with the intervention. Additionally, to incentivize the participants to complete the chapters the participants could sign a behavioural contract regarding how many chapters they would complete per week, then if they had a 'streak' of meeting these requirements they could receive a reward (i.e., money). Alternatively, the participants could initially gain access to one chapter of the Happiness Trap, then once they complete a certain quantity of journal entries they gain access to another chapter. This method could supply more accurate information regarding chapter of the book that the participants had read, their frequency of accessing the intervention, how many journal entries they completed and the duration of their engagement with the intervention. These measures will afford the researcher a more accurate representation of the engagement level rather than relying solely on self-report measures.

Comparing intervention with traditional face to face ACT

Traditional face-to-face therapy has been proposed to be more effective than self-help methods. It is important to contrast the present intervention with

that of traditional face-to-face therapy regarding differences in outcomes (i.e., reduction of emotional eating and maintenance of behaviours). Both modes of intervention (i.e., the present and the traditional ACT) should occur over the same time period to provide a reliable indication as to the effectiveness of the therapy. The participants in both conditions would complete pre and post measures with additional follow-up sessions. This idea could be combined with the more objective behavioural measure for emotional eating, in an attempt to provide a more robust measure. With this future research idea, it is important that the traditional face-to-face ACT is delivered by either a trained ACT therapist or a trained psychologist. The trained individual would need to strictly conduct only ACT, with videos being recorded and analysed by a highly trained ACT supervisor, to provide a reliable measure of validity. This idea has merit because if the present intervention provides similar results to those of the traditional face-to-face ACT, then it would prove to be an effective alternative for individuals who cannot access the traditional face-to-face ACT for various reasons.

Group orientated intervention

One issue that the present study experienced was the high rate of participant attrition. Indeed, 13 participants withdrew from the current research. Conducting the intervention in a group setting may aid in reducing attrition. In this process, the participants would each be given the intervention and then meet every two weeks or so as a group to read a section of the intervention together. After the group reading session, the participants would have the opportunity to discuss their ideas and thereafter the participants would be asked to practice some of the techniques using either the mobile application or breaking into pairs or

groups. With this type of intervention, there would be an added focus on developing skills in the group setting and creating a caring and safe community environment. This modality of intervention could be valuable to both parties. It will be more time-efficient for the researcher, the researcher would potentially gain a deeper understanding of the participant's experiences and a larger amount of feedback for the intervention. For the participants, it could build a community environment, and provide mutual encouragement through developing social connections. This may help improve the retention rate as participants may develop support networks in these groups and encourage each other to continue with the intervention.

Assessing intervention with Māori population

As previously mentioned, one of the potential applications of the present research is using the intervention in other cultural contexts such as the Māori population. The Māori population has been reported to have a high rate of obesity and diabetes (Hawley & McGarvey, 2015). One of the reasons for this could be the lack of positive mental health skills, particularly for avoidance and cognitive fusion. The present intervention could provide an effective method to deliver positive mental health skills by teaching the processes and ideas of ACT. However, in order to make this intervention appropriate for the Māori population, it may need to be restructured. Future research could focus on reaching out to members of the Māori community (i.e., kaumatua, cultural experts, Māori tikanga experts, a focus group, etc.), and working in collaboration with them to tailor the intervention to suit members of this population. Some ideas for this intervention format could be a more whānau orientated intervention for implementation and

understanding of the processes of ACT or having a focus group of Māori individuals to complete the intervention together. Additionally, introducing the idea of this intervention at a marae in a wānanga setting to discuss potential ideas regarding altering the format of the intervention.

Conclusion

A combination of the Happiness Trap and the mobile application (i.e., ACT companion) appeared to reduce both the self-reported emotional eating and experiential avoidance behaviours, across the eight participants. This decrease in emotional eating could be facilitated by the indirect reduction of experiential avoidance with an increase in value orientated behaviour, though this emotional eating behaviour is not recorded using a fully objective behavioural measure. Even with this limitation, there are a variety of applications for the present research, including the widespread use of an effective intervention, using the intervention in the context of a younger audience, and using the intervention with different cultural groups. The next step for this research would be to use an objective behavioural measure for emotional eating and compare the results with those of the traditional face-to-face ACT. This research is of importance as it indicates that the present intervention may serve as an effective tool for education regarding positive mental health skills, and reduction of avoidance behaviour.

