

**Exploring the Relationship Between Chocolate Cake-Related Guilt, Eating,  
and Individual Differences**

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Degree of Master of Science  
in Psychology

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## Contents

List of Tables .....	iv
Table of Figures .....	v
Acknowledgements.....	vi
Abstract.....	vii
Introduction.....	1
Overview.....	1
Food and Emotions .....	3
Food and Guilt .....	6
Guilt and Chocolate .....	9
Individual Difference Variables.....	11
Self-Control and Eating .....	12
Self-Compassion and Eating.....	14
Neuroticism and Eating.....	17
Stress and Eating.....	19
The Present Study .....	21
Method .....	24
Participants.....	24
Phase 1 .....	24
Phase 2 .....	25
Procedure .....	27
Phase 1 .....	27
Phase 2 .....	28
Measures .....	29
Phase 1 .....	29
Phase 2 .....	32
Statistical Analyses .....	34
Results.....	37

Total Sample (Phase 1) .....	37
Preliminary Analyses .....	37
Guilt and Celebration .....	39
Moderator analyses .....	41
Experiment Sample (Phase 2) .....	43
Preliminary Analyses .....	43
Default association and experimental manipulation .....	46
Exploratory Analyses .....	49
Discussion .....	52
Guilt Findings .....	52
Healthy Eating Behaviours, Attitudes, Intentions, and Perceived Behavioural Control .....	53
Experimental Findings .....	55
Food Intake .....	55
Guilt Experienced After Eating .....	56
Affect Change .....	56
Guilt and Individual Difference Variables .....	57
Self-Control .....	57
Self-Compassion .....	58
Neuroticism .....	58
Guilt and Perceived Stress .....	59
The Moderating Role of Individual Difference Variables and Perceived Stress .....	60
Perceived Stress .....	60
Self-Control .....	60
Self-Compassion .....	61
Neuroticism .....	62
Strengths .....	62
Limitations and Future Direction .....	63
Implications .....	66
Conclusion .....	68

References.....	70
Appendices.....	82
Appendix A: Ethics Approval.....	82
Appendix B: Healthy Eating Behaviours.....	83
Appendix C: Attitudes, Intentions, and Perceived Behavioural Control.....	84
Appendix D: Hypothetical Menu Choice .....	87
Appendix E: Self-Control Scale.....	89
Appendix F: Self-Compassion Scale-Short Form.....	90
Appendix G: Big Five Inventory: Neuroticism .....	92
Appendix H: Perceived Stress Scale.....	93
Appendix I: Phase 1: Information Sheet and Consent Form .....	94
Appendix J: Phase 2: Information Sheet and Consent Form .....	99
Appendix K: Phase 2: Taste Test Questionnaire .....	102

## List of Tables

Table 1: Descriptive Characteristics of the Sample .....	25
Table 2: Descriptive Statistics for Phase 1 Variables .....	37
Table 3: Correlation Matrix for Phase 1 Variables .....	38
Table 4: Differences Between Participants Associating Chocolate Cake with Guilt or Celebration.....	40
Table 5: Interactive Effect of Participants' Default Association and Self-Control on the dependent Variables in Phase 1 .....	42
Table 6: Descriptive Statistics fo Phase 2 Variables .....	44
Table 7: Correlation Matrix for Phase 2 Variables .....	45
Table 8: Default Associations and Experiemental manipulation ANOVA Results .....	48
Table 9: Correlation Between Individual Difference Variables, Perceived Stress, and Food Intake and Guilt After Eating.....	49
Table 10: Interactive Effect of Participants' Default Association and Self-Control on the Dependent Variables in Phase 2 .....	50

## Table of Figures

Figure 1. Interactive Effect of Default Association and Self-Control on Healthy Eating Intentions.....	41
Figure 2. Interactive Effect of Default Association and Self-Control on Savoury Food Intake .....	51

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## Abstract

Food and eating are often associated with both positive and negative emotions: pleasure and enjoyment, and also worry and guilt. Guilt has the potential to have both adaptive and maladaptive consequences on health behaviours. The present study aimed to further explore the relationship between a default association of guilt with a ‘forbidden’ food item (i.e., chocolate cake) and healthy eating behaviours, attitudes, intentions, and perceived behavioural control. Individual difference variables (self-control, self-compassion, and neuroticism) and stress were also examined in relation to guilt. This study investigated the influence of a default guilt association on hypothetical and actual food choices. The findings suggest that food-related guilt can have both adaptive and maladaptive consequences on healthy eating behaviours and on individual difference variables. Individuals with chocolate cake-guilt associations reported healthier eating intentions and higher perceived behavioural control in relation to healthy eating. Those with guilt associations did not report more positive attitudes toward healthy eating nor higher self-control. They reported lower levels of self-compassion and higher levels of neuroticism and perceived stress. In regard to a hypothetical food choice, no differences were found between those with guilt or celebration associations. With one exception, guilt did not have adaptive effects during a taste test in regard to sweet and savoury food intake and post-eating guilt. Self-control appeared to be a protective factor from the maladaptive effects of guilt: self-control moderated the relationship between a guilt association and healthy eating intentions and savoury food intake. The overall findings from this research indicate that an alternative approach to promoting healthy eating and living should be considered.



## **Exploring the Relationship Between Chocolate Cake- Related Guilt, Eating, and Individual Differences**

### **Overview**

In today's society, individuals are constantly exposed to new eating, health, and fitness trends that are aimed at encouraging individuals to eat healthily and be physically active. Advertisements for gym memberships, nutritional advice, and weight loss programmes and products are often screened on television or advertised online to encourage individuals to make healthier choices. For example, the 'Weight Watchers' programme offers a range of services including online support, mobile applications, and healthy recipes to help individuals change their lifestyles (Weight Watchers International, 2014). Some companies, such as 'Tank: Juice Bar', offer healthy food and beverage options under a 'guilt free' slogan to provide consumers with healthier options (Tank Juice Limited, 2014). Another example is the 'Get Up to Five' running plan, which uses a supportive community approach to encourage physical activity among sedentary individuals (Extra Mile Runners, 2014). These products and programmes have the potential to help individuals make healthier choices. However, they can have unintended outcomes, such as negative emotions. For example, individuals may experience stress or guilt in response to these products or programmes, which might in turn hinder healthy behaviours (Guttman & Ressler, 2001).

Furthermore, food has become more than a simple energy source in current society. Social interactions often involve the consumption of food or beverages in order to bond with others in a relaxed, inviting, and comfortable environment. For many individuals, food is associated with positive emotions, including pleasure (Chamberlair, 2004; Rozin, Fischler, Imada, Sarubin, & Wrzesniewski, 1999; Rozin, Kurzer, & Cohen, 2002). However, for

others, food can be a source of negative emotions, such as stress, worry, or guilt (Rozin et al., 1999; Rozin et al, 2002), particularly foods that have a high fat or sugar content.

Previous researchers have explored the consequences of associating ‘forbidden’ (i.e., unhealthy) food items with negative emotions, particularly guilt, on eating behaviours and quality of life (e.g., Rozin et al., 1999, 2002; Rozin, Bauer, & Catanese, 2003; Kuijjer & Boyce, 2014; Kuijjer, Boyce, & Marshall, 2014). Some research suggests that guilt can have adaptive consequences, such as an increase in perceived importance of self-regulatory goals and an increase in self-control itself (e.g., Giner-Sorolla, 2001; Hofmann & Fisher, 2012). Other research has found that experiencing food related guilt can have maladaptive consequences leading to negative outcomes including unhealthier food choices and long term weight gain (e.g., Kuijjer & Boyce, 2014; Kuijjer et al., 2014).

The present study will further explore the relationship between associating a ‘forbidden’ food item (chocolate cake) with guilt. Individuals’ eating behaviours and attitudes, intentions, and perceived behavioural control in relation to healthy eating will be evaluated. The influence that individual differences and personality characteristics might have on this association will be examined. This study will assess how individuals who associate chocolate cake with guilt are different to those who associate it with celebration in regard to self-control, self-compassion, neuroticism, and perceived stress. Individuals will make a hypothetical food choice and will also participate in a taste test requiring them to make real food choices. The present study aims to further examine whether having food-guilt associations can have adaptive effects and lead to positive health behaviour change, if guilt can have maladaptive effects leading to unhealthier choices, or if guilt can be both adaptive and maladaptive depending on individual differences.

## **Food and Emotions**

The relationship between food and emotions varies between cultures and genders. In terms of gender, research suggests that in comparison to men, women are more likely to associate food with negative emotions (Cartwright & Stritzke, 2008). Research by Dubé, LeBel, and Lu (2005) showed that males are more likely to eat to maintain positive emotions (e.g., if they are happy they eat to stay happy), whereas females are more likely to eat in response to negative emotions as an attempt to comfort themselves. In their study, Dubé, LeBel, and Lu instructed individuals to identify their preferred comfort food. Individuals were then asked to recall the extent to which they experienced certain positive or negative emotions before and after consuming their preferred comfort food (Dubé, LeBel, & Lu, 2005). The findings demonstrated that females were more likely to experience negative emotions in relation to food, particularly before consuming high-calorie sweet foods. However, the experience of negative emotions preceding food intake appears to decrease with age. In other words, there is an increased tendency for positive emotions to precede the consumption of comfort foods as individuals age (Dubé, LeBel, & Lu, 2005).

In terms of cultural differences, some cultures (e.g., the French) are more likely to associate the experience of eating with positive emotions including pleasure; whereas food can be a source of negative emotions like stress and guilt for others, such as Americans (Dubé, LeBel & Lu, 2005; Rozin et al., 1999, 2002). It appears that the American culture tends to focus more on health outcomes and consequences of eating rather than on focusing on enjoying the experience of eating, as the French do (Rozin et al., 1999). For example, a study conducted by Rozin and colleagues (2002) showed that Americans were more likely to associate the word 'fat' with the word 'food' in comparison to the French and Indian cultures who were more likely to associate 'food' with 'eating' or 'hunger', respectively. According to Rozin et al. (1999), the American culture is more likely to have concerns about healthy

eating and to change their eating in a way they consider 'healthy'. However, Americans are less likely to consider themselves 'healthy eaters' in comparison to the Japanese, French, and Belgian cultures.

In addition, food tends to be associated with positive emotions in many cultures because it is present during celebratory occasions, like weddings and birthdays (Chamberlain, 2004; Evers, Adriaanse, de Ridder, deWitt Hubberts, 2013). Food may elicit positive emotions, including comfort and reassurance, during events which are not positive themselves, such as funerals (Chamberlain, 2004). Food can also result in negative emotions when there are negative cultural or personal meanings attached to food and eating (Desmet & Schifferstein, 2008).

Furthermore, the relationship between emotions and eating appears to be complicated and bidirectional. Research has shown that it is possible for emotions to alter eating behaviour (Turner, Luszczynska, Warner & Schwarzer, 2010). Experiencing negative emotions can lead to increased food consumption. This can occur because more self-regulatory resources are being used toward regulating emotions and fewer resources are available for regulating eating behaviours. Therefore, individuals become more likely to display disinhibited eating behaviours (Canetti, Bachar, & Berry, 2002; Tice & Bratslavsky, 2000). Individuals can also experience negative or positive emotions as a result of eating. Food-related positive emotions can result from sensory pleasure experienced while eating and from joyful memories associated with particular foods (Desmet & Schifferstein, 2008). However, food can elicit negative emotions in situations where individuals are aware of undesirable consequences (e.g. weight gain) of consuming certain products, such as chocolate (Desmet & Schifferstein, 2008). Food-related negative emotions often result from consuming high-calorie or high-fat foods (Tice & Bratslavsky, 2000; Tice, Bratslavsky, & Baumeister, 2001).

The concept of 'sources of food emotion' has been proposed by Desmet and Schifferstein (2008) to refer to situations that may directly or indirectly cause emotions in relation to food. Five sources of food emotions have been proposed: sensory properties, experienced consequences, associated consequences, personal or social meaning, and behaviour of agents. First, sensory properties as a source of food emotions refers to characteristics such as smell, taste and texture of food that elicit different emotions (Desmet & Schifferstein, 2008). For example, while pleasure can result from the bitter taste of coffee for some individuals, disgust can be a response for others.

Second, experienced consequences refer to the emotions that result from the physiological effects of consuming particular foods (Desmet & Schifferstein, 2008). One example is experiencing satisfaction after drinking a glass of cold water on a hot summer day. Third, associated consequences relate to emotions that result from anticipating the effects of certain foods (Desmet & Schifferstein, 2008). An example is experiencing fear of gaining weight when contemplating eating ice cream, because it is a food with high fat and sugar content. The fourth potential source of food emotions relates to the personal or cultural meanings attached to foods (Desmet & Schifferstein, 2008). For example, Macht and Dettmer (2006) mention that it is possible for negative emotions, particularly chocolate-related emotions, to result from culturally developed food associations between chocolate and being overweight. In other words, individuals are more likely to have negative attitudes toward chocolate if they are part of a society that holds a negative view of chocolate due to its high sugar and fat content.

Finally, food emotions can result from behaviour agents associated with the food (Desmet & Schifferstein, 2008). Emotions can be experienced in relation to the person or people involved in the food preparation process (Desmet & Schifferstein, 2008). For instance, admiration and gratefulness for a friend can be experienced when this friend invested a large

amount of time and effort into baking and decorating a birthday cake for you. These five sources of food emotion contribute to the explanation of the link between food and emotions. Other sources of food emotions may exist beyond these five. Nevertheless, these sources are a good basis for understanding how food emotions occur (Desmet & Schifferstein, 2008).

### **Food and Guilt**

As a result of the current increase in obesity and obesity-related health risks, many countries (including New Zealand) have directed public health campaigns toward promoting healthy and responsible lifestyle choices (Guttman & Salmon, 2004). These public health campaigns tend to focus on personal responsibility: how individuals are responsible for eating a healthy diet and having an active lifestyle (Guttman & Salmon, 2004). This type of campaign can lead to feelings of guilt in relation to lifestyle choices, which ideally would motivate individuals to make healthier choices (Kuijer & Boyce, 2014). However, researchers have suggested that it is possible for guilt to hinder healthy behaviours, because individuals might experience helplessness and feel unable to change their behaviours (Guttman & Ressler, 2001). Therefore, one important question to consider is whether guilt has positive or negative consequences regarding health behaviours.

Guilt involves the conscious or unconscious reflection and examination of the self in comparison to certain standards individuals hold for themselves (Tangney, Stuewig & Mashek, 2007). Guilt tends to be experienced as an instant response to anticipated or actual behaviour (Tangney et al., 2007). For example, pre-consumption guilt can be experienced when individuals anticipate 'giving into temptation' and consuming 'forbidden' food, when they would like to restrain from eating (Cartwright & Stritzke, 2008; Rodgers, Stritzke, Bui, Franco, & Chabrol, 2011). Post-consumption guilt is likely to arise when individuals consume a food item that they later regret having eaten or overeaten (Cartwright & Stritzke, 2008).

Furthermore, guilt has the potential to have both adaptive and maladaptive effects (Tangney et al., 2007). Experiencing guilt may be functional and lead to positive behaviour change, as individuals have the tendency to avoid behaviours that elicit negative emotions (Tangney et al., 2007). Guilt can lead to corrective action after a personal behavioural rule has been violated, motivating people to ‘get back on track’ and helping them accomplish their health goals (Tangney et al., 2007). Guilt may also help individuals shift their focus from immediate gratification back to long-term goals, possibly resulting in increased self-control (Baumeister & Heatherton, 1996).

Some research has provided evidence for the adaptive effects of guilt (Conradt, Dierk, Schlumberger, Rauh, Hebebrand, & Rief, 2008; Giner-Sorolla, 2001; Hoffman & Fisher, 2012). For example, Giner-Sorolla (2001) conducted a study that focused on the effect of self-conscious and hedonic emotions on self-control. The overall results from this study showed that when facing delayed-cost dilemmas (i.e., when a choice has short-term positive consequences, but long-term negative consequences), high levels of negative self-conscious emotions, including guilt, were associated with increased self-control. Hence, experiencing higher levels of anticipated guilt when confronting a dilemma may result in higher levels of self-control.

In addition, Hofmann and Fisher (2012) recently found that experiencing guilt in response to a breach in self-control increased the importance of subsequent self-regulatory goals and increased awareness of temptation-goal conflict. Thus, guilt can help individuals identify the relevance of exercising self-control in regard to future behaviours and recognise how immediately gratifying behaviours could negatively affect their long-term goals.

Conversely, guilt can also be maladaptive, particularly when the guilt-causing behaviour cannot be prevented from occurring. Guilt may lead to decreased self-esteem, self-

control, or increased self-criticism (Tangney et al., 2007). Consequently, individuals may experience helplessness or hopelessness, as they might believe that after consuming a guilt-inducing food corrective action is no longer effective because the negative effects have already taken place (Herman & Polivy, 1984). Hofmann and Fisher (2012) found that, even though guilt showed some adaptive effects in their study, experiencing guilt was also related to decreased self-control in subsequent events. In other words, although the guilt experienced after a breach in self-control resulted in participants reporting more commitment to their self-regulation goals, this guilt also made them more likely to display disinhibited behaviour in following occasions.

Research examining guilt in relation to food or food intake predominantly points to maladaptive effects of feeling guilty. For instance, food-related guilt is a common occurrence among individuals who suffer from eating disorders (see Sassaroli, Bertelli, Decoppi, Crosina, Milos, & Ruggiero, 2005). Moreover, research among non-eating disordered populations has shown that food-related guilt is strongly related to self-reported disordered eating patterns including restrained eating, emotional eating (i.e., eating to regulate emotions), dieting, anorexia, and bulimia (e.g., Cartwright & Stritzke, 2008; Cramer & Hartleib, 2001; Müller, Dettmer, & Macht, 2008; Rodgers et al., 2011).

A few studies have looked at food-related guilt in relation to indicators of healthy eating (rather than disordered eating; e.g., Kuijer & Boyce, 2014; Kuijer et al., 2014). These studies did not find any support for the idea that guilt may have motivational or adaptive effects. Kuijer and colleagues (Kuijer & Boyce, 2014; Kuijer et al., 2014) found that participants associating a prototypical 'forbidden' food item (i.e., chocolate cake) with guilt reported unhealthier eating behaviours and lower levels of perceived behavioural control over healthy eating compared to participants associating the same food item with celebration. Participants associating chocolate cake with guilt did not report more positive attitudes



toward healthy eating or stronger healthy eating intentions. In addition, those associating the food item with guilt were less successful at maintaining their weight over an 18 month period (Kuijer & Boyce, 2014).

### **Guilt and Chocolate**

Research has demonstrated that one of the most craved foods is chocolate (Rogers & Smit, 2000), particularly among women (Cartwright & Stritzke, 2008; Rodgers et al., 2011). According to Macht & Dettmer (2006), chocolate is probably highly appealing because it has a chemical reaction in the human body: releases endorphins, which leads to the sensation of pleasure. Perhaps, this is why chocolate is often a comfort food for individuals when they are experiencing depressive symptoms.

According to researchers, craving chocolate is a process that involves coping with competing approach and avoidance inclinations simultaneously (Cartwright & Stritzke, 2008; Rodgers et al., 2011). In other words, individuals can experience an intense desire to consume chocolate (i.e. craving), while simultaneously experiencing a desire to avoid chocolate intake or to limit intake to socially acceptable levels (Cartwright & Stritzke, 2008). Thus, the consumption of chocolate can result in positive and negative emotions.

Unfortunately, the positive emotions experienced as a result of eating chocolate tend to be temporary (Cartwright & Stritzke, 2008). Negative emotions, such as guilt, have been linked to the consumption of chocolate (Cartwright & Stritzke, 2008; Macht & Dettmer, 2006; Müller, Dettmer & Macht, 2007). Researchers have suggested that chocolate-related affect is likely to occur when individuals must decide between enjoying the pleasurable (usually short-term) effects of consuming chocolate or confronting the stigma or negative (usually long-term) health consequences related to the consumption (or overconsumption) of chocolate, such as weight gain (i.e., delayed-cost dilemma; Baumeister & Heatherton, 1996;

Giner-Sorolla, 2001). Research implies that overweight and obese individuals are more likely to associate chocolate with feelings of guilt (Rodgers et al., 2011).

As a result of the competing positive and negative emotions that have been associated with chocolate consumption, this item has been used as a prototypical example of a ‘forbidden’ food item in previous research examining food-related guilt (e.g., Cartwright & Stritzke, 2008; Kuijer & Boyce, 2014; Kuijer et al., 2014; Müller et al., 2008; Rozin et al., 2003). A forced-choice format has been used in past studies to examine so called ‘default’ patterns of thinking in relation to food (i.e., ‘default associations’; Rozin et al., 1999, 2003). These default associations are measured by presenting individuals with a food item (e.g., fried egg) and two options (e.g., breakfast or cholesterol) from which they must choose the option that they most easily associate with the presented food item (e.g., Kuijer & Boyce, 2014; Kuijer et al., 2014). Due to the chocolate being a prototypical example of a ‘forbidden’ food item, the present study will assess individuals’ default association between chocolate cake and *guilt* or *celebration* using a forced choice format based on Rozin et al. (2003) and Kuijer and colleagues (Kuijer & Boyce, 2014; Kuijer et al., 2014).

Research examining chocolate-related guilt has yet to clarify whether guilt is experienced before or after consumption, or both. According to Cartwright and Stritzke (2008), feelings of guilt can arise before chocolate consumption when individuals’ desire to restrain from intake is overridden by their approach inclinations to eat chocolate. It is possible for chocolate-related guilt to affect behaviour by inhibiting the frequency of chocolate consumption (Cartwright & Stritzke, 2008). Conversely, guilt can also be experienced after chocolate consumption when individuals become aware of their regret for having eaten chocolate (Cartwright & Stritzke, 2008). The present study will investigate the effects of pre-consumption guilt on eating behaviours and will measure post-consumption guilt in relation to type and amount of food eaten.

A main limitation of past research investigating chocolate-related guilt and eating behaviours is that it has been purely based on self-report. This issue will be addressed in the present study by using a hypothetical food choice and an actual taste test. This study will use a bogus taste test employing an experimental manipulation to prime participants with their default chocolate cake association before eating ‘junk’ food. Individuals who associate chocolate cake with guilt will be primed with guilt to determine whether bringing guilt associations to the participants’ awareness before the taste test can alter eating behaviour. Adaptive effects of guilt would likely occur before food consumption, leading to decreased food consumption or healthier eating (c.f. Giner-Sorolla, 2001). Therefore, if guilt can have adaptive effects on behaviour, the experimental manipulation in this study should lead to decreased food consumption during the taste test among those who are primed with guilt and have chocolate cake-guilt associations. However, if guilt has no adaptive consequences or only has maladaptive consequences, priming individuals with guilt will have no beneficial effects or detrimental effects on eating behaviours. A No Prime group will be used to allow comparisons between primed and non-primed individuals with guilt associations and between those with guilt in comparison to celebration associations.

### **Individual Difference Variables**

Different psychological constructs have been investigated in relation to eating and eating-related guilt. The present study will examine how self-control, self-compassion, and neuroticism fluctuate in relation to food-related guilt and the influence that these constructs can have on eating behaviours, attitudes, intentions, and perceived behavioural control in relation to healthy eating. Furthermore, this study will examine moderating role that these individual difference variables can have on the relationship between an individuals’ default association and their hypothetical and actual food choices.

## **Self-Control and Eating**

Self-control is a psychological construct that has been extensively included in the health, emotions, and food literature. Past research has demonstrated that there is a relationship between self-control, food intake and choices, and emotions (positive and negative; e.g. Aspinwall, 1998; Canetti et al., 2002; Frederickson, 2001; Tice, Bratslavsky, & Baumeister, 2001; Turner, Luszczynska, Warner, & Schwarzer, 2010; Winterich & Haws, 2011). Self-control is the ability to modify or adjust one's behaviour to achieve the best possible long-term outcome (Gailliot, Baumeister, deWall, Maner, Plant, Tice, Brewer, & Schmeichel, 2007; Giner-Sorolla, 2001; Tangney, Baumeister, & Boone, 2004; Tice et al., 2001). Self-control involves exercising control in four major areas: thoughts, emotions, impulses, and performance (Tangney et al., 2004).

Furthermore, self-control influences decision making, particularly when individuals face a choice with immediate short-term rewards and long-term costs. (Baumeister & Heatherton, 1996; Giner-Sorolla, 2001). For example, high self-control would be required when an individual with a weight loss goal is faced with the temptation of eating a slice of chocolate cake. A slice of chocolate cake would provide immediate gratification (pleasure), but it would not contribute to their weight loss goal because of its high sugar and fat content. Self-control failure (i.e., eating the slice of cake) could lead to self-criticism or feelings of guilt after the positive emotions experienced from consumption fade.

Research suggests that self-control is a limited resource. Self-control expenditure results in a diminished availability of self-control for subsequent events requiring constraint (Baumeister, Bratslavsky, Muraven, & Tice, 1998; Muraven & Baumeister, 2000). For example, Baumeister and colleagues (1998) conducted a study in which participants underwent a self-control task: resisting the temptation to consume freshly baked cookies (presented along with a bowl of radishes). Participants then completed another self-control task

measuring their persistence at solving unsolvable puzzles. Participants whose self-control was depleted by restraining themselves from consuming cookies were less persistent during the puzzle solving task than participants who did not resist cookie consumption. Additionally, Gailliot and colleagues (2007) suggest that different self-control processes require varied expenditures of self-control. For example, restraining from overeating chocolate cookies when a full platter is available will require more self-control (for those tempted by cookies) than restraining from eating cookies if there are only four cookies available and there is a healthier alternative that could subside sugar craving (e.g., dates).

In terms of food consumption, higher levels of self-control have been associated with healthier food choices and decreased consumption of high-fat foods (Turner et al., 2010). It is possible that positive emotions strengthen self-control, leading to healthier or decreased eating (Turner et al., 2010; Winterich & Haws, 2011). Conversely, experiencing negative emotions can lead to increased or unhealthier eating because emotional distress impairs self-control (Tice et al., 2001). Tice and colleagues (2001) suggest this can happen because of four main reasons. The first reason is intentional self-destruction, which refers to behaviours where individuals abandon their pursuit of health goals due to emotional distress (e.g. feelings of guilt; Piers & Singer, 1971). The second reason is capacity, which describes situations where individuals' self-control is impaired by negative emotions because their emotional distress is overwhelming and prevents them from thinking rationally. Third is motivation, which refers to situations in which emotional distress decreases individuals' desire to control their behaviour or they feel unable to regulate their behaviour. The final reason is priority shift, which occurs when individuals tend to shift their focus from long-term goals (e.g. controlling food intake) to immediate rewards (e.g. regulating emotions).

As increased self-control has been found to be related to healthier food choices (Turner et al., 2010) and negative emotions such as guilt have been associated with decreased

self-control (Hofmann & Fisher, 2012; Rozin et al., 1999, 2003), the present study will examine the relationship between individuals' default association, their self-control, and their healthy eating behaviours, intentions, attitudes, and perceived behavioural control. It is expected that participants with chocolate cake-guilt associations in this study will report lower self-control than those with celebration associations. Those with associating chocolate cake with guilt who have low self-control are also hypothesised to report healthier eating behaviours, intentions, attitudes, and perceived behavioural control. Self-control is also expected to moderate the relationship between default association and hypothetical and actual food choices. Those with guilt associations and high self-control will be more likely to make healthier food choices from the hypothetical food menu than those with low self-control. Likewise, individuals with guilt associations and high self-control will probably consume a decreased amount of 'junk' food during the taste test in comparison to those with low self-control.

### **Self-Compassion and Eating**

Self-compassion is a recently developed psychological concept relevant to the field of coping and emotional regulation. Self-compassion involves recognising personal flaws and imperfections without self-judgement, and understanding that shortcomings are part of being human (Leary, Tate, Adams, Allen, & Hancock, 2007; Neff, 2003a, 2003b; Neff, Kirkpatrick, & Rude, 2007; Neff, 2011). Self-compassion can be considered a stable personality trait (Neff, 2003), but it can also be experimentally induced with state manipulation, leading to decreased negative emotions in relation to recalled events (see Leary et al., 2007).

Three main components of self-compassion have been proposed: self-kindness (versus self-judgement), common humanity (versus isolation), and mindfulness (versus over-identification; Neff, 2003a; Neff et al., 2007). Self-kindness refers to avoiding being critical and judgemental toward the self, and being kind and understanding instead. Common

humanity involves accepting the idea that one's life experiences stem from being human, rather than believing one is isolated from the rest of humanity. Mindfulness concerns having a balanced awareness of one's negative thoughts and feelings, but not over-identifying with them.

A meta-analysis examining the relationship between self-compassion and psychopathology indicated that increased levels of self-compassion were associated with decreased levels of mental health symptoms, including anxiety, stress and depression (MacBeth & Gumley, 2012). Self-compassion has been shown to be positively correlated with positive affect, and negatively correlated with negative affect (Leary et al., 2007; Neff et al., 2007; Neff & Vonk, 2009). Research suggests that self-compassion might be particularly important for psychological functioning among individuals with body-image dissatisfaction and with disordered eating attitudes and behaviours (e.g. Adams & Leary, 2007; Ferreira et al., 2013)

According to Neff (2003a), self-compassionate individuals are more likely to avoid experiencing negative emotions when possible by performing preventive behaviours such as eating healthily to avoid feeling guilty after eating or relaxing before becoming overstressed. Theoretically, self-compassion should be associated with improved self-awareness and understanding regarding one's limitations and with an emotional approach rather than avoidance (Neff, 2003a). A study by Neff, Hsieh, and Dejitterat (2005) examining the relationship between self-compassion and academic failure provided supporting evidence for approach inclinations when coping with failure. The findings showed that individuals with higher levels of self-compassion had emotion-focused coping strategies (i.e. recognising and accepting emotions) instead of avoidance-focused strategies. Research also suggests that self-compassion helps moderate emotions resulting from distressing events including feelings of shame, rejection, or failure (Allen & Leary, 2010; Gilbert, 2005; Leary et al., 2007). Thus,

individuals spend less self-regulating efforts on emotion regulation and can focus their control efforts on other health behaviours (Terry & Leary, 2011).

Research on self-compassion in relation to food and eating seems promising, even though it is limited and has mostly been conducted with disordered samples (e.g., Adam & Leary, 2007; Ferreira, Pinto-Gouveia, & Duarte, 2013; Kelly, Carter, & Borairi, 2014). Research suggests that individuals with higher self-compassion are less likely to display disordered eating patterns and more likely to report lower levels of body dissatisfaction in comparison to those with low self-compassion (Ferreira et al., 2013). Additionally, research indicates it is possible that being self-compassionate results in decreased self-criticism when individuals break their diets by consuming 'forbidden' food items (Wasylikiw, MacKinnon, & MacLellan, 2012). This in turn could lead to decreased emotional eating to cope with negative emotions, such as guilt. For example, a pilot study by Adams and Leary (2007) indicated that women who were restrained eaters with lower levels of self-compassion had more negative reactions to hypothetical diet-breaking compared to women with high self-compassion. Self-compassion in this study was also associated with a decreased tendency to use eating as a coping mechanism for negative emotions. Adams and Leary (2007) also found that motivating individuals to think about their eating in a self-compassionate manner resulted in decreased eating among individuals high on restraint, resulting in them eating similar amounts to those low on restraint.

Moreover, high levels of self-compassion could be seen as either harmful or beneficial. Self-compassion could be thought of as an excuse to negate responsibility for behaviours that violate self-imposed rules (e.g. dieting), which could result in more consistent rule breaking because of decreased personal consequences (Adams & Leