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# **Mindful Eating and Wellbeing**

A thesis presented in partial fulfilment of the requirements for the degree of

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## **Abstract**

Emerging evidence supports the application of mindful eating to individual health and wellbeing. The present study examined the relationship of mindful eating to specific health behaviour outcomes; physical activity and fruit and vegetable intake. The moderating influence of Self-Compassion and Self-Efficacy was also investigated. A total of 388 participants were recruited via an online quantitative questionnaire, which assessed demographics and health behaviours, as well as including the Mindful Eating Questionnaire, Self-compassion Scale-SF and the General Self-efficacy Scale. Results indicated mindful eating was significantly correlated with physical activity and fruit and vegetable intake. Self-Compassion and Self-Efficacy correlated highly with mindful eating practice, although played a minimal role in moderating the mindful eating and health behaviour relationship. Future studies could aim to include more detail around the specific types of exercise and foods being consumed in order to infer any health benefits. Findings have implications for the management of specific health indicators, including overweight, obesity, and restrictive eating disorders – these are discussed.

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## Introduction

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Recent research suggests investigating *how*, *when* and *why* a person eats may be more valuable than *what* they consume in order to optimize health and wellbeing (Hart, 2014). An average of 200 decisions are made each day concerning food consumption, with psychological processes having a strong influence on dietary intake (Camilleri, Mejean, Bellisle, Hercberg & Peneau, 2015). Yet, many people are unaware of their subconscious choices and behaviours related to food, and distraction or not visually noting how much food is consumed increases food intake in that moment and can also influence subsequent food decisions. Hart (2014) proposes mindless eating behaviours can lead to unhealthy lifestyle choices with drastic health outcomes, including overeating and associated weight issues.

Stress-related eating is increasingly cited as a difficulty in managing health behaviours and weight (Corsica, Hood, Katterman, Kleinman & Ivan, 2014). Overwhelmed with daily food decisions in combination with the fast-paced nature of modern life, Hart (2014) believes individuals eating in modern societies often do so on “autopilot”, no longer attuned to internal cues such as satiety, fullness and hunger. Very often, these cues indicated by the body are ignored, with healthy and nutritious choices being abandoned in favor of ‘convenience’ meals that work with ‘busy’ lifestyles.

Mindless food consumption is predominantly seen in Western industrialized cultures, while many collectivist cultures have a very different relationship with food. Cross-culturally, there are substantial differences in food amount, type, and way it is eaten and therefore differences in subsequent health outcomes. Rozin, Fischler, Imada, Sarubin and Wrzesniewski (1999) investigated the different functions of food in Belgium, France, USA and Japan. Results showed food was associated most with health connotations and least with pleasure in Americans [Western culture], while the collectivist French culture associated food as more pleasure orientated with less focus on ‘diet’ associations, restriction and stress.

Buric, Farias, Mee, Jong, and Brazil (2017) found mindfulness and related practices show considerable evidence for improving mental and physical health outcomes. Mindfulness when applied to food consumption is known as Mindful Eating. Mindful eating is a relatively new movement emerging within westernized culture that has previously been practiced within some collectivist cultural contexts (e.g., those adhering to Buddhism). Jordan, Wang, Donatoni and Meier (2014) explains mindful eating involves a cultivated awareness of consumption,

environmental surroundings and other factors influential to individual relationships with food. Mindful eating involves an increased attention in the moment of consumption, less sensitivity to negative emotions, and has been linked to specific health outcomes, including a preference for healthier foods and increased physical activity (Gilbert & Waltz, 2010). This emerging phenomenon may be the key to maintaining health behaviours. Incorporating mindfulness into health means moving away from a simplistic model and acknowledging that health involves all aspects of the mind and body (Puddicombe, 2012; Williams & Kabat-Zinn, 2016).

In addition to physical health benefits, regular mindful eating practice may also contribute towards psychological benefits, including higher levels of self-compassion and self-efficacy. Neff (2003) maintains self-compassion entails seeing one's own experience in light of the common human experience, acknowledging that suffering, failure, and inadequacies are part of the human condition. This means less judgment of oneself while holding negative thoughts and emotions mindfully with balanced awareness. Having higher self-compassion may enhance an emotionally positive attitude and bring about a new perspective on perceived inadequacies, which further supports aspects of mindful eating practice. Self-efficacy may also have a link to mindful eating behaviours as it encourages belief in one's ability to succeed in specific situations. Hart (2014) believes self-efficacy is foundational to maintaining any form of meaningful and sustained change. These individual psychological factors may well facilitate or be facilitated by mindful eating.

The 2017/2018 New Zealand Health Survey indicated around one third of all adults and one in ten children are overweight or obese in Aotearoa New Zealand (Ministry of Health, 2018). Despite obesity and overweight being addressed as health priorities since the 1980s, data indicates both are still rapidly increasing, particularly in OECD countries (Williams, Mesidor, Winters, Dubbert, & Wyatt, 2015). The scientific community has desperately tried to identify effective approaches in promoting healthy weight, with many remaining unsuccessful (Huo, Lyons, & Magliano, 2016). Current attempts generally focus on the calories-in/calories-out fallacy that has been widely unsuccessful over the long-term (Malhotra, Noakes, & Phinney, 2015).

Currently, few studies have explored mindful eating in the Aotearoa New Zealand context. The purpose of the present study is to enhance understandings of mindful eating in this country by investigating the influence of mindful eating on physical activity and fruit and vegetable intake. Further, this research will examine whether individual variables, such as self-

compassion and self-efficacy, are influential to the mindful eating and health behaviour relationship. Why mindful eating might be useful to explore within this context relates to its potential to facilitate positive change to, among other priorities, the epidemic of excessive weight among many adults and children in Aotearoa New Zealand.

To guide the reader, the thesis is structured as follows. Chapter one provides a brief overview and definition of mindfulness and mindful eating. The chapter discusses the relationship that mindful eating has with health behaviours; specifically physical activity and fruit and vegetable consumption. The role individual factors may play in the health outcomes and mindful eating relationship is then explored with a focus on the influence of self-efficacy and self-compassion. Lastly, an overview of the present research goals are presented and the proposed relationships between variables are outlined.

Chapter two provides an overview of the methodology used in the present research. Firstly, the procedure for data collection is outlined, followed by the recruitment process. Individual participant characteristics are provided, followed by an overview of each of the measures used within the quantitative questionnaire. This is concluded with a description of the other demographic and physical health related information obtained during data collection.

Chapter three presents the results of the present study. The correlations between all variables: mindful eating, health behaviours and individual factors, are presented. This is followed by findings on each of the research questions that were outlined in the overview. Next the differences in health outcomes due to individuals being higher and lower in mindful eating are presented. Following this, the results demonstrating the moderating effects of the individual factors self-compassion and self-efficacy are presented.

A detailed discussion of the overall findings are presented in Chapter Four. The specific relationships between variables are examined alongside the meaning of the findings in context of each of the health behaviours: physical activity and fruit and vegetable consumption. Also discussed is the moderating role the individual factors had on mindful eating and the health behaviours. Some limitations of the present study are identified. This is followed by implications of the findings and recommendations for future research. Lastly, a summary and overall conclusion are provided.

# **Chapter 1:**

## **Overview of Mindfulness and Mindful Eating**

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This chapter begins with an overview of the concepts of mindfulness and mindful eating. The following section of the chapter investigates the relationship between mindful eating and two health behaviours; physical exercise and fruit and vegetable intake. Next, the individual factors of self-efficacy and self-compassion are considered in terms of their relationship to mindful eating. Lastly, the goals and proposed relationships in the present research are identified.

### **1.1 Outlining Mindfulness**

Since the time of Sigmund Freud, psychologists have been interested in exploring Eastern philosophical concepts from a Western scientific perspective (Neff, Pisitsungkagarn, & Hsieh, 2008). As a relatively new construct of interest to Western Psychology, consensus regarding a definition of mindfulness is still to be achieved (Coffey, Hartman, & Fredrickson, 2010). However, common descriptions of mindfulness typically reference the state of being aware of and attentive to the present moment without distraction. For example, Kabat-Zinn (2003) defines mindfulness as the awareness that happens when paying attention, on purpose, in the present moment, and non-judgmentally. Further explanation by Puddicombe (2012) suggests in the fullest sense, mindfulness means more than to simply be present, but to be genuinely interested and curious in investigating why you think and feel the way you do. It can be as simple as following guided meditation or reminding oneself to remain present and focus on the task, thoughts or feelings at hand in specific moments throughout the day. Mindfulness is a form of self-awareness, as it enhances general self-regulation, decreases emotional reactivity and gives insight into the perceptual, cognitive and behavioral aspects of human living, with more purposeful intention and satisfaction (Kristeller, 2003).

The past three decades have witnessed an increased academic interest in mindfulness, which may be attributed to its influence on physical and psychological well-being (Edenfield & Saeed, 2014; Prasak et al., 2012). A host of studies indicate mindfulness-based interventions are effective in reducing psychological distress, such as anxiety disorders (Goldin & Gross, 2010; Kabat-Zinn, 2003), depression (Kumar, Feldman & Hayes, 2008; Speca, Carlson,

Goodey & Angen, 2000), attention deficit hyperactivity disorder (Zylowska et al., 2008), and parasuicidal behavior (Linehan, Armstrong, Suarez, Allmon, & Heard, 1991).

Despite its apparent effectiveness, Hanley, Abell, Osborn, Roehrig and Canto (2016) suggest there may be evidence for some adverse effects from mindfulness practices although the research is unclear. It may be that stripping away the consistent outside distractions of life can result in an increased awareness of unpleasant or distressing thoughts. Individuals may have thoughts that have previously been avoided and submerged, but through the process of practicing mindfulness they are brought to the fore. Individuals may not hold the coping skills nor distress tolerance to deal with such thoughts, which may influence adverse effects. However, Shapiro (1992) concludes that although some individuals may experience ‘adverse’ effects, they are typically transformed over time, as throughout the continuation of the practice, ‘problems’ become less like problems and more like experiences that can be learnt from.

Although mindfulness has remained a core part of Buddhist contemplative practice for centuries, some suggest as an academic and/or clinical practice, mindfulness can be fully independent of spiritual beliefs (Khan & Zadeh, 2014). Given this separation, the wealth of literature suggesting the benefits of mindfulness, and the dearth of literature indicating adverse effects, Kahn and Zadeh (2014) suggest there is a necessity for examining ways mindfulness can realistically be incorporated into life in the modern world, and whether or not it has a significant impact on daily functioning. One of the areas where mindfulness may hold promise with daily functioning is in the area of food consumption.

## **1.2 Defining Mindful Eating**

As with defining mindfulness in general, a consensual definition of mindful eating is also yet to be reached, although commonalities in descriptions are evident. Taylor, Daiss and Krietsch (2015) define mindful eating as food consumption driven by appropriate cues for eating. Martin, Prichard, Hutchinson and Wilson (2013) state mindful eating means having an increased awareness and responsiveness to satiety, hunger, energy levels, emotions and environmental cues. Similarly, Framson, Kristal, Schenk, Littman, Zeliadt and Benitez (2009) describe mindful eating as a nonjudgmental awareness of physical and emotional sensations associated with eating. Most definitions include the attentive awareness and focus on all sensations throughout the process of eating. Albers (2010) suggests mindful eating involves being attentive and in-the-moment with the sensation of taste, awareness of satiety cues, cognition and emotions associated with the eating process. Lastly, Beshara, Hutchinson and

Wilson (2013) define mindful eating as a “non-judgmental awareness of physical and emotional sensations while eating or in a food related environment” (p. 26), thus acknowledging the importance of also being attentive to environments that may trigger a range of physical and psychological reactions.

Generally speaking, the practice of mindful eating involves slowing down and treating each meal as a time to acknowledge the senses and thoughts occurring while eating. Albers (2009) identifies three basic steps involved in the practice of mindful eating. The first step is to notice each of the individual thoughts surrounding all five senses, including the textures of the food. The second is to identify repetitive habits and distractions, such as multitasking or having an unconscious awareness of eating. The final step is to notice the importance of identifying what may trigger the initiation and cessation of eating. These key steps involve disconnecting from previous automatic behavior patterns, and learning new, more relaxed and engaging ways of eating. This is in stark contrast to current fast-paced eating patterns, which bring little focus to the senses or other aspects involved in food consumption. To eat mindfully, is to pay attention to your food and body before, during, and after eating and to notice your hunger, sensations, and feelings throughout the entire process. Once practiced regularly, old automatic patterns can be replaced, looking at the eating process through a new lens. The result of mindful eating is to feel calm and balanced around food.

Although various descriptions exist, the above definitions all identify comparable patterns and meanings. In recognizing the value and relevance of each of the above definitions, it seemed pertinent to develop a definition that enabled aspects of each of the above to be incorporated and acknowledged. Therefore, an adapted combination of these definitions will be used for the purposes of the present research, where mindful eating will be defined as: *being purposefully attentive and engaging in a non-judgmental awareness of all of the experienced physical and emotional sensations taking place throughout the process of eating.*

### **1.3 Mindful Eating and Health Behaviours**

Despite the relatively recent interest in mindful eating in Western academia, a host of literature attests to its influence on a range of physical health outcomes (e.g., Buric, Farias, Mee, Jong, & Brazil, 2017; Prazak, Critelli, Martin, Miranda, Purdum, & Powers, 2012). In particular, mindful eating has been applied in clinical settings to address restrictive eating, with results suggesting its effectiveness in this domain, such as with binge-eating disorder (e.g., Kristeller & Wolever, 2014) and anorexia nervosa (e.g., Albers, 2010).

For example, Kristeller and Wolever (2014) explored mindful eating in the treatment of binge eating compared with two other conditions; a psycho-educational/cognitive behavioral (PECB) intervention and a wait list control group. Results 4 months' post-intervention showed out of the 150 overweight or obese individuals (66% who met the full DSM-IV-R criteria for binge eating disorder), 95% of the mindful eating group no longer met the BED criteria, compared to 76% of those receiving the PECB treatment. Similarly, Albers (2010) successfully treated a case study of anorexia nervosa, by introducing individuals to the principles of mindful eating over 15 sessions. Results indicated BMI increased from 17.9 to 19.5 and caloric intake from 900-1000 to 1500-2000 per day, thus demonstrating the effectiveness of the training. Albers (2010) found mindful eating increased awareness of positive body image and decreased reactivity to distressing thoughts about food, body shape, and overwhelming emotions.

Mindful eating has also shown promise with regard to excessive eating, such as overweight and obesity. In their study of over 60 000 participants, Camilleri, Mejean, Bellisle, Hercberg and Peneau (2015) used the Five Facet Mindfulness Questionnaire. Although the FFMQ has recently been scrutinized as not truly measuring the construct of mindfulness (Goldberg et al., 2016), results of the Camilleri et al. (2015) study revealed participants with higher mindfulness scores were less likely to be overweight or obese. The effects of mindfulness on eating behaviour were also demonstrated by Dalen, Smith, Shelly, Sloan, Leahigh and Begay (2010) who used a program called Mindful Eating and Living (MEAL) with 10 obese male adults. Results revealed the MEAL program was not only associated with individuals losing significant amounts of weight, but also resulted in improvements to eating patterns.

Recent evidence also demonstrates personality characteristics likely to result in obesity such as impulsivity, emotional distress and being inattentive can be better handled and adapted by education in mindful eating (Mantzios & Wilson, 2014). Hendrickson and Rasmussen (2013) researched the effects of mindful eating behavioral training on impulsive and risky choice patterns for obese and healthy weight individuals. Participants who completed the mindful eating session showed more self-controlled and less risk adverse behavior, demonstrating the role mindful eating can play in the ability to feel in control and make informed choices, rather than being blindly influenced by impulsive negative eating patterns.

Altering the automatic eating patterns surrounding food intake are key to sustainable change. Kristeller (2003) believes many of our most basic bodily processes, including eating,

have become highly conditioned. Such studies as those mentioned above, suggest mindful eating can provide valuable information about the relationship with food and how this may be effectively managed to promote positive eating behaviours and associated positive health outcomes. Edenfield and Saeed (2014) maintain mindfulness-based practices likely cause a “therapeutic lifestyle change”, which may lead to health-promoting behaviours such as enhanced physical activity, healthy food choices, and increased overall wellbeing. Indeed, mindful eating may influence health behaviours related to daily functioning that are not necessarily clinically problematic (Kristeller, 2003; Hendrickson & Rasmussen, 2013), such as physical exercise and fruit and vegetable intake. The role mindful eating may play in each of these health behaviours is therefore worth examining.

### *1.3.1 Mindful Eating and Exercise*

The practice of mindful eating is thought to influence the amount and type of physical activity individuals participate in. The more mindful eating is practiced, the more attention is given to one’s body (Puddicombe, 2012). Being in tune with your physical body means recognizing areas that need more nurturing and may result in wanting to make better lifestyle choices for overall health, such as participating in physical exercise. Slowing down and focusing on the way the body feels when participating in mindful eating influences individual participation and overall results with certain types of physical activity. Understanding the role mindful eating plays in physical exercise may help individuals to ultimately improve their overall physical health.

However, Moor, Scott and McIntosh (2013) examined mindful eating and its relationship to physical activity among 90 university students, who each completed the Mindful Eating Questionnaire (MEQ) and a series of self-reported questions about height, weight and physical activity. Results showed mindful eating was significantly related to lower BMI, but not significantly related to the level of physical activity. Physically active students were more likely to lack awareness of their food and to eat in response to negative emotions. This information is contrary to popular belief that those who are more physically active have an increased awareness of their food intake and make healthier food choices.

Gilbert and Waltz (2010) also examined whether mindfulness was related to physical activity in 269 participants who completed the Five Facet Mindfulness Questionnaire (FFMQ) and the International Physical Activity Questionnaire. They found the degree of mindfulness



in everyday life significantly predicted higher involvement in moderate and vigorous physical activity. Similarly, Martin, Prichard, Hutchinson and Wilson (2013), investigated the relationship of mindful eating and exercise behavior in 159 female exercisers, who completed questions related to age, weight, height, self-reported exercise, and the type/frequency of the exercise, using the Mindful Eating Questionnaire (MEQ), which is relatively short; has high internal consistency, reliability and good construct validity; and, has shown promise in clinical practice and enhanced understanding of dietary behaviour (Framson et al., 2009). In using the MEQ, Martin et al. (2013) indicate participation in low cardio activity (such as yoga or walking) was significantly related to greater awareness of eating behaviours. Alternatively, the amount of time involved in high cardio based exercise (such as running) was significantly associated with greater eating disturbances, negatively correlating with trait mindfulness.

These findings highlight the importance of not only understanding how mindful eating may relate to physical activity but also focusing on how body awareness may change in each different type of physical exercise. Both studies indicate increased rates of participation in high cardio physical activity being associated with less mindful eating behaviour and having a lowered awareness of negative food patterns. The findings also revealed mindful eating was positively associated with the amount of time spent participating in lower cardio and breathing based activities. It appears different types of exercise have different outcomes and relationships to mindfulness and mindful eating.

However, Martin et al. (2013) recognised some limitations with their research as the correlational nature of the study does not allow for any causal conclusions to be made. It is possible people with a healthy relationship to eating and body image choose to participate in activities such as yoga that focus on body awareness, and not the opposite which implies that yoga enhances mindful eating, body awareness or body image. Mindful eating involves slowing down, calming of the mind and a focus on the present moment, similar to the behaviours of low cardio physical activity. Findings demonstrating more effectiveness with low cardio activity might be because high cardio physical activity does not allow for the same calm centred focus that mindfulness demands. Overall, this suggests the findings related to mindful eating are not conclusive and mindful eating is likely a complex concept.

In summary, there appears to be a relationship between mindful eating and physical activity although the direction of this relationship is currently unknown. It may be that mindful eating influences physical activity, physical activity influences mindful eating or perhaps there

are other factors involved in this relationship. The nature of this relationship may be dependent on participation in a particular type of physical activity. It also seems the MEQ has proven useful in previous research for measuring the concept of mindful eating.

### *1.3.2 Mindful Eating and Fruit and Vegetable Intake*

Mindful eating focuses on slowing down the eating process and reflecting on all sensory aspects involved. With practice, individuals begin to recognise differences in sensation while consuming certain types of foods, also ones that may not be the best choices for their overall health. Therefore, another factor thought to be influenced by mindful eating is not only food intake and the way food is eaten, but more specifically the type of food that is consumed. The practice of mindful eating involves focusing on the overall process of eating, but also delves deeper into the way different types of food can make a person feel, both physically and psychologically. People who practice mindful eating become attuned to the way certain foods create different positive or negative outcomes for their mind and body (Kristeller, 2003). Given the process of mindful eating highlights the sensations of consuming different food types, it is likely implicated in or influential to individual food choices.

For example, Jordan, Wang, Donatoni and Meier (2014) investigated whether mindful eating predicted healthier eating behavior with over 400 participants across four different studies. Participants completed the Mindful Attention Awareness Scale (MAAS), an uncontrolled eating scale, and a measure assessing attitudes towards fruits and sweets. Hofling, Moosbrugger, Schermelleh-Engel, and Heidenreich (2011) found big differences in mindfulness outcomes depending on whether statements in the MAAS are worded positively or negatively, implying a lack of validity of this measure. Despite this potential limitation, Jordan, Wang, Donatoni and Meier (2014) found a positive relationship between mindfulness and food choices that are believed to be healthier across all four studies, suggesting mindfulness affects eating behaviour by encouraging a preference for foods perceived as healthier, such as fruit and vegetables, and/or discouraging a preference for foods perceived not to be as healthy. This finding is consistent with the idea that mindful eating facilitates more or less appeal for certain foods (Kristeller & Wolever, 2011).

Although it may seem simple to increase fruit and vegetables to obtain better health outcomes, many individuals struggle with applying this guidance to their diet. A lack of food enjoyment may be a contributor to not engaging in healthier food behaviours. Hong, Lishner

and Han (2014) investigated whether mindful eating creates more willingness to sample foods not typically enjoyed and whether there was an increase in enjoyment when eating these foods. The 411 participants were randomly assigned to one of 3 groups; a mindful eating task condition, a non-mindful eating task condition and a no-task baseline condition. Some of the less desired foods offered were anchovies, wasabi peas, and prunes, which they then rated for enjoyment. Participants in the mindful eating condition indicated higher levels of enjoyment of the sampled food when compared with both of the other conditions. Hong, Lishner and Han (2014) state that mindless behavior, like not attending to simple aspects such as taste and texture, may significantly account for the reduced enjoyment experienced when eating any type of food. Automatic behaviours and rigidity is challenged when mindful eating is introduced as it creates a new perspective for viewing foods, even those foods previously not enjoyed, thus positively changing a person's overall relationship with food.

Kristeller (2003) believes societal pressures have begun to override basic nutritional needs. Food as a viable source of pleasure and emotional satisfaction becomes distorted and reinforced by endless social instructions as to what type of eating is most correct, healthy or appropriate. The intake of fruit and vegetables is a consistently important contributor to maintaining health. As noted above with physical activity, Gilbert and Waltz (2010) also examined whether mindfulness was related to diet utilizing the Five Facet Mindfulness Questionnaire (FFMQ) and The National Institute of Health Fruit and Vegetable Screener. Results found the degree of mindfulness in everyday life significantly predicted the amount of fruit and vegetable intake. When people choose to mindfully eat they begin to appreciate the way healthier foods taste and the various positive effects of making nutritious food choices. However, it is also possible that engaging in health behaviours leads to higher levels of mindfulness.

In summary, it seems there is a relationship between mindful eating and fruit and vegetable intake however this relationship is complex. It may be that individuals are more willing to sample 'healthier' foods when they engage in mindful eating or it may be that mindful eating facilitates an attitude change towards healthy foods increasing their consumption. There may also be additional individual variables that equally contribute to the mindful eating and fruit and vegetable relationship. With previous studies the established measures such as the FFMQ and the MAAS have some limitations so again the MEQ appears to be the most current useful measure of mindful eating.

## **1.4 Mindful Eating and Individual Factors**

As previous studies indicate and as noted above, the relationship between mindful eating and health indicators is not straightforward and should involve the consideration of other influential variables (Moor, Scott & McIntosh, 2013). It may be that certain health behaviours facilitate higher levels of mindful eating, or mindful eating influences increased tendency for certain health behaviours, or both may be equally influenced by other outside individual variables (Gilbert & Waltz, 2010).

Indeed, Camilleri et al. (2015) believe there are many socio-demographic and lifestyle correlates of mindfulness. Their research revealed men and women with higher scores of mindful eating showed greater physical activity, higher education level, practiced relaxation techniques more often, were older and were slightly more often former smokers than those participants with lower scores. Additionally, mindful eating is a relatively new concept with limited research showing the long term effects of how the practice may impact health behaviours (Kristeller, Wolever & Sheets, 2014; Beshara, Hutchinson & Wilson, 2013).

It is assumed the benefits of mindful eating outweigh any negative effects in the long term, however the research area is too underdeveloped to make any definitive conclusions. The relative effectiveness of mindful eating might be more related to the complex relationship that ME has to other variables; the number of which are seemingly endless, but identifying some of them could be beneficial in helping individuals to maintain the practice. Two such variables that may be implicated in the complex relationship between mindful eating and health outcomes are the variables of self-compassion and self-efficacy, which form the focus of the next two sections.

### *1.4.2. Mindful Eating and Self-Compassion*

Neff (2003) defines self-compassion as offering a form of non-judgmental understanding to one's own pain, inadequacies and failures, and believes it consists of three main elements: kindness, common humanity and mindfulness. Neff and Dahm (2015) believe when faced with struggles, mistakes, and personal inadequacies, self-compassion responds with kindness rather than harsh self-criticism and judgement; recognizing that imperfection is all part of the shared human experience. In order to give oneself compassion, one must turn toward, acknowledge, identify and accept suffering.

Drawing attention to the importance of kindness and understanding of the body is something both mindful eating and self-compassion advocate, which may be why the concepts are seemingly linked. Both mindfulness and self-compassion are constructs drawn from Buddhist philosophy. Although both concepts share remarkable similarities, the relationship between mindful eating and self-compassion is still under exploration. Taylor, Daiss and Krietsch (2015) investigated associations between self-compassion, mindful eating, eating disorder symptomatology and BMI in 150 college students. Each individual completed the Self-Compassion Scale short form (SCS-SF), MEQ and the Eating Attitudes Test (EAT-26). Findings suggested high self-compassion predicted lower BMI and eating disorder symptomatology, but was associated with increased mindful eating. The findings also suggested that those who are self-compassionate view food intake awareness and mindful eating as a form of self-kindness that their body deserves.

There is increasing evidence supporting mindfulness and self-compassion being utilized together. A study by Mantzios and Wilson (2015) involved sixty-three soldiers over 5 weeks, with each given independent diet plans and assigned randomly to either the control group or one of the two experiment interventions (mindfulness and mindfulness with self-compassion). All participants in the experimental groups lost weight, while the control group gained weight. At six month follow-up, only the mindfulness and self-compassion group continued to lose weight. These findings suggest developing both mindfulness and self-compassion in combination appears more promising than just mindfulness alone. Soysa and Wilcomb (2015) state there is a dearth of research focusing on the combined effects of mindfulness, self-compassion, self-efficacy and gender in predicting psychological health and wellbeing. Their study also utilized the Self-Compassion Scale: Short Form (SCS-SF) finding high levels of self-compassion strongly predicted increased mindfulness, but also had varying effects on depression, anxiety, stress and physical wellbeing.

Based on such findings, it appears individuals are also more likely to engage in positive health behaviours, such as exercise and fruit and vegetable consumption, when they are more compassionate towards themselves and their behaviour (Mantzios & Wilson, 2014). The increased understanding of the body that comes with both mindful eating and self-compassion supports a drive to nurture oneself, make better choices regardless of current feelings, while also persisting through thoughts that may be negative or involve judgement. This relationship is important to investigate further as practicing mindful eating alongside self-compassion may mean improvement to positive health outcomes is not only more likely to occur, but may also

be more effective or sustainable long-term. However, the question remains as to whether self-compassion influences mindful eating which then influences health outcomes; or whether mindful eating influences self-compassion which then influences health outcomes; or whether mindful eating and self-compassion make independent contributions to health outcomes.

#### *1.4.1. Mindful Eating and Self-Efficacy*

Self-efficacy can play a major role in how one approaches goals, tasks and challenges. According to Bandura (2006) self-efficacy is concerned with one's belief in their capability to succeed in specific situations or accomplish a task. Self-efficacy creates a sense of understanding of the amount of influence a person can hold over their own lifestyle choices and is foundational to maintaining meaningful and sustained change (Kidd, Graor & Murrock, 2013). Having increased self-efficacy supports the belief in one's ability to succeed and accomplish tasks.

O'Leary (1985, 1992) initiated a conversation strongly supporting self-efficacy as a tool to help with various facets of health behavior, which has been supported by subsequent researchers. Self-efficacy has shown strong influences on weight control, alcohol abuse and exercise (Strecher, McEvoy Devellis, Becker, & Rosenstock, 1986). Ersoz (2017) used the General Self-Efficacy Scale (GSES) to demonstrate that continuity in health behaviours such as exercise, was positively influenced by self-efficacy. Individuals with high self-efficacy are better able to confront high risk situations and cope successfully (Clark, Abrams, Niaura, Eaton, & Rossi, 1991). Combined, such studies highlight the importance of perceived self-efficacy as an attributing cognitive factor affecting health outcomes.

Self-efficacy has also been linked to mindfulness. Charoensukmongkol's (2014) research considered the benefits of mindfulness meditation on emotional intelligence, general self-efficacy, and perceived stress with data collected from 317 respondents in Thailand. Charoensukmongkol (2014) also used the General Self Efficacy Scale (GSES) to investigate his hypothesis that individuals who regularly practice mindfulness tend to develop higher self-efficacy. Conclusions showed practicing mindfulness associated strongly with higher emotional intelligence, higher general self-efficacy and lower general perceived stress.

Holding a belief in the capacity to approach new tasks with a sense of achievement and discipline may play a key role in the initiation and/or continuation of mindful eating practice. A sense of perceived control makes it more likely to sustain mindful eating practice and lead

to increased feelings of efficacy. The reverse is also possible suggesting mindful eating interventions may create an improvement in individual self-efficacy (Kidd, Graor & Murrock, 2013), which also may help individuals commit to a healthier lifestyle. Much of the research support to date tends to be for the latter proposition, suggesting mindfulness influences self-efficacy.

For example, Gilbert and Waltz (2010) utilized measures of mindfulness, physical activity, diet and self-efficacy with their research involving 269 individuals. Results indicated mindfulness behaviours not only predicted higher self-efficacy but also resulted in positively increasing other health outcomes, such as physical activity and fruit and vegetable intake. Rott, Seaborn, Schmidt, Tafalla, Pejsa and Evers (2008) researched whether an eight-week mindful eating education program would increase an individual's self-efficacy and overall weight loss. Results demonstrated the experimental group lost significantly more weight than the control group and improved significantly in their self-efficacy.

Yet, given self-efficacy is about one's own perceived competence in relation to a specific task, and mindfulness influences self-efficacy while also influencing specific health behaviours (i.e., exercise, food consumption), the possibility exists that self-efficacy plays a role in the relationship between mindful eating and such health behaviours. The combination of mindful eating and self-efficacy may be highly influential to how well a person is able to maintain a healthy diet and exercise and subsequent better health. Although the direction of influence is not always straight forward, the psychological concept of self-efficacy holds value for individuals wanting to enhance the effectiveness of mindful eating practice and/or improve their health outcomes. It would be useful to research further how self-efficacy may enhance the effectiveness of mindful eating and consequently influence overall health outcomes.

## **1.5 Overview of the Present Research**

The present study will contribute to current literature on mindful eating and wellbeing, through each of the subsequent research aims:

### *1. Investigate the relationship between mindful eating and physical activity.*

Mindful eating has been shown to influence physical activity (e.g., Gilbert & Waltz, 2010). Although the relationship between mindful eating and exercise is seemingly positive (Moor, Scott & McIntosh, 2013), further research is needed to investigate potential differences in the way mindful eating relates to different types of exercise and their frequency. Martin,

Prichard, Hutchinson and Wilson (2013) found participating in either high or low cardio exercise results in different health outcomes, with each having different relationships to mindful eating. There is currently only a small area of research looking at the way mindful eating relates to specific physical health behaviours, such as physical activity. Consequently, the first research goal is to contribute more information and knowledge in the area by looking at the relationship between mindful eating and the role it may play in the type and frequency of exercise. Figure 1 provides a depiction of this research aim, which based on previous findings (specifically those of Martin et al. (2013)) hypothesize that mindful eating will be positively related to frequency of low-cardio physical activity, and negatively related to frequency of high-cardio physical activity.

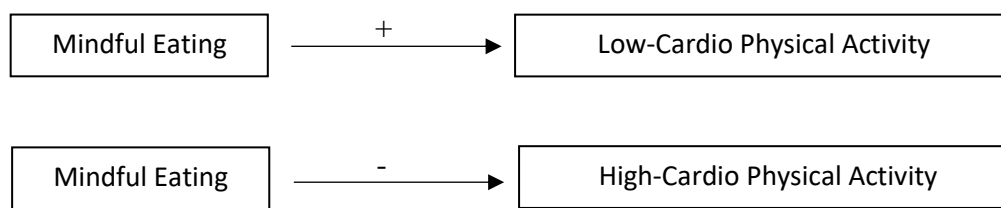


Figure 1. *Proposed relationships between mindful eating and physical activity.*

## 2. *Investigate the relationship between mindful eating and fruit and vegetable consumption.*

Wansink and Sobal (2007) believe people are only aware of a fraction of food decisions they make daily and are somewhat unaware of how the environment around them may influence their decisions. Mindful eating practice creates a new awareness around food choices and consumption as individuals begin to acknowledge the influence of the environment and also the types of food they are choosing to consume. Participation in mindful eating has also been shown to impact the food choices individuals make by increasing awareness for the sensory experience while consuming and also may increase satisfaction from foods that were not previously enjoyed. There is currently minimal research investigating the direct relationship between involvement in mindful eating and subsequent fruit and vegetable intake.



The present research aims to contribute more knowledge in this area by identifying the relationship between mindful eating and fruit and vegetable intake. As indicated by figure 2 and based on findings from previous research suggesting the positive association between mindful eating and ‘healthier’ food choices, it is hypothesized the variables will share a positive relationship.

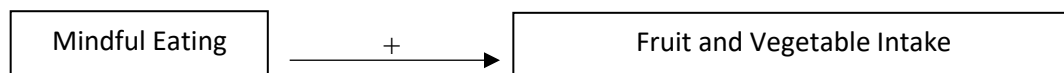


Figure 2. *Proposed relationship between mindful eating and fruit and vegetable consumption.*

3. *Investigate the relationship between mindful eating and self-compassion, and the potential moderating role of self-compassion in the relationship between mindful eating and i) fruit and vegetable consumption and ii) physical activity.*

Another key individual variable related to mindful eating is self-compassion. Taylor, Daiss and Krietsch (2015) suggests self-compassionate people are more driven and likely to care for themselves by eating a more balanced diet. What is less known is whether individuals with high self-compassion are more likely to be higher in mindful eating, or whether those who eat mindfully foster a more self-compassionate attitude? Both mindful eating and self-compassion have been shown to have positive relationships with specific health behaviours, such as physical activity and food consumption. Because of the unknown direction of the relationship between mindful eating and self-compassion, it makes it difficult to ascertain whether mindful eating alone contributes to changes in health behaviours, or whether self-compassion might also play a role in this relationship. The present research aims to investigate this further by firstly exploring whether mindful eating and self-compassion are related in the present sample, and secondly by investigating the role self-compassion may play in moderating the health behaviours of physical activity and fruit and vegetable consumption. As indicated in figure 3, it is hypothesized that mindful eating and self-compassion will be positively related, and that self-compassion will moderate the relationship between mindful eating and both physical activity and fruit and vegetable intake.

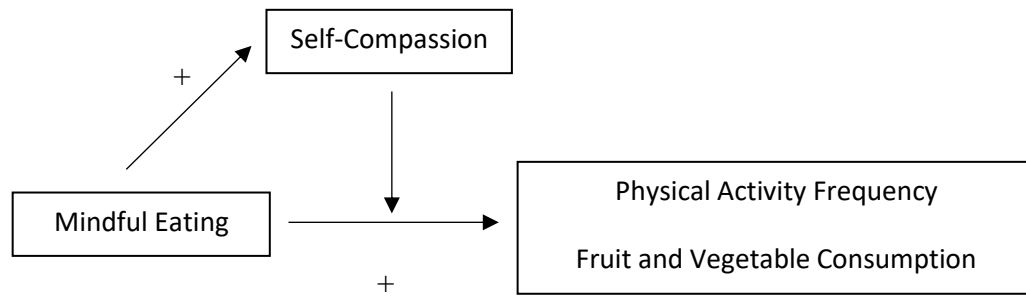


Figure 3. *Proposed moderating relationship of self-compassion with mindful eating and physical activity and fruit and vegetable consumption.*

4. *Investigate the relationship between mindful eating and self-efficacy, and the potential moderating role self-efficacy in the relationship between mindful eating and i) fruit and vegetable consumption and ii) physical activity.*

Self-efficacy; the belief in one's ability to succeed in a sometimes difficult situation or accomplish a task, has the potential to assist the practice of mindful eating (Gilbert & Waltz, 2010). The majority of research suggests practicing mindfulness influences self-efficacy, and both mindful eating and self-efficacy have previously been positively related with specific health behaviours. Based on such previous findings, the present research aims to investigate whether mindful eating and self-efficacy are related in the present sample, as well as investigating the role self-efficacy may play in moderating the health behaviours of physical activity and fruit and vegetable consumption. As indicated in figure 4, it is hypothesized that mindful eating and self-efficacy will be positively related, and that self-efficacy will moderate the relationship between mindful eating and both physical activity and fruit and vegetable intake.

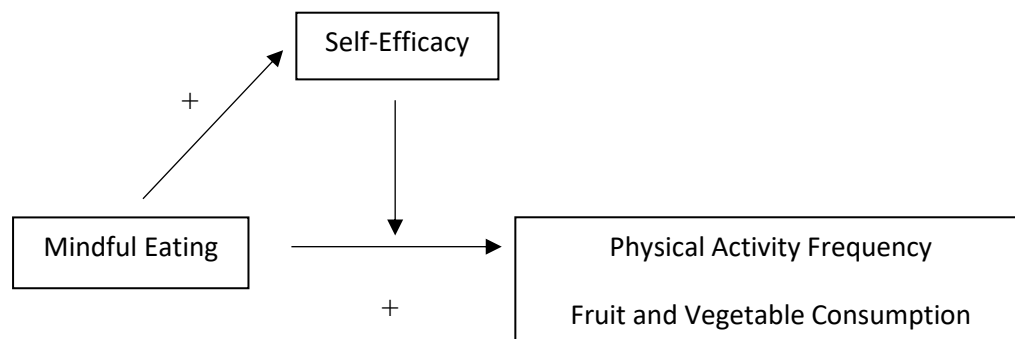


Figure 4. *Proposed moderating relationship of self-efficacy with mindful eating, physical activity and fruit and vegetable consumption.*

## **Chapter 2:**

### **Method**

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This chapter provides an overview of the methodology used in this research. Firstly, the procedure for data collection will be outlined, followed by the recruitment process in section 2.2. Individual participant characteristics are given in section 2.3, which is followed by an overview of each of the measures utilized for the quantitative questionnaire, in section 2.4.

#### **2.1. Procedure**

The research was peer reviewed and deemed low risk by the researcher and supervisor. A low risk notification was submitted to and approved by the Massey University Human Ethics Committee. A quantitative questionnaire was distributed online using the Qualtrics survey software, and included a number of psychological scales, a section on demographics, and several other questions about physical exercise and fruit and vegetable intake. The questionnaire was pilot-tested using a small sample derived from the researcher's acquaintanceship networks. A few minor issues such as wording and survey structure were addressed as a result of this process, prior to the questionnaire being made 'live' and available for completion. On initiating the questionnaire, participants were first directed to an information sheet containing details about the research, including who was conducting it, what it was about, and their rights as participants. Participants were then directed to provide their consent to participate, before beginning the questionnaire proper, which took no more than 20 minutes to complete. At the completion of the questionnaire, participants were advised they were able to request a summary of the results upon completion of the research.

#### **2.2 Recruitment**

Individuals aged 18 years or older were eligible to participate in the study via questionnaire completion. Participants were recruited via a snowball method, initially commencing with the researcher's acquaintanceship networks, Facebook friends, and various Facebook groups including 'Massey University Psychology students' and 'Massey University School of Psychology Manawatū' groups. Emails were also sent to the Massey University Psychology Postgraduate email list, and an advertisement was placed on the Massey University School of Psychology website for current research being conducted.

## **2.3 Participants**

The questionnaire received 468 hits. Once the final data was available participants who did not proceed with the questionnaire beyond the consent form question or who had over half of their responses missing were discounted, leaving a total remaining participant size of 388. A total of 387 participants selected their age group with a range in age from 18-60 years and with 2.1% between 18-19 years, 30.7% between 20-29 years, 28.9% between 30-39 years, 16.8% between 40-49 years, 11.6% between 50-59 years and 9.8% being 60 years or over. Of this, 387 specified gender, which included 34 (8.8 %) male, 351 (90.7%) female and 2 (0.5%) individuals selecting 'Other'.

A total of 385 participants indicated which ethnic group they most strongly identified with. A majority were in the New Zealand European ethnic group (66.8%), with minorities belonging to Māori (6.8%), Samoan (0.8%), Niuean (0.3%), Chinese (0.5%), and Indian (0.5%). Over a quarter (24.4%) of the participants selected the option 'other' for their ethnic group. Of the 386 participant responses to the education level question at the time of questionnaire completion, the most common level of education was a bachelor's degree (33.7%) followed by high school qualification (23.1%), polytechnic or trade certificate (16.8%), master's degree (14.2%), honor's degree (8.0%), doctoral degree (2.8%) and professional degree (JD, MD) (1.3%).

## **2.4 Measures**

Similar to the previously identified research by Moor, Scott and McIntosh (2013) a quantitative survey utilizing the Mindful Eating Questionnaire and several self-reported questions was used alongside various other measures. The materials used for each construct in the study are described below.

### *2.4.1 Mindful Eating*

Mindful eating behaviours and emotions were measured using the Mindful Eating Questionnaire (MEQ) by Framson, Kristal, Schenk, Littman, Zeliadt and Benitez (2009). The MEQ is a 28 item self-report questionnaire assessing five domains of mindful eating: disinhibition, awareness, external cues, emotional response and distraction. Examples items include: "When a restaurant portion is too large, I stop eating when I'm full" and "When I'm feeling stressed at work, I'll go find something to eat." Participants respond from one of four tick box options including: never/rarely, sometimes, often, and usually/always. Each of the

questions are divided into each of the relative five domains and given a response value according to what answer was selected ranging from 1-4. The response value points are totaled and divided by the number of questions in each domain to calculate the total domain scores. Answers with a “not-applicable” response are excluded. The five domain scores are then totaled and divided by 5 giving the individuals an overall mindful eating score.

Individual mindful eating scores were categorized as either higher or lower in mindful eating by using a median split to dichotomize the sample. For example, the median mindful eating score within the current sample was 2.71 so individuals with a score ranging from 1 up to 2.71 were categorized as being lower in mindful eating. Individuals with a total score of 2.71 and above (to the highest possible score of 4) were regarded as being higher in mindful eating. Previous research by Taylor, Daiss and Krietsch (2015) indicates the overall MEQ has adequate psychometric properties, with the alpha being .84 in their study. In the present study the overall MEQ has adequate psychometric properties, with the Cronbach’s alpha being .82 indicating a high level of reliability.

#### *2.4.2 Self Compassion*

Self-compassion was measured using the Self-Compassion Scale Short Form (SCS-SF) by Raes, Pommier, Neff and Van Gucht (2011). The SCS-SF is a shortened version of the original Self Compassion Scale by Neff (2003), consisting of 26 items. The SCS-SF consists of 12 questions, which are responded to on a Likert scale ranging from 1- 5 (i.e., 1 = Almost Never and 5 = Almost Always). Example items include: “When I fail at something important to me I become consumed by feeling of inadequacy” and “When I’m going through a very hard time, I give myself the caring and tenderness I need.” The 12 questions equally divide into 6 subscales separating Self-kindness, Self-judgement, Common Humanity, Isolation, Mindfulness and Over-identified items. Subscale scores are computed by calculating the mean of the subscale item responses. The negative subscale items under self-judgement, isolation and over identification are reversed scored. The mean of sub scores results in a total self-compassion score between 1 and 5. According to Neff (2018) on score interpretations, an average overall self-compassion scores tend to be around 3.0 (2.83 in the current study) so you can interpret overall scores accordingly. Suggesting with a rough guide scores between 1-2.5 indicate being low in in self-compassion, 2.5-3.5 indicating moderate self-compassion and 3.5-5 indicating those who are high in self-compassion. Taylor, Daiss and Krietsch (2015) indicate the SCS-SF has high internal reliability with an alpha of .84 in their research on the associations

among self-compassion and mindful eating. The present study found the Self-Compassion Scale – Short Form to have adequate internal consistency with an alpha of .88.

#### *2.4.3 Self Efficacy*

Self-Efficacy was measured using the General Self Efficacy Scale developed by Schwarzer and Jerusalem (1995). The scale consists of 10 items, with example items including: “When I am confronted with a problem, I can usually find several solutions” and “I can always manage to solve difficult problems if I try hard enough.” A Likert-type scale is used to rate responses from: 1= Not at all true, 2 = Hardly true, 3 = Moderately true, 4 = Exactly True. All responses are added up to a sum self-efficacy score ranging from 10 to 40 points. Schwarzer and Jerusalem (1995) state there is no cut off score for being higher or lower in self-efficacy instead it is suggested to establish groups by doing a median split to dichotomize individual scores. In the present study the median score of 30 was used with individuals who scored between 10-30 indicative of being lower in self-efficacy and those who scored 30 and above indicative of being higher in self-efficacy. The General Self Efficacy scale has been used by many researchers such as Scholz, Gutierrez, Sud and Schwarzer (2002) who maintain internal consistencies typically range between alpha .75 and .91. The present study found the internal consistency of the General Self Efficacy scale to be .86.

#### *2.4.4 Exercise Amount and Type*

Two multi-choice questions investigated the physical activity of the participants. The first asking “How many days each week do you engage in at least 30 minutes or more of physical activity?” with responses ranging from 0-7 days. The second involved asking participants “When you engage in physical activity would you say that it is: High Cardio (e.g., Running Aerobics, Cycling), Low Cardio (e.g., Yoga, Pilates, Walking), A mixture of both or Not applicable.”

#### *2.4.5 Fruit and Vegetable Intake*

Fruit and Vegetable intake was measured by asking participants “How many days each week do you eat the commonly recommended 5 portions of fruit and vegetables each day?” Multi-choice response options ranged from 0-7 days.

#### *2.4.6 Demographics*

A series of self-reported questions enquired about general demographic characteristics including weight, height, age, gender, ethnicity and level of education. In order to get an idea of participants experience they were also asked two specific questions about mindful eating. Firstly, indicating if they had previously heard of the practice of mindful eating before by answering yes or no. If participants indicated yes to having previously heard of mind eating before they were then asked whether they had ever engaged in the practice mindful eating before by selecting either yes or no.

## Chapter 3:

### Results

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This chapter displays the results of the present research. The Statistical Package for Social Sciences (SPSS) was used to analyze the data. Firstly, participant demographics and their previous knowledge or involvement with mindful eating practice are reported. Then an overview of participant scores is given on each of the utilized study measures, along with the means, standard deviations and mean norms of each measure. The participant health behaviours are then presented. Followed by correlations between mindful eating, health behaviours and individual factors. Next, the differences with those higher and lower on mindful eating is reported, followed by the results of difference in physical activity type. Lastly, the moderating individual factors on health behaviours are demonstrated through hierarchical multiple regressions.

#### 3.1 Participant Demographics

The current sample consisted of 388 participants. Of this, 387 specified gender, which included 34 (8.8%) male, 351 (90.7%) female and 2 (0.5%) individuals selecting ‘Other’. Participants ranged in age from 19-60 years or over, with the majority between the age of 20-39 years (59.6%). The weight range of participants in the current study is demonstrated in figure 5 below. The majority of individuals were between 56-85 kilograms (53.5%) with 20 (5.2%) participants selecting ‘I would prefer not to say’ and 3 (.8%) individuals of the 388 decided not to answer the question.

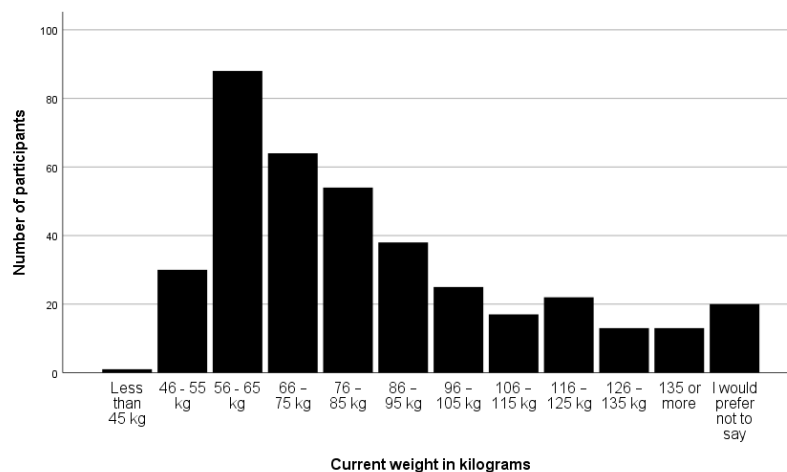


Figure 5. *Histogram of the weights of participants in the present study*



As seen below in Table 1, of the 388 participants 226 answered ‘yes’ to having previously heard of the practice of mindful eating. Of those, 116 answered ‘yes’ to having previously engaged in the practice of mindful eating.

Table 1: *Participant knowledge and previous involvement with mindful eating*

	Have you heard of the practice of mindful eating before?	Have you engaged in the practice of mindful eating before?
<b>Yes</b>	226 (58.2%)	116 (52.0%)
<b>No</b>	162 (41.8%)	107 48.0%
<i>N</i>	388	223

Table two provides the means and standard deviations for the measures used in the current study, along with each of the measures theoretical score range, range within the current sample, and comparison to the mean norms.

Table 2: *Means and Standard Deviations of Present Study Measures*

Measure	Current sample means	Sample <i>SD</i>	Theoretical score range	Range in Sample	Mean norms
<b>MEQ</b>	2.72	.38	1.00-4.00	1.55-3.85	2.79
<b>GSES</b>	30.5	4.44	10-40	7-40	29.55
<b>SCS-SF</b>	2.84	.74	1.00-5.00	1.00-5.00	3.00

*Note.* MEQ = Mindful Eating Questionnaire; GSES = General Self-Efficacy Scale; SCS-SF = Self-Compassion Scale Short Form. Norms for the MEQ originated from a study conducted by Framson et al. (2009). Norms for the GSES are from Scholz et al. (2002). Norms for the SCS-SF originated from a study conducted by Raes et al. (2011).

### 3.2 Physical Health Behaviours

Physical activity frequency statistics (as shown in Figure 6 below) showed of the 386 valid participants, the majority (60.3%) engaged in 30 minutes or more of physical activity from 2 to 5 days a week ( $M = 3.52$ ,  $SD = 2.07$ ). Fruit and vegetable intake (as seen in figure 7 below) was varied ( $M = 4.42$ ,  $SD = 2.06$ ). However, 79 of the 386 participants (20.5%) said

they eat 5 portions of fruit and vegetables 7 days a week, with 6.2 % selecting they eat 5 portions of fruit and vegetables 0 days a week.

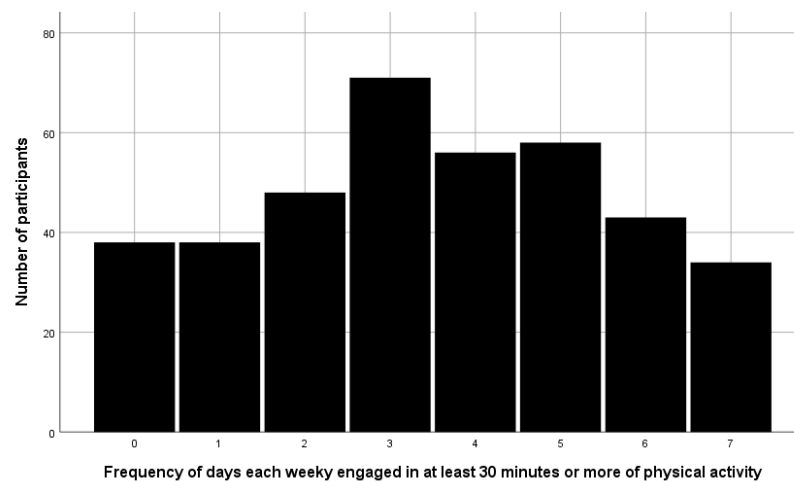


Figure 6. Participant responses to ‘How many days each week do you engage in at least 30 minutes or more of physical activity?’

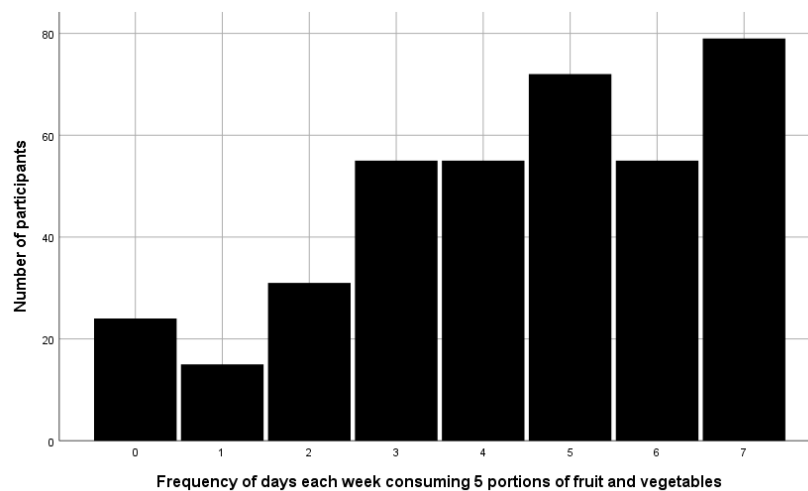


Figure 7. Participant responses to “How many days each week do you eat the commonly recommended 5 portions of fruit and vegetables?”

### 3.3 Correlations between Mindful Eating, Health Behaviours and Individual Factors

It was considered appropriate to perform Pearson’s correlations between each of the five variables; mindful eating, physical activity frequency, fruit and vegetable intake, self-compassion and self-efficacy. However, Shapiro-Wilk tests showed violations of the normality assumption, so Kendall’s tau-b correlation tests were conducted. As the correlation matrix in

Table 3 below shows, mindful eating shared positively significant relationships with all variables; physical activity, fruit and vegetable intake, self-compassion, and self-efficacy. Fruit and vegetable intake was significantly positively correlated with both physical activity and self-compassion. Self-efficacy and self-compassion were also moderately positively correlated with each other.

Table 3: *Kendall's tau-b Correlation Matrix between Mindful Eating, Health Behaviours, Self-Compassion and Self-Efficacy*

Variables	1	2	3	4	5
<b>1. Mindful Eating</b>	1				
<b>2. Physical Activity Frequency</b>	.13*	1			
<b>3. Fruit and Vegetable Intake</b>	.15*	.17*	1		
<b>4. Self-Compassion</b>	.29*	.03	.12*	1	
<b>5. Self-Efficacy</b>	.17*	.01	.07	.36*	1

\*Correlation is significant at the 0.01 level (2-tailed).

### 3.4 Differences in Health Behaviours and Individual Factors due to Mindful Eating

Independent samples t-tests were conducted to test whether there were any differences in physical activity frequency, fruit and vegetable intake, self-compassion and self-efficacy, according to whether participants scored higher or lower in mindful eating. Shapiro-Wilk tests indicated normality assumptions were not violated, and Levene's tests for equality of variances were non-significant, suggesting equal variances could be assumed.

For physical activity frequency, results indicated the *t* test was statistically significant, with those lower in mindful eating ( $M = 3.20$ ,  $SD = 2.16$ ) reporting exercising less frequently .62 days of the week, 95% CI [-1.03, -.21], than those higher in mindful eating ( $M = 3.82$ ,  $SD = 1.95$ ),  $t(384) = -2.97$ ,  $p < .003$ , two tailed,  $d = 0.30$ . Statistically significant results for fruit and vegetable intake were also demonstrated with those lower in mindful eating ( $M = 4.19$ ,  $SD = 2.04$ ) reported eating fruit and vegetables less frequently .45 days of the week, 95% CI [-.865, -.044], than those who were higher in mindful eating ( $M = 4.64$ ,  $SD = 2.065$ ),  $t(384) = -2.18$ ,  $p < .030$ , two-tailed,  $d = 0.22$ .

With self-compassion the *t* test was statistically significant, with participants lower in mindful eating ( $M = 1.59$ ,  $SD = .63$ ) being .43 lower in self-compassion, 95% CI [-.56, -.29],

than those participants who were higher in mindful eating ( $M = 2.01$ ,  $SD = .73$ ),  $t(386) = -6.16$ ,  $p < .001$ , two-tailed,  $d = 0.63$ . Lastly, the  $t$ -test for mindful eating and self-efficacy was statistically significant, with participants lower in mindful eating ( $M = 1.39$ ,  $SD = .49$ ) having a mean difference of .17 lower, 95% CI  $[-.27, .07]$ , in their self-efficacy scores than those participants who were higher in mindful eating ( $M = 1.56$ ,  $SD = .49$ ),  $t(381) = -3.37$ ,  $p < .001$ , two-tailed,  $d = 0.35$ .

### 3.5 Physical Activity Type and Mindful Eating

The majority of participants participated in low cardio (42.6%) or a mixture of both high cardio and low cardio (40.9 %). Only 16.6 % ( $N = 58$ ) of the participants selected high cardio as the type of physical activity they did the most (see Figure 8 below).

A one-way between groups analysis of variance (ANOVA) was used to investigate differences in mindful eating scores according to the type of physical activity that was participated in; high cardio, low cardio or a mixture of both. Frequency of each type of physical activity is displayed in Figure 8 below. The ANOVA assumptions of normality and homogeneity of variance were not violated, and the  $F$  test was not significant,  $F(2, 347) = .16$ ,  $p = .856$ . The effect size was extremely small  $\eta^2 = .00$ .

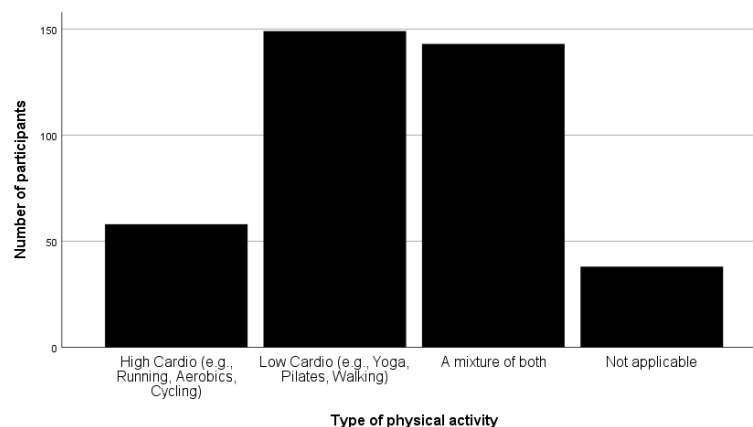


Figure 8. Participant responses to the type of physical activity engaged in most each week

### 3.6 Individuals Factors as Predictors to Health Behaviours

To test for potential moderating effects on health behaviours determined by the individual factors of self-compassion and self-efficacy, a series of Hierarchical Multiple Regression analyses (MRA) were performed. This aimed to identify the proportion of variance in physical activity frequency and fruit and vegetable intake that can be accounted for by self-compassion and self-efficacy, beyond that already accounted for by mindful eating.

#### 3.6.1 Self-Compassion

The moderating effects of self-compassion on physical activity were examined then followed by fruit and vegetable intake. Each of the assumptions of the multiple regressions were evaluated and met except for the Mahalanobis distance where two cases exceeded the critical  $\chi^2$  for  $df = 2$  (at  $\alpha = .001$ ) of 13.82 in the data file, indicating a multivariate outlier. These two cases were excluded from the data set, and further regressions run.

The first MRA showed on step 1 mindful eating accounted for 3% of the variance in physical activity frequency  $R^2 = .03$ ,  $F(1, 382) = 11.48$ ,  $p < .001$ . On step 2, self-compassion was added to the regression equation, and accounted for an additional .1% of the variance in physical activity frequency,  $\Delta R^2 = .001$ ,  $\Delta F(1, 381) = .477$ ,  $p = .490$ . In combination, mindful eating and self-compassion explained 3.1% of the variance in physical activity frequency,  $R^2 = .030$ , adjusted  $R^2 = .025$ ,  $F(2, 381) = 5.97$ ,  $p < .003$ . Cohen's  $f^2$  showed the combined effect as small ( $f^2 = .03$ ).

With fruit and vegetable intake, step 1 of the hierarchical MRA showed mindful eating accounted for 4.3% of the variance in fruit and vegetable intake  $R^2 = .04$ ,  $F(1, 382) = 17.35$ ,  $p < .001$ . On step 2, self-compassion was added to the regression equation, and accounted for an additional 1% of the variance in fruit and vegetable intake,  $\Delta R^2 = .01$ ,  $\Delta F(1, 383) = 3.90$ ,  $p = .049$ . In combination, mindful eating and self-compassion explained 5.3% of the variance in fruit and vegetable intake,  $R^2 = .053$ , adjusted  $R^2 = .048$ ,  $F(2, 381) = 10.69$ ,  $p < .001$ . Cohen's  $f^2$  showed the combined effect as small ( $f^2 = .06$ ).

For self-compassion the Unstandardised ( $B$ ) and standardised ( $\beta$ ) regression coefficients, and squared semi-partial (or 'part) correlations ( $sr^2$ ) for each predictor on each step of the hierarchical multiple regressions are reported in Table 4.

Table 4: *Unstandardised (B) and Standardised ( $\beta$ ) Multiple Regression Coefficients for Each Predictor Variable on Each Step of a Hierarchical Multiple Regression Predicting Physical Activity, Fruit and Vegetable Intake and Self-Compassion*

Dependent Variable	Model	Variables/Predictors	B	$\beta$	sr <sup>2</sup>
Physical Activity Frequency	Step 1	Mindful Eating	.93	.17	.029
	Step 2	Mindful Eating	1.05	.19	.029
		Self-Compassion	-.11	-.04	.001
Fruit and Vegetable Intake	Step 1	Mindful Eating	1.12	.21	.043
	Step 2	Mindful Eating	.88	.16	.022
		Self-Compassion	.30	.11	.010

### 3.6.2 Self-Efficacy

With self-efficacy one additional case was excluded in order for the maximum Mahalanobis distance to be met and further regressions run. Firstly, physical activity was investigated, with step 1 of the hierarchical MRA revealing that mindful eating accounted for 3.3% of the variance in physical activity frequency  $R^2 = .033$ ,  $F(1, 376) = 12.68$ ,  $p < .001$ . Self-efficacy was then added to the regression equation, and accounted for an additional .4% of the variance in physical activity frequency,  $\Delta R^2 = .004$ ,  $\Delta F(1, 375) = 1.37$ ,  $p = .243$ . Mindful eating and self-efficacy in combination, explained 3.6% of the variance in physical activity frequency,  $R^2 = .036$ , adjusted  $R^2 = .031$ ,  $F(2, 375) = 7.03$ ,  $p < .001$ . Cohen's  $f^2$  showed the combined effect as small ( $f^2 = .04$ ).

Lastly, moderating effects on fruit and vegetable intake were investigated with mindful eating accounting for 4.2% of the variance in fruit and vegetable intake  $R^2 = .042$ ,  $F(1, 376) = 16.65$ ,  $p < .001$ . On step 2, self-efficacy was added and accounted for an additional .4% of the variance in fruit and vegetable intake,  $\Delta R^2 = .004$ ,  $\Delta F(1, 375) = 1.53$ ,  $p = .217$ . Mindful eating and self-efficacy in combination explained 4.6% of the variance in fruit and vegetable intake,  $R^2 = .046$ , adjusted  $R^2 = .041$ ,  $F(2, 375) = 9.10$ ,  $p < .001$ . Cohen's  $f^2$  showed the combined effect as small ( $f^2 = .05$ ). In Table 5 below the regression coefficients and squared semi-partial correlations for each predictor are displayed.

Table 5: *Unstandardised (B) and Standardised ( $\beta$ ) Multiple Regression Coefficients for Each Predictor Variable on Each Step of a Hierarchical Multiple Regression Predicting Physical Activity Frequency, Fruit and Vegetable Intake, and Self-Efficacy*

Dependent Variable	Model	Variables/Predictors	B	$\beta$	$sr^2$
Physical Activity Frequency	Step 1	Mindful Eating	.98	.18	.033
	Step 2	Mindful eating	1.07	.20	.036
		Self-Efficacy	-.03	-.06	.003
Fruit and Vegetable Intake	Step 1	Mindful Eating	1.11	.21	.042
	Step 2	Mindful Eating	1.02	.19	.033
		Self-Efficacy	.03	.07	.003

## **Chapter 4:**

### **Discussion**

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The discussion chapter begins by outlining the objectives and specific aims of the present study. A summary of the findings on mindful eating and wellbeing are provided in context of the two health behaviours examined; exercise behaviour and fruit and vegetable consumption, while also discussing the role of self-compassion and self-efficacy. Next, the perceived limitations of the study are outlined. This is followed by the implications of the findings and recommendations for future research on mindful eating. Lastly, a summary and overall conclusion of the present study are discussed.

The objective of the current study was to investigate the relationship between mindful eating and wellbeing, aiming to identify how mindful eating may influence the health behaviours of physical activity and fruit and vegetable intake. Self-compassion and self-efficacy were also investigated as additional individual factors that may enhance the effectiveness of mindful eating. The majority of individuals in the present study had previously heard of the practice of mindful eating. Over half of those had previously engaged in the practice, perhaps highlighting its increasing prevalence. Overall, findings increased knowledge regarding mindful eating and its relationship with individual wellbeing.

#### **4.1 Mindful Eating and Exercise Behaviour**

Previous research is inconclusive regarding the relationship between frequency of physical activity and mindful eating. Some research suggests higher amounts of physical exercise are associated with being low in mindfulness and having a lack of awareness of food (Moor, Scott, & McIntosh, 2013), although this relationship is likely confounded by the type of physical activity engaged in. Findings of the present study showed physical activity frequency was significantly correlated with mindful eating. The majority of participants in the present study did engage in some form of physical exercise for at least 30 minutes or more, on most days. Only 38 participants did not exercise at all each week. Those individuals who were lower in mindful eating behaviours also reported exercising less frequently. Although there were associations of higher mindful eating with increased frequency of exercise, it is also important to distinguish differences in mindful eating associated with different types of



exercise (Martin et al., 2013). Previous research suggests participation in low-cardio physical activity is significantly related to greater awareness of eating behaviours, when compared with those who participate in high-cardio physical activity. That is, the higher an individual is in mindful eating does not necessarily reflect higher frequency in all types of physical activity. There are particular types of physical activity that encourage more awareness of breath and body, much like mindful eating practice (Martin et al., 2013).

The present study hypothesized mindful eating would be related to physical activity, such that a positive relationship would be evident between mindful eating and low-cardio activity, while a negative relationship would be evident between mindful eating and high-cardio activity. Contrary to previous findings, the present study revealed there were no significant differences in participant's mindful eating scores according to their participation in either high- or low-cardio physical activity. However, this does not necessarily mean there are no mindful eating differences according to exercise types. The majority of participants in the present study mainly engaged in low-cardio physical activity or a combination of both high- and low-cardio physical activity. A small minority engaged in low-cardio activity alone. Investigating mindful eating among a wider sample that included a range of individuals who engage in only high-cardio or only low-cardio activity may have helped to distinguish more notable differences. Additionally, further clarifying the specific type of low-cardio activity engaged in may assist with identifying which types have a stronger link to mindful eating. For example, if focusing on more breathing-based, guided exercise such as yoga assists greater body awareness, positive relationships with food and higher mindful eating behaviours, then this type of activity needs to be fostered as a determinant of increasing wellbeing. Further inquiry, beyond just high- or low-cardio, identifying the specific types of exercise (i.e. yoga, running, hiking) that are more likely to promote mindful eating and its subsequent health benefits, would be of great value for future wellbeing studies.

There were two moderating factors investigated in the present study hypothesized to enhance the effectiveness of mindful eating and health behaviour outcomes; self-compassion and self-efficacy. Firstly, the relationship between mindful eating and self-compassion was examined. As hypothesized, mindful eating and self-compassion had a significantly strong positive correlation and the highest correlation amongst all variables within the study. Those individuals lower in mindful eating were significantly lower in self-compassion, when compared with those higher in mindful eating. These findings mirror previous research by Taylor, Daiss and Krietsch (2015) suggesting people with higher self-compassion are more

likely to make respectful, nourishing choices for their body and how they consume food. Engaging in mindful eating with a self-compassionate approach means the practice is perhaps more likely to be attempted successfully and be sustained long-term, as both behaviours complement each other. The results could also suggest that individuals with more self-compassion are better at identifying negative thought patterns and more lenient or understanding of their own faults and inadequacies, something that mindful eating encourages. Encouraging awareness of thought patterns presented within the practice and approaching them with a more self-compassionate, non-judgmental understanding means that mindful eating is certainly more of a positive, effective experience.

The present study also investigated whether self-compassion moderates the relationship between mindful eating and physical activity. Results revealed mindful eating alone accounted for 3% of the variance in physical activity frequency. When self-compassion was added to the equation it only accounted for an additional .1% of the variance in physical activity. Although these results are positive, the effect of mindful eating on physical activity and the combined effect of mindful eating and self-compassion on physical activity were minimal. Although the concepts may correlate highly, this finding reveals self-compassion has a lack of influence in the mindful eating and physical activity relationship, contrary to previous research findings (Mantzios & Wilson, 2014; Soysa & Wilcomb, 2015). There are a number of reasons this lack of influence could be occurring.

Firstly, the measure of self-compassion (SCS-SF) may not give a true indication of an individual's actual self-compassion, due to the questionnaire being solely self-reported. Although the SCS-SF is validated, self-reporting needs to be accounted for when considering individual results (Neff, 2018). For example when individuals are asked about desirable qualities (such as self-compassion), individuals may select answers they aspire to be true, as opposed to their actual health behaviours. This means answers given may not be representative of the actual levels of those variables. Strauss et al. (2016) argue there is also a need to redefine self-compassion and currently there are no psychometrically robust self- or observer-rated measures. Results in the present study showing self-compassion to have little influence in the mindful eating and health behaviour relationship could mean the questionnaire is only capturing a partial picture of self-compassion. Acts of self-compassion are often 'invisible' and there is a danger of measuring what is easy to quantify in questionnaires rather than the actual concept. Self-compassion may be more accurately identified and observed through individual interactions and daily functioning, rather than being self-reported.

A related issue is that mindfulness and self-compassion may be so similar, they are difficult to differentiate psychometrically. For example, Neff and Dahm (2015) suggest self-compassion is about kindness to self rather than harsh self-criticism and judgement; which is similar to the definition of mindfulness. Both mindfulness and self-compassion are constructs drawn from Buddhist philosophy, and the nature of the relationship between mindful eating and self-compassion is still under exploration. This study offers no further explication of the differentiation between the two constructs (as this was not a purpose of the research), although the lack of differentiation could reasonably contribute to the lack of moderating influence of self-compassion on the mindful-eating and physical activity relationship.

As noted above with the correlations of mindful eating and exercise, there was also no further clarification of what specific types of high or low cardio exercise individuals participated in such as yoga, pilates, running, jogging or cross-fit. Previous studies have shown involvement in breathing based activity such as yoga and pilates create more openness to self-compassion and being kind and gentle with oneself (Neff & Dahm). Further clarifying exercise beyond just high- or low-cardio may highlight specific types of activity that are enhanced by the combination of self-compassion and mindful eating. Although previous studies have theorized about the ability of self-compassion to enhance the effectiveness of eating and health behaviours, this is still under exploration. Therefore, a valid explanation for the lack of influence of self-compassion shown within the present study could be it simply is not relevant to the relationship between mindful eating and physical activity.

The second moderating variable investigated in the mindful eating and physical activity relationship was self-efficacy. Self-efficacy has previously shown significant effects in the relationship between mindful eating and health behaviour outcomes (Hart, 2014). This was also the case in the present study with self-efficacy showing a significant positive relationship with both mindful eating and physical activity. The results could also suggest, having a more mindful approach to eating promotes self-efficacy, or that increased physical activity also promotes concepts like individual self-efficacy. Previous research suggests self-efficacy encourages further continuation of the mindful eating practice (Rott et al., 2008), although the direction of influence is still yet to be determined.

Significant differences in self-efficacy according to individuals being higher or lower in mindful eating were also apparent, with a significantly positive relationship noted between the variables. As O'Leary (1985, 1992) previously found perceived self-efficacy plays a

meaningful role in the effectiveness of changing health behaviours. Individuals with high self-efficacy feel they have an increased sense of will and control in their eating choices. Those individuals with higher self-efficacy may also be likely to have a higher sense of self-esteem, which also promotes confidence in one's ability. Having high self-esteem may mean individuals engage more with mindful food consumption as opposed to engaging in negative eating or disordered behaviours that are associated with having lowered self-esteem. It may also be useful to investigate further the role self-esteem and body image may play in individual health behaviour and decisions.

The role of self-efficacy was further explored as a potential moderator in the mindful eating and physical activity relationship. When self-efficacy was added to the equation there was an additional .4% increase in physical activity frequency. Mindful eating and self-efficacy had a combined variance of 3.7% on physical activity. These results reveal there is a small positive effect on physical activity frequency when mindful eating and self-compassion are utilized together. Although results are slight, this is still in line with previous findings (Strecher et al., 1986, Hart, 2014) demonstrating self-efficacy to have some influence on health behaviour outcomes, such as exercise.

There are a few other potential influences to consider that may contribute to and explain the lack of influence self-efficacy demonstrated in the mindful eating and physical activity equation. For example, preconceived perceptions about the difficulty involved when eating mindfully may effect whether individuals engage and continue working past unsuccessful attempts. It also may be that concepts such as self-efficacy are not easily learnt and have more to do with the way individuals have been nurtured throughout their lifetime. This may mean parents or role models of individuals have encouraged similar values and demonstrated behaviours such as giving up or persisting in difficult situations. Modelling has been shown to be a large determinant of affecting individual self-efficacy (Bandura, 2006). For example, when we see someone succeeding our own self-efficacy increases, alternatively when we observe people failing our self-efficacy decreases.

There may be a lack of knowledge about what mindful eating may look like in practice or individuals may decide mindful eating is simply not relatable or 'not for them' creating barriers to the openness or likelihood of attempting the practice. Although just over half of the individuals within the present study said they had both heard of and engaged with mindful eating, these previous attempts may have had their own impact in the study. It could be that

individuals have engaged in the practice and were given incorrect information or had negative experiences therefore influencing any future attempts or potential benefits. There was no indication in the present study of whether the individual's previous experience of mindful eating was positive or negative, which could have influenced their approach and answers throughout the questionnaire. It is also possible individuals may simply choose not to engage in physical activity by choice perhaps because of a range of health ailments. These circumstantial barriers then influence how mindful eating might affect health outcomes as they change an individual's ability to participate in physical activity.

Practical issues such as income and availability to food may have also played a significant role in health and eating behaviours of individuals within the present study. For example, a person may be mindful of the benefits making healthier food choices has perhaps even mentally supporting diets such as veganism. However, due to issues such as accessibility to foods, the time available to prepare it, or income there is an impact on their self-efficacy to actually consume such foods. These practical barriers affect individual self-efficacy and the likelihood of participating in mindful eating practice and subsequent involvement in physical activity. As with self-compassion, additional reasoning behind the lack of influence self-efficacy demonstrated in the present study could be simply measuring an individual's self-efficacy levels according to the GSES may not be reflective of their actual self-efficacy in a real life situation. Although the GSES is widely used, the highly subjective concept of self-efficacy can be hard to measure accurately. Recent research by Zhou, Chun and Kam (2016) implies that measuring general self-efficacy and measuring hope are intrinsically the same thing and research in both these areas should be integrated. Perhaps using a measure of hope such as the Dispositional Hope Scale would have revealed a stronger influence in the mindful eating and exercise relationship.

Another consideration in the mindful eating and exercise relationship is the potential disconnect individuals may have occurring between the body and the mind. Until recently health and wellbeing has been largely dictated by only physical determinants. Therefore, there is a potential disconnect that takes place for individuals between the health of the mind and its relationship to physical health. On one hand some individuals are greatly aware of the intimate link between the need to exercise well and eat well and its impact on psychological wellbeing. However, on the other hand nutrition and physical exercise may be approached with having a sole focus on the physical gains or the aesthetic benefits. This disregards any psychological, emotions and 'feel good' benefits involved. The concept of mindful eating may be so far

removed from some individuals idea of what health behaviour looks like they see little relevance in the practice. Disconnection between the body and mind would also explain the lack of influence of concepts such as self-efficacy on health behaviours in the present study.

## **4.2 Mindful Eating and Fruit and Vegetable Intake**

Previous research suggests mindful eating is strongly influential to making healthier food choices such as increased fruit and vegetable intake (Jordan, Wang, Donatoni & Meier, 2014; Kristeller & Wolever, 2011). When investigating food choices of individuals in the current study the majority reported consuming 5 or more portions of fruit and vegetables (the current recommended daily intake) 7 days a week. The present study also revealed mindful eating was significantly positively correlated to the amount of fruit and vegetables individuals consumed. Additionally, individual fruit and vegetable intake also correlated highly with physical activity frequency and self-compassion. As previous studies have suggested, those who make healthier food choices are also likely to be more self-compassionate and to participate in higher amounts of physical activity (Taylor et al., 2015).

The present study also identified differences in individual fruit and vegetable intake according to the level of mindful eating. Participants higher in mindful eating reported eating fruit and vegetables more frequently than those who scored lower in mindful eating. This mirrors previous findings by Gilbert and Waltz (2010) where the degree of mindfulness in everyday life predicted individual fruit and vegetable intake, as well as being related to self-efficacy and physical activity. The present study findings also reflect learnings from previous studies (Kristeller, 2003; Jordan, Wang, Donatoni & Meier, 2014) suggesting individuals with increased awareness around food become more attuned to the way specific foods make them feel, which in turn encourages healthier food choices. Increased fruit and vegetable consumption means individuals notice physically feeling better during a meal even having positive physical symptoms sometime after consumption, such as increased energy and less bloating. Increased energy from consuming the required nutrients from healthier food choices means individuals are supporting their body with the fuel it needs to properly function, potentially assisting readiness to exercise more frequently. This may explain the high correlation between physical activity and fruit and vegetable intake within the present study. High levels of mindful eating may also reflect higher fruit and vegetable intake in the present study, as individuals who engage in mindful eating are already attuned to caring about the

health of their body and have an invested interest in providing themselves with the key nutrients it needs.

However, the link between high fruit and vegetable consumption and eating mindfully may not be as clear cut. Individuals may also choose to consume higher amounts of fruit and vegetables for a number of reasons, including wanting to restrict their calorie content. Consuming a large amount of fruit and vegetables does not necessarily mean they are consumed mindfully. It may be that those who are mindful eaters increase healthier food intake but this does not mean having a healthier food intake increases mindful eating. Clarification is also needed when measuring fruit and vegetable consumption, as there are many misunderstandings in the old-fashioned '5-a-day' message. In recent research by Rooney et al. (2016) findings suggest the portions and consumption of vegetables needs to be well above the '5 a day' mark to reflect any worthwhile differences in individual health outcomes. Participants may have selected consuming the required portions of fruit and vegetables 7 days a week however there was no consideration of the portion size, quality or variety. Redefining these historical indicators of what constitutes a healthy food choice or portion would be needed in any future research to ensure the accuracy of any health conclusions made. Addressing these alongside gaps in the nutritional knowledge of individuals would help to assist any future campaigns in better understanding health behaviours.

As with physical exercise above, self-compassion and self-efficacy were both investigated to demonstrate their potential influence in the relationship between mindful eating and fruit and vegetable intake. Firstly identified was the role of self-compassion in the relationship. Previous literature supports the ideal of self-compassion being a strong influence in the practice of mindful eating and health behaviours such as dietary intake (Taylor et al., 2015; Mantzios & Wilson, 2014; Soysa & Wilcomb, 2015). However, results revealed mindful eating alone was accountable for 4.3% of the variance in individual fruit and vegetable intake. When the moderating effects of self-compassion were considered the present study revealed self-compassion only accounted for an additional 1% of the variance in individual fruit and vegetable intake. Therefore the combination of mindful eating and self-compassion only explained 5.3% of fruit and vegetable consumption.

The lack of influence self-compassion has in this relationship within the present study needs to acknowledge a number of wider considerations. The Self Compassion Scale-Short Form utilized within the study is a shortened version of the original Self Compassion Scale

which may prove more accurate in accessing self-compassion. Also worth considering are the subscale scores and meanings which are less reliable within the short form of the scale (Raes, Pommier, Neff & Van Gucht, 2011). Although the SCS-SF has been validated, its relevance to the present study may be minimal as there is no all-purpose measure of self-compassion. Items in a particular measure are usually cast in general terms disregarding situational demands and circumstances and may have little relevance or predictive value. Neff (2003) maintains scales of self-compassion must be tailored to the particular domain of functioning that is the object of interest. Tailoring the measure of self-compassion with a focus on mindful eating and exercise behaviour may have provided more significant results.

It is also possible individuals higher in self-compassion do not give their food intake as much criticism in terms of what they eat or what the long term health benefits are. Mindful eating and self-compassion both share aspects of non-judgement and focusing on feelings and emotions in the present moment. Viewing dietary intake in this way may mean little thought is given to the future repercussions of choices made ‘in the moment’. This could explain the lack of influence self-compassion plays as a moderator in the present study. Although individuals may eat mindfully and have high self-compassion, this may not increase the likelihood to consume healthier food. Accepting dietary imperfections without criticism of inadequacies may mean individuals are more content with their food choices and do not view them as needing any change. Self-compassion has also been shown to act as a buffer against the self-stigma associated with overweight and obesity (Hilbert et al., 2015). This may mean individuals who are overweight and also have higher self-compassion are more accepting of their physical state because of lowered negative thoughts and feelings towards themselves. This would give reasoning for the lack of influence shown in the present study as individuals who are more mindful and self-compassionate may not see a need to change their health behaviours, instead they learn to view themselves in a less self-judgmental light.

The second individual factor investigated as a moderating variable in the mindful eating and fruit and vegetable relationship was self-efficacy. Self-efficacy likewise showed a small positive influence on the amount of fruit and vegetables individuals consumed. In the current study when self-efficacy was added to the mindful eating and fruit and vegetable relationship equation it accounted for an additional .4% with a combined variance in fruit and vegetable intake of 4.6%. Again, these findings are positive but small. The relationship of self-efficacy to fruit and vegetable intake has previously been found to play a crucial role in counteracting self-doubt and encouraging the likelihood of maintaining a long term change in food



consumption (Gilbert & Waltz, 2010). As above with exercise behavior, although the size of influence of self-efficacy is small this does not mean self-efficacy is not a key influencer in the relationship between mindful eating and fruit and vegetable intake.

These results need to be considered in light of other practical factors not investigated in the present study. As noted with physical activity above, socio-cultural factors may play a role in the mindful eating and food intake relationship. Obtaining an indication of socio-economic status of individuals in the present study may have been useful to identify discrepancies in their subsequent food consumption. It may be that individuals may know the benefits of higher fruit and vegetable consumption, but not have the financial means to purchase such foods, or there may be other compounding issues, such as lack of transport to and from shops selling these items. Secondly, cultural upbringing and roles within households may mean individuals have less say over what types of food are prepared for meals. Perhaps asking about an individual's perception of choice in their food intake would have also been beneficial. Having certain personality characteristics may also play a role in the strength of this relationship. Individuals who practice mindful eating may, for whatever reason, readily adopt self-care strategies such as self-compassion and self-efficacy. Particular personality types with more prominent behavioral characteristics, such as striving for self-improvement and heightened self-awareness, may have an increased likelihood of being exposed to mindful eating due to their own invested education and interest in such ideals. These individuals may also be more likely to nourish their body with the best possible food choices and consciously choose to engage in more frequent physical activity.

Another consideration why self-efficacy may have played a diminished role in the present study is, rather than being a moderating variable, it may instead act as a mediator and prevent relapse towards unhealthy behaviours. Individuals who consume higher amounts of fruit and vegetables and are higher in mindfulness may have increased self-efficacy, as individual success raises self-efficacy and failure lowers it. In the present study this may explain why self-efficacy correlates highly with both mindful eating and health behaviours, but does not show a moderating effect in the relationship. Alternatively, it could be the successful continuation of both mindful eating and health behaviours that promotes and enhances higher self-efficacy as individuals gain successful results from these behaviours.

Notably, the present study only contained one question enquiring about individual fruit and vegetable intake. A more comprehensive examination into the dietary intake of individuals

perhaps using a scale such as the Food Frequency Questionnaire, would give a more accurate record of what individuals consume. The FFQ delves deeper into food consumption patterns by analyzing individual food frequency over a 12 month period. This alone would add value to the research as it provides a more in-depth analysis on an individual's food behaviour. Additionally, the FFQ captures the habitual food intake of 154 food items with intake frequency ranging from 'never or less than once per month' to 'two or more every day' (Sam, Skeaff & Skidmore, 2014). Questions cover a wide variety of nutritional information including beverages consumed, cooking methods and even supplement use. Obtaining this kind of detailed information would be highly valuable in accurately understanding individual food consumption. This may also give the ability to identify the types of long term habitual food consumption that negatively impact health outcomes, which would be valuable to the wellbeing field. A broadened investigation of food intake is needed and may highlight a more significant relationship with individual factors like self-compassion and self-efficacy.

In summary, exercising more frequently and consuming more fruit and vegetables are shown to have significant correlations with mindful eating and promote better overall wellbeing and health. However, it is difficult to determine the direction of influence with these variables. Those who eat mindfully may be more involved in such health behaviours or those who participate in a higher frequency of health behaviours may in turn become more conscious and mindful with their food choices. As discussed above there are many other variables influential to this relationship. The individual variables of self-compassion and self-efficacy appear to have some influence in the mindful eating and health behaviour relationship, although this is minimal with the direction of influence also unclear. The lack of influence of these factors in the present study needs to take into consideration the above factors such as measures used and other extraneous variables that influence overall outcomes. Also an openness to the conclusion that self-compassion and self-efficacy may not play any significant role in the relationship between mindful eating and health behaviour outcomes needs to be considered. It could be the understanding of any links made around these concepts is simply theorized and misunderstood, needing further examination.

### **4.3 Limitations of the Current Study**

Despite the findings demonstrating some positive results they need to be considered in light of the following limitations. Firstly, as with previous studies in this area (e.g., Khan & Zadeh, 2014), participants were 90 percent female. This gender disproportion suggests health

and wellbeing studies might appeal more to the female population who are perhaps more concerned with their diet and health.

Secondly, caution is needed when generalizing the results to a wider population. As participants were recruited on a voluntary basis this implies they already have an increased health consciousness and interest in nutritional issues. As with the study by Martin et al. (2013), completing the questionnaire may have attracted those who engage in healthier lifestyles and are more invested in their health choices. This gives a skewed representation of the general population. Further supporting this notion, the majority of participants within the present study were not classed as being 'obese' or overweight. Drawing any conclusions from a sample where the majority of individuals are not overweight obscures the data and is not reflective of the behaviour of individuals from a variety of weight categories. It may be that individuals who are obese have a vastly different relationship with food than demonstrated in the present study. Investigating the behaviour of more overweight individuals may also give a better understanding of the eating behaviours and foods associated with lower mindful eating, such as convenience foods and takeaways. Making sure to include wider weight range of participants would allow for more representative, conclusive results and widen understanding of mindful eating.

The social desirability bias must also be considered a limitation within the present study. The wellbeing questionnaire and all dietary information was self-reported. This means participants could select answers that portrayed themselves in a better light or perhaps select answers that they would have liked to be true for themselves. The social norms in New Zealand tend to idolize having a healthy, slimmer figure despite much of the population being overweight. Individuals are more likely to select answers in line with these social norms perhaps making them feel more accepted. Therefore, collecting self-reported information on weight and food intake needs to account for errors in the accuracy of responses due to social desirability, underreporting or an inaccurate perception of actual behaviours. Further information is also needed from participants around exercise and food consumption. Obtaining an observational or longitudinal representation of individual physical activity and food intake would mean data collected was more accurate. More in-depth questionnaires such as the FFQ outlined above investigating the variety of food being consumed and similar monitoring physical activity, would help to give more accurate data and help avoid social desirability. It is also important to identify fruit and vegetable intake is only a very limited indicator of food consumption. The amount of fruit and vegetables consumed does not account for the way in

which it was cooked beforehand, any variety in the types of fruit and vegetables consumed or give any recognition to the nutritional density.

Another limitation to consider is the cultural and ethnic diversity of the participants within the study. The large majority of participants within the present study were New Zealand European, which does not adequately represent the vast diversity of the general population. Having a largely westernised representation of the mindful eating and wellbeing relationship may mean findings with concepts like mindful eating and self-compassion are less prevalent due to these concepts being rooted in Buddhism and collectivist societies. The way food is used culturally and socially within groups is diverse. For many cultures, food demonstrates a resource used to communicate, maintain respect and show hospitality. This may contrast with the way food consumption may be generally represented within a westernized society with a more individualistic focus on what or how food is consumed. Results of the present study largely represent a westernized view of food consumption not accounting for this cultural diversity. Health behaviours such as food consumption are extremely diverse across cultures and any future studies would benefit by actively engaging participants from ethnically diverse backgrounds.

Alongside any culture considerations, the way health and wellbeing is modelled within the family context also needs to be recognised. Recent research by Webb, Rogers, Etzel and Padro (2018) delved deeper into family culture evaluating the sociocultural model of family fat talk and positive body image in relation to mindful eating. The influence of family factors and parental commentary were investigated to highlight the strong impact they have on individual disordered eating. The association between family fat talk and negative body commentary showed an inverse relationship with mindful eating and body appreciation. There were also discrepancies in the awareness of how food functions within the body according to whether families had encouraged a positive or negative relationship with food. This highlights the growing need to consider a wide range of psychological influences, such as family factors, that may disrupt an individual's own appreciation for the workings of the body and their relationship with food. Acknowledging individual differences in the psychological influence of embedded parental roles and exposure to certain types of modelling in the relationship with food makes sense when researching ways to best support mindful eating. Previously learnt psychological constructs impact attunement with body functionality, ongoing food relationships and responsiveness to hunger or satiety cues. Khan and Zadeh (2014) support the importance of not focusing solely on physical influences, but to include a background of how

an individual's health relationship has been established over their lifetime. Having a more holistic view of health is important in determining overall wellbeing and would be beneficial in any future research on mindful eating.

#### **4.5 Implications of the Findings and Recommendations for Future Research**

The findings of the present study contribute to the currently limited and underdeveloped research area of mindful eating. The present study demonstrates significant correlations with the practice of mindful eating, individual factors and health behaviour outcomes. Although causal relationships cannot be concluded, evidence suggests mindful eating is indeed influential to individual health behaviour outcomes, specifically physical activity and fruit and vegetable intake. The results of the present study also point to several other implications and provisional conclusions.

One of the most pertinent findings of the present study is how mindful eating may be used to help to counteract the current obesity epidemic. Fostering mindful eating practice offers a new approach to the epidemic and demonstrates real-world implications for improving health behaviours. The current way the obesity epidemic is being addressed is not working. As shown throughout the present study mindful eating practice plays a role in encouraging the positive health outcomes for individuals. Mindful eating maintains a unique focus on the awareness of the *way* food is consumed as opposed to previous unsuccessful attempts at reducing obesity which focus solely on the caloric value of food. There has been little movement in the medical community away from the well-known biomedical model. The slow movement may be due to lack of exposure to evidence supporting the idea of a more holistic biopsychosocial model of health (Astin, Shapiro, Eisenberg & Forsys, 2003). Clinicians trying to combat the obesity epidemic often lack the exploration of the psychological aspects involved, such as those identified with the practice of mindful eating. Clinicians would greatly benefit from recognizing the role of thoughts and emotions involved in health behaviour decisions and outcomes. The present study also advances the determinants of obesity and why this is such a prevalent issue in today's society. With faced paced lifestyles and 'auto-pilot' consumption ever increasing, the demand for increasing awareness in the moment is key to altering current health behaviours. It is a matter of educating individuals about alternative ways of approaching their current behaviours around food. Hart (2014) states mindful eating will lead to improved lifestyle factors and increasingly better physical and mental health. With the current obesity

epidemic at an all-time high, supporting solutions such as mindful eating would be a step in the right direction towards counteracting obesity.

At a societal level the results of this study may help also to raise awareness around behaviours involved in eating disorders. Mindful eating identifies thought patterns and behaviours that negatively impact on physical and mental health. It appears many individuals are unaware of their eating habits and food consumption, which in some cases may lead to emotional eating and binge eating. Supporting awareness around consumption patterns through mindful eating would help to identify the thoughts and emotions that surround eating disorders. Additionally, the influence of mindful eating on health behaviours such as physical activity may also have implications for overall individual mental health. Engagement in physical activity has been shown to increase mental health outcomes and relieve symptoms of anxiety and depression. Learning to recognize and understand the thoughts and emotions involved in tasks such as eating, may mean individuals are better able to recognize their thoughts and emotions in other areas of their lives. If increasing mindful eating in turn promotes a higher engagement in physical activity and its subsequent benefits on mental health, this is also an avenue worth investment.

It is evident from the findings above that in order to further develop the mindful eating and wellbeing conversation, additional research is essential. It would also be helpful to consider asking additional questions around psychological wellbeing. An individual's emotional wellbeing, their unique body image awareness and relationship to self plays an important role in their subsequent health choices. The current study focused on participation in physical health behaviours such as exercise and fruit and vegetable intake. This means only a physical indication of a person's wellbeing was being represented. It may be that individuals who do not participate in the recommended amount of physical activity or fruit and vegetable consumption do still obtain a confident and well-rounded sense of wellbeing. Future research in wellbeing should consider utilizing a psychological wellbeing assessment measure to identify levels of wellbeing in individuals regardless of their physical health outcomes. Hulbert-Williams, Nicholls, Joy and Hulbert-Williams (2014) believe an individual's relationship with food dictates their physical and psychological health. Increasing research in the area of mindful eating would enhance understanding around food relationships and establish the impact the relationship has on overall wellbeing.

## **4.6 Summary and Conclusion**

The present study has successfully contributed to a very limited body of research on mindful eating. Advocating for an awareness on a new perspective to food consumption may be the pivotal change the obesity epidemic needs. As previous attempts continue to focus on deficits and diet restriction, mindful eating instead is designed to slow down the process, appreciating all aspects of the human body and its functionality.

The current study investigated the relationship between mindful eating and physical activity and fruit and vegetable intake. Mindful eating had a positive but small influence on the two health behaviour outcomes. Further, the individual factors of self-compassion and self-efficacy were investigated as moderating variables in the mindful eating and health behaviour relationship. These individual factors were found to have high correlations with both mindful eating and health behaviours, but minimal influence as moderating variables. It is clear a considerable amount of individual variables need to be acknowledged in the task of evaluating what is influential to mindful eating and wellbeing. It is important to continue further investigation in the understanding of mindful eating and its role in health behaviours and individual wellbeing.

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## **Appendix A**

### **Mindful Eating and Wellbeing Information Sheet**

#### **Who is doing this research?**

My name is Stephanie Barnett and I am a Masters student in the School of Psychology at Massey University in Palmerston North. I am completing this research as part of a Master of Arts, and am being supervised by Doctor Natasha Tassell-Matamua.

#### **What is this research about?**

For some time now I have been interested in the practice of mindfulness and its potential benefits. I am particularly interested in the concept of Mindful Eating and its relationship to physical and mental wellbeing. There has been some research that supports the potential outcomes of Mindful Eating, while other studies suggest it is just a ‘fad’ concept that holds no real scientific value. This study hopes to increase understanding about mindful eating, and contribute more to debates in this area.

#### **What is involved?**

Participation in this research simply involves completing an online questionnaire, which should take no more than 20 minutes of your time.

#### **Who can participate?**

If you are 18 years or older, you are invited to participate in this research. You do not have to have any previous experience or knowledge of Mindful Eating.

#### **Your rights as a participant:**

You are under no obligation to accept this invitation. But, if you decide to participate, you have the right to decline to answer any particular question, and may contact me to ask questions at any time. In order to protect your privacy the survey is anonymous, and I will not be able to identify who you are or which responses are yours.

Data resulting from this research will be securely stored at Massey University for 5 years, after which it will be destroyed. The information you provide will be used in my Master’s thesis and submitted for assessment, and the findings may be published in scientific journals or presented at scientific conferences in New Zealand and overseas.

A summary outlining the findings of this research will be available at the completion of the research. There will be an option for you to request this summary at the completion of the questionnaire.

This project has been evaluated by peer review and judged to be low risk. Consequently it has not been reviewed by one of the University's Human Ethics Committees. The researcher(s) named in this document are responsible for the ethical conduct of this research.

If you have any concerns about the conduct of this research that you want to raise with someone other than the researcher(s), please contact Dr Brian Finch, Director (Research Ethics), Email: [humanethics@massey.ac.nz](mailto:humanethics@massey.ac.nz).

### **Contact Information**

If you have any further questions please feel free to contact my supervisor or me.

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## Appendix B

### Mindful Eating and Wellbeing Questionnaire

#### Demographic Information

In this section, I would like to know a little more about you. Please respond by selecting or filling in the relevant answers below.

What is your current age?

- 18 to 19 years
- 20 to 29 years
- 30 to 39 years
- 40 to 49 years
- 50 to 59 years
- 60 years or over
- 

What is your gender?

- Male
- Female
- Other

Which ethnic group/s do you belong to?

*(If your answer includes more than one ethnic group, please indicate which one you consider to be your primary ethnicity).*

- New Zealand European
- Māori
- Samoan
- Cook Island Māori
- Tongan
- Niuean
- Chinese
- Indian
- Other

What is the **highest** level of education you have completed?

- High School
- Polytechnic or trade certificate
- Bachelor Degree
- Honour's Degree
- Master's Degree
- Doctoral Degree
- Professional Degree (JD, MD)

What is your current occupation?

What is your current weight in kilograms?

- Less than 45 kg
- 46 - 55 kg
- 56 - 65 kg
- 66 – 75 kg
- 76 – 85 kg
- 86 – 95 kg
- 96 – 105 kg
- 106 – 115 kg
- 116 – 125 kg
- 126 – 135 kg
- 135 or more
- I would prefer not to say

What is your current height in centimetres?

- \_\_\_\_\_cm
- I would prefer not to say

Have you heard of the practice of mindful eating before?

- Yes or No

If yes to above - Have you engaged in the practice of mindful eating before?

- Yes or No

How many days each week do you engage in at least 30 minutes or more of physical activity?

0, 1,2,3,4,5,6,7.

When you engage in physical activity would you say that it is:

- High Cardio (e.g., Running, Aerobics, Cycling)
- Low Cardio (e.g., Yoga, Pilates, Walking)
- A mixture of both
- Not applicable

How many days each week do you eat the commonly recommended 5 portions of fruit and vegetables each day?

0, 1,2,3,4,5,6,7.

*In this section, I would like to know about some of the behaviours and emotions you engage in when eating food or in a food related environment. Please choose the options that best fit with your current behaviours and emotions. There are no right or wrong answers.*

Please read each statement carefully before answering and tick the most relevant box that applies. Never/Rarely, Sometimes, Often, Usually/Always

1. *I eat so quickly that I don't taste what I'm eating.*
2. *When I eat at "all you can eat buffets, I tend to overeat. 5<sup>th</sup> 'tick box' - I don't eat at buffets.*
3. *At a party where there is a lot of good food, I notice when it makes me want to eat more food than I should.*
4. *I recognize when food advertisements make me want to eat. Food ads never make me want to eat. 5<sup>th</sup> 'tick box' – Food ads never make me want to eat.*
5. *When a restaurant portion is too large, I stop eating when I'm full.*
6. *My thoughts tend to wander while I am eating.*
7. *When I'm eating one of my favourite foods, I don't recognize when I have had enough.*
8. *I notice when just going into a movie theatre makes me want to eat candy or popcorn. 5<sup>th</sup> 'tick box' – I never eat candy or popcorn.*
9. *If it doesn't cost much more, I get the larger size food or drink regardless of how hungry I feel.*
10. *I notice when there are subtle flavours in the foods I eat.*
11. *If there are leftovers that I like, I take a second helping even though I'm full.*
12. *When eating a pleasant meal, I notice if it makes me feel relaxed.*
13. *I snack without noticing that I am eating.*
14. *When I eat a big meal, I notice if it makes me feel heavy or sluggish.*
15. *I stop eating when I'm full even when eating something I love.*
16. *I appreciate the way my food looks on my plate.*
17. *When I'm feeling stressed at work, I'll go find something to eat. 5<sup>th</sup> 'tick box' – I don't work.*
18. *If there's good food at a party, I'll continue eating even after I'm full.*
19. *When I'm sad, I eat to feel better.*
20. *I notice when foods and drinks are too sweet.*
21. *Before I eat I take a moment to appreciate the colours and smells of my food.*
22. *I taste every bite of food that I eat.*
23. *I recognize when I'm eating and not hungry. 5<sup>th</sup> 'tick box' – I never eat when I'm not hungry.*
24. *I notice when I'm eating from a dish of candy just because it's there.*
25. *When I'm at a restaurant, I can tell when the portion I've been served is too large for me.*
26. *I notice when the food I eat affects my emotional state.*
27. *I have trouble not eating ice cream, cookies, or chips if they're around the house.*
28. *I think about things I need to do while I am eating.*

## Self-Compassion

In this section, I want to know how you typically act towards yourself in times of difficulty. There is no right or wrong answers. Just choose the option that you believe best represents your behaviour.

Please read each statement carefully before answering.

Indicate how often you behave in the stated manner, using the following scale:

Almost Never 1   2   3   4   5   Almost Always

1. When I fail at something important to me I become consumed by feelings of inadequacy.

\_\_\_\_\_

2. I try to be understanding and patient towards those aspects of my personality I don't like.

\_\_\_\_\_

3. When something painful happens I try to take a balanced view of the situation. \_\_\_\_\_

4. When I'm feeling down, I tend to feel like most other people are probably happier than I am. \_\_\_\_\_

5. I try to see my failings as part of the human condition. \_\_\_\_\_

6. When I'm going through a very hard time, I give myself the caring and tenderness I need.

\_\_\_\_\_

7. When something upsets me I try to keep my emotions in balance. \_\_\_\_\_

8. When I fail at something that's important to me, I tend to feel alone in my failure \_\_\_\_\_

9. When I'm feeling down I tend to obsess and fixate on everything that's wrong. \_\_\_\_\_

10. When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people. \_\_\_\_\_

11. I'm disapproving and judgmental about my own flaws and inadequacies. \_\_\_\_\_

12. I'm intolerant and impatient towards those aspects of my personality I don't like.

## **Self-Efficacy**

In this section, I am looking at your general self-efficacy. Self-efficacy involves the belief in one's ability to succeed in specific situations or accomplish a task. There is no right or wrong answer so please just choose the answers that best reflect your behaviour.

Please read each statement carefully before answering.

Indicate how often you behave in the stated manner, using the following scale:

Rating Scale:

1 = Not at all true 2 = Hardly true 3 = Moderately true 4 = Exactly true

Items:

1. I can always manage to solve difficult problems if I try hard enough.
2. If someone opposes me, I can find the means and ways to get what I want.
3. It is easy for me to stick to my aims and accomplish my goals.
4. I am confident that I could deal efficiently with unexpected events.
5. Thanks to my resourcefulness, I know how to handle unforeseen situations.
6. I can solve most problems if I invest the necessary effort.
7. I can remain calm when facing difficulties because I can rely on my coping abilities.
8. When I am confronted with a problem, I can usually find several solutions.
9. If I am in trouble, I can usually think of a solution.
10. I can usually handle whatever comes my way.

## **Support people to contact for further information and/or help:**

### **Eating Disorder Services**

- Eating Disorder Association of New Zealand  
Phone: 0800 2 EDANZ or (09)5222679  
Email: [info@ed.org.nz](mailto:info@ed.org.nz) WEB: <http://www.ed.org.nz/>
- <http://nzeatingdisorderspecialists.co.nz/>

### **Health, Obesity and Weight support services**

- <http://www.health.govt.nz/>
- <http://www.nutritionfoundation.org.nz/nutrition-facts/maintaining-a-healthy-bodyweight/adults>

### **Mindfulness**

Mindfulness and meditation information and training:

- [www.headspace.com](http://www.headspace.com)
- Mindful eating courses: <http://mindfulnessworks.co.nz/>
- Mindfulness in New Zealand: <http://mindfulnessinnewzealand.co.nz/>