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Appendix (1) Multi-Dimensional Experiential Avoidance Questionnaire

Please indicate the extent to which you agree or disagree with each of the following statements

1	2	3	4	5	6
strongly disagree	**moderately disagree**	**slightly disagree**	**slightly agree**	**moderately agree**	**strongly agree**

1.	I won't do something if I think it will make me uncomfortable ……...	1 2 3 4 5 6
2.	If I could magically remove all of my painful memories, I would ……...	1 2 3 4 5 6
3.	When something upsetting comes up, I try very hard to stop thinking about it ……...	1 2 3 4 5 6
4.	I sometimes have difficulty identifying how I feel ……...	1 2 3 4 5 6
5.	I tend to put off unpleasant things that need to get done ……..	1 2 3 4 5 6
6.	People should face their fears ……...	1 2 3 4 5 6
7.	Happiness means never feeling any pain or disappointment ……	1 2 3 4 5 6
8.	I avoid activities if there is even a small possibility of getting hurt …….	1 2 3 4 5 6
9.	When negative thoughts come up, I try to fill my head with something else ……...	1 2 3 4 5 6
10.	At times, people have told me I'm in denial …….	1 2 3 4 5 6
11.	I sometimes procrastinate to avoid facing challenges ……..……..	1 2 3 4 5 6
12.	Even when I feel uncomfortable, I don't give up working toward things I value …….....	1 2 3 4 5 6
13.	When I am hurting, I would do anything to feel better ...…...……..	1 2 3 4 5 6
14.	I rarely do something if there is a chance that it will upset me ……	1 2 3 4 5 6
15.	I usually try to distract myself when I feel something painful …….	1 2 3 4 5 6
16.	I am able to "turn off" my emotions when I don't want to feel ……	1 2 3 4 5 6
17.	When I have something important to do I find myself doing a lot of other things instead...	1 2 3 4 5 6
18.	I am willing to put up with pain and discomfort to get what I want …….	1 2 3 4 5 6
19.	Happiness involves getting rid of negative thoughts ……	1 2 3 4 5 6
20.	I work hard to avoid situations that might bring up unpleasant thoughts and feelings in me	1 2 3 4 5 6
21.	I don't realize I'm anxious until other people tell me ……..	1 2 3 4 5 6
22.	When upsetting memories come up, I try to focus on other things ……..	1 2 3 4 5 6
23.	I am in touch with my emotions ……...	1 2 3 4 5 6
24.	I am willing to suffer for the things that matter to me ……..	1 2 3 4 5 6
25.	One of my big goals is to be free from painful emotions …….	1 2 3 4 5 6
26.	I prefer to stick to what I am comfortable with, rather than try new activities ……	1 2 3 4 5 6
27.	I work hard to keep out upsetting feelings ……...	1 2 3 4 5 6
28.	People have said that I don't own up to my problems …….	1 2 3 4 5 6
29.	Fear or anxiety won't stop me from doing something important …….	1 2 3 4 5 6
30.	I try to deal with problems right away ……..	1 2 3 4 5 6

- PLEASE TURN PAGE OVER -

31. I'd do anything to feel less stressed ……. 1 2 3 4 5 6
32. If I have any doubts about doing something, I just won't do it ……... 1 2 3 4 5 6
33. When unpleasant memories come to me, I try to put them out of my mind …… 1 2 3 4 5 6
34. In this day and age people should not have to suffer ……... 1 2 3 4 5 6
35. Others have told me that I suppress my feelings ……. 1 2 3 4 5 6
36. I try to put off unpleasant tasks for as long as possible ……... 1 2 3 4 5 6
37. When I am hurting, I still do what needs to be done ……... 1 2 3 4 5 6
38. My life would be great if I never felt anxious ……. 1 2 3 4 5 6
39. If I am starting to feel trapped, I leave the situation immediately ……... 1 2 3 4 5 6
40. When a negative thought comes up, I immediately try to think of something else ……. 1 2 3 4 5 6
41. It's hard for me to know what I'm feeling ……... 1 2 3 4 5 6
42. I won't do something until I absolutely have to …….. 1 2 3 4 5 6
43. I don't let pain and discomfort stop me from getting what I want …….. 1 2 3 4 5 6
44. I would give up a lot not to feel bad …… 1 2 3 4 5 6
45. I go out of my way to avoid uncomfortable situations …… 1 2 3 4 5 6
46. I can numb my feelings when they are too intense …….. 1 2 3 4 5 6
47. Why do today what you can put off until tomorrow …… 1 2 3 4 5 6
48. I am willing to put up with sadness to get what I want …… 1 2 3 4 5 6
49. Some people have told me that I "hide my head in the sand" ……. 1 2 3 4 5 6
50. Pain always leads to suffering …….. 1 2 3 4 5 6
51. If I am in a slightly uncomfortable situation, I try to leave right away …… 1 2 3 4 5 6
52. It takes me awhile to realize when I'm feeling bad ……. 1 2 3 4 5 6
53. I continue working toward my goals even if I have doubts ……. 1 2 3 4 5 6
54. I wish I could get rid of all of my negative emotions …….. 1 2 3 4 5 6
55. I avoid situations if there is a chance that I'll feel nervous…….. 1 2 3 4 5 6
56. I feel disconnected from my emotions ……. 1 2 3 4 5 6
57. I don't let gloomy thoughts stop me from doing what I want ……. 1 2 3 4 5 6
58. The key to a good life is never feeling any pain …….. 1 2 3 4 5 6
59. I'm quick to leave any situation that makes me feel uneasy …… 1 2 3 4 5 6
60. People have told me that I'm not aware of my problems …… 1 2 3 4 5 6
61. I hope to live without any sadness and disappointment ……... 1 2 3 4 5 6
62. When working on something important, I won't quit even if things get difficult …… 1 2 3 4 5 6

Appendix (2) Valuing Questionnaire

Please read each statement carefully and then circle the number which best describes how much the statement was true for you DURING THE PAST WEEK, INCLUDING TODAY.

	0	1	2	3	4	5	6	
	Not at all true						Completely true	
1) I spent a lot of time thinking about the past or future, rather than being engaged in activities that mattered to me	0	1	2	3	4	5	6	____
2) I was basically on "auto_pilot" most of the time	0	1	2	3	4	5	6	____
3) I worked toward my goals even if I didn't feel motivated to	0	1	2	3	4	5	6	____
4) I was proud about how I lived my life	0	1	2	3	4	5	6	____
5) I made progress in the areas of my life I care most about	0	1	2	3	4	5	6	____
6) Difficult thoughts, feelings or memories got in the way of what I really wanted to do	0	1	2	3	4	5	6	____
7) I continued to get better at being the kind of person I want to be	0	1	2	3	4	5	6	____
8) When things didn't go according to plan, I gave up easily	0	1	2	3	4	5	6	____
9) I felt like I had a purpose in life	0	1	2	3	4	5	6	____
10) It seemed like I was just 'going through the motions', rather than focusing on what was important to me	0	1	2	3	4	5	6	____

Progress:____
Obstruction:____

Appendix (3) Acceptance and Action Questionnaire

Below you will find a list of statements. Please rate how true each statement is for you by circling a number next to it. Use the scale below to make your choice.

1	2	3	4	5	6	7
never true	very seldom true	seldom true	sometimes true	frequently true	almost always true	always true

1.	My painful experiences and memories make it difficult for me to live a life that I would value.	1	2	3	4	5	6	7
2.	I'm afraid of my feelings.	1	2	3	4	5	6	7
3.	I worry about not being able to control my worries and feelings.	1	2	3	4	5	6	7
4.	My painful memories prevent me from having a fulfilling life.	1	2	3	4	5	6	7
5.	Emotions cause problems in my life.	1	2	3	4	5	6	7
6.	It seems like most people are handling their lives better than I am.	1	2	3	4	5	6	7
7.	Worries get in the way of my success.	1	2	3	4	5	6	7

This is a one-factor measure of psychological inflexibility, or experiential avoidance. Score the scale by summing the seven items. Higher scores equal greater levels of psychological inflexibility.

Appendix 4

Compulsive Eating Scale (CES)

How often do you do each of the following activities? Circle ONE answer for each question that comes closest to describing you.

1. Eat because you are feeling lonely				
a. Never	b. Once or twice a year	c. Once a month	d. Once a week	e. More than once a week
2. Feel completely out of control when it comes to food				
a. Never	b. Once or twice a year	c. Once a month	d. Once a week	e. More than once a week
3. Eat so much that your stomach hurts				
a. Never	b. Once or twice a year	c. Once a month	d. Once a week	e. More than once a week
5. Eat too much because you are bored				
a. Never	b. Once or twice a year	c. Once a month	d. Once a week	e. More than once a week
6. Go out with friends for the purpose of over-stuffing yourselves with food				
a. Never	b. Once or twice a year	c. Once a month	d. Once a week	e. More than once a week
7. Eat so much food so fast that you don't know how much you ate or how it tasted				
a. Never	b. Once or twice a year	c. Once a month	d. Once a week	e. More than once a week
8. Get out of bed, go into the kitchen, and finish the remains of some delicious food, because you know it was there.				
a. Never	b. Once or twice a year	c. Once a month	d. Once a week	e. More than once a week

Appendix (5)

THE GENERAL HEALTH QUESTIONNAIRE

GHQ 28

David Goldberg

Please read this carefully.

We should like to know if you have had any medical complaints and how your health has been in general, *over the past few weeks*. Please answer ALL the questions on the following pages simply by underlining the answer which you think most nearly applies to you. Remember that we want to know about present and recent complaints, not those that you had in the past.

It is important that you try to answer ALL the questions.

Thank you very much for your co-operation.

Have you recently

A1 – been feeling perfectly well and in good health?	Better than usual	Same as usual	Worse than usual	Much worse than usual
A2 – been feeling in need of a good tonic?	Not at all	No more than usual	Rather more than usual	Much more than usual
A3 – been feeling run down and out of sorts?	Not at all	No more than usual	Rather more than usual	Much more than usual
A4 – felt that you are ill?	Not at all	No more than usual	Rather more than usual	Much more than usual
A5 – been getting any pains in your head?	Not at all	No more than usual	Rather more than usual	Much more than usual
A6 – been getting a feeling of tightness or pressure in your head?	Not at all	No more than usual	Rather more than usual	Much more than usual
A7 – been having hot or cold spells?	Not at all	No more than usual	Rather more than usual	Much more than usual
B1 – lost much sleep over worry?	Not at all	No more than usual	Rather more than usual	Much more than usual
B2 – had difficulty in staying asleep once you are off?	Not at all	No more than usual	Rather more than usual	Much more than usual
B3 – felt constantly under strain?	Not at all	No more than usual	Rather more than usual	Much more than usual
B4 – been getting edgy and bad-tempered?	Not at all	No more than usual	Rather more than usual	Much more than usual
B5 – been getting scared or panicky for no good reason?	Not at all	No more than usual	Rather more than usual	Much more than usual
B6 – found everything getting on top of you?	Not at all	No more than usual	Rather more than usual	Much more than usual
B7 – been feeling nervous and strung-up all the time?	Not at all	No more than usual	Rather more than usual	Much more than usual

Please turn over

Have you recently

C1 – been managing to keep yourself busy and occupied?	More so than usual	Same as usual	Rather less than usual	Much less than usual
C2 – been taking longer over the things you do?	Quicker than usual	Same as usual	Longer than usual	Much longer than usual
C3 – felt on the whole you were doing things well?	Better than usual	About the same	Less well than usual	Much less well
C4 – been satisfied with the way you've carried out your task?	More satisfied	About same as usual	Less satisfied than usual	Much less satisfied
C5 – felt that you are playing a useful part in things?	More so than usual	Same as usual	Less useful than usual	Much less useful
C6 – felt capable of making decisions about things?	More so than usual	Same as usual	Less so than usual	Much less capable
C7 – been able to enjoy your normal day-to-day activities?	More so than usual	Same as usual	Less so than usual	Much less than usual

---

D1 – been thinking of yourself as a worthless person?	Not at all	No more than usual	Rather more than usual	Much more than usual
D2 – felt that life is entirely hopeless?	Not at all	No more than usual	Rather more than usual	Much more than usual
D3 – felt that life isn't worth living?	Not at all	No more than usual	Rather more than usual	Much more than usual
D4 – thought of the possibility that you might make away with yourself?	Definitely not	I don't think so	Has crossed my mind	Definitely have
D5 – found at times you couldn't do anything because your nerves were too bad?	Not at all	No more than usual	Rather more than usual	Much more than usual
D6 – found yourself wishing you were dead and away from it all?	Not at all	No more than usual	Rather more than usual	Much more than usual
D7 – found that the idea of taking your own life kept coming into your mind?	Definitely not	I don't think so	Has crossed my mind	Definitely has

A ☐ **B** ☐ **C** ☐ **D** ☐ **TOTAL** ☐

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School of Psychology

THE UNIVERSITY OF WAIKATO
Te Whare Wānanga o Waikato

Appendix (6) **CONSENT FORM**

A completed copy of this form should be retained by both the researcher and the participant.

Research Project: ACT intervention for obesity and unhealthy eating behaviours

Please complete the following checklist. Tick (✓) the appropriate box for each point.	**YES**	**NO**
1. I have read the Participant Information Sheet (or it has been read to me) and I understand it.		
2. I have been given sufficient time to consider whether or not to participate in this study		
3. I am satisfied with the answers I have been given regarding the study and I have a copy of this consent form and information sheet		
4. I understand that taking part in this study is voluntary (my choice) and that I may withdraw from the study at any time without penalty		
5. I have the right to decline to participate in any part of the research activity.		
6. I know who to contact if I have any questions about the study in general.		
7. I understand that the information supplied by me could be used in future academic publications.		
8. I know that the information that could identify me will remain confidential and anonymous to everyone but the researcher, unless I request not to.		
9. I understand that my participation in this study is confidential and that no material, which could identify me personally, will be used in any reports on this study.		
10. I am aware that as a participant in this study I will be sent a copy of the research findings, unless I explicitly request otherwise.		
I wish to view the summary report of my interview		
I have given consent regarding recording of the information said in the interview and in the questionnaires.		

Declaration by participant:
I agree to participate in this research project and I understand that I may withdraw at any time. If I have any concerns about this project, I may contact the Secretary of the Committee, email humanethics@waikato.ac.nz, postal address, University of Waikato, Te Whare Wananga o Waikato, Private Bag 3105, Hamilton 3240.

Participant's name (Please print): _____

Signature: _____ Date: _____

Declaration by member of research team:
I have given a verbal explanation of the research project to the participant, and have answered the participant's questions about it. I believe that the participant understands the study and has given informed consent to participate.

Researcher's name (Please print): _____

Signature: _____ Date: _____

Appendix (7)

University of Waikato
School of Psychology

Information sheet for Participants

My name is Tadhg Norgrove, I am a 5th year psychology student at the University of Waikato. I would like to invite you to participate in my research. My goal is to explore the use of acceptance and commitment therapy as an effective intervention for individuals who are unhappy with their current weight or are experiencing unhealthy eating behaviours. I hope that involvement in the study will help you to develop a healthier relationship with food and your body.

As a participant in this study you will receive the Happiness Trap book by Russ Harris and free access to the complementary mobile application ACTcompanion®. The book is designed to explain the ways in which searching for happiness can lead to individuals becoming miserable, depressed, anxious, stressed, etc. The goal of the book is to empower individuals to live a life of value and meaning using Acceptance and Commitment Therapy (ACT), which is based on the idea of behaving in line with your values and developing mindfulness.

This intervention will last for 3 months, during which time you will read the book and complete the corresponding ACTcompanion® app. Additionally, you will compete a weekly check-in online journal entries regarding the frequency and intensity of unhealthy eating behaviours and avoidance of problems/insecurities. You will also complete a variety of questionnaires, complete a weigh-in measuring weight and body fat percentage, and supply demographic information during a before and after the intervention with the researcher.

As a participant in the study, you can withdraw at any time with no penalties (you will keep the book and retain access to the app for 6 months). In order to withdraw from the study, contact the researcher either by phone or email listed below. Any information that you supply in the study will be confidential and reported in a way that the information cannot be linked back to you. The information you provide will be stored securely at the University of Waikato for a minimum of 5 years.

If you choose to participate, you are welcome to request access to the information you provide before it is published, and you will be given the opportunity to remove your data before inclusion in the study. The thesis resulting from this research will be freely available through the online Research Commons at the University of Waikato library. Additionally, a summary of the findings will be sent to you unless otherwise specified.

If you are interested in taking part in this study or would like to hear more information please contact Tadhg Norgrove at:

tcd6@students.waikato.ac.nz

Or

Phone: 02102210645

Additionally, if you would like to contact either of the supervisors of this research. Their details are listed below:

Supervisor: Doctor Rebecca Sargission
School of Psychology
University of Waikato
Email: rebeccas@waikato.ac.nz

Supervisor: Doctor Mohi Rua
School of Psychology
University of Waikato
Email: mrua@waikato.ac.nzThis research project has been approved by the Human Research Ethics Committee (Health) of the University of Waikato under HREC(Health)#2018-06. Any questions about the ethical conduct of this research may be addressed to the Secretary of the Committee, email humanethics@waikato.ac.nz, postal address, University of Waikato, Te Whare Wananga o Waikato, Private Bag 3105, Hamilton 3240.

If you experience any distress during the course of this research. Please contact the services below:

- Mental Health Services (07 834 3607) with the Waikato District Health Board
- The depression helpline (0800 111 757)
- Lifeline (0800 543 354)
- Your local GP (to access the four-free counselling/therapy sessions)
- Depression.org.nz
- Also if under the age of 25 then contact youth line on (0800 611 116)

Thank you for your time.
Hope you have a great day.

Kind regards,
Tadhg Norgrove

Appendix 8

Demographics Questionnaire

Thank you for taking the time to complete this questionnaire.

1.) Gender: _____

2.) Age: ____

3.) Please indicate what ethnicity you identify yourself as?

European ☐
Māori ☐
Pacific peoples ☐
Asian ☐
Middle Eastern/Latin American/African ☐
Other ☐

if 'other' please specify……..

4.) Please indicate your marital status

- Single, never married ☐
- Married or domestic partnership ☐
- Widowed ☐
- Divorced ☐
- Separated ☐

5.) Please indicate the highest level of education that you have completed

Primary ☐
Secondary ☐
Technical ☐
Post-secondary ☐
Tertiary ☐
- If tertiary please specify……..

Thank you for taking the time to complete this questionnaire.

Appendix (9)

Journal Entry

1. How are you finding the Happiness Trap so far? (Please select one)

Not helpful Somewhat helpful Moderately helpful Very helpful Extremely helpful

2. What chapter have you recently completed/reading currently…?

   (Chapter X)

3. In the past day approximately, how much have you engaged in unhealthy eating behaviours?

   (Insert number of unhealthy eating behaviours)

4. In the past day approximately, how much have you used unhealthy eating to avoid negative feelings and emotions? (Please select one)

   Not at all Rarely Sometimes Regularly Always

5. In the past day approximately, how much experiential avoidance have you engaged in?

   (Insert number of experiential avoidance)

Tired of Struggling with your body?

Failing at dieting, at the mercy of your emotions and can't control urges to eat unhealthy food. Looking for a way to feel in control of your actions and feelings? Want to live a life of value and meaning?

Kia ora my is Tadhg Norgrove, as part of my masters thesis I am a currently looking for participants to engage in Acceptance and Commitment therapy, for obesity and unhealthy eating behaviours intervention.

This research will take a total of 5-6 months to complete, as a participant in this research you would finish the Happiness Trap (given to you) roughly reading 40 minutes a week and complete weekly-check in exercises (5 short questions).

If your interested please contact me on
Email: tcd6@students.waikato.ac.nz
Phone:02102210645

This research has been approved by the University of Waikato Human Research Ethics Committee (Health). If you have any concerns about the ethics of the study, please contact the Chair of this committee at humanethics@waikato.ac.nz.

Appendix 11 Feedback for the actcompanion and the Happiness Trap

1.) How helpful did you find the Happiness Trap?

Not at all Slightly helpful Somewhat helpful Very helpful Extremely helpful

2.) Did you notice a change in your behaviour following the use of the Happiness Trap and the act companion? Circle the option that applies to you.

1 = Not at all 2 3 4 5 = Extremely

3.) Was the application easy to use? Circle the option that applies to you.

1 = Not at all 2 3 4 5 = Extremely

4.) Was the Happiness Trap easy to understand and implement? Circle the option that applies to you.

1 = Not at all 2 3 4 5 = Extremely

5.) Did you notice any change in your emotional eating following reading the Happiness Trap and completing the application? Circle the option that applies to you.

1 = Not at all 2 3 4 5 = Extremely

6.) What did you like or dislike about the Happiness Trap and the act companion?

7.) What aspects about the Happiness Trap and act companion could be improved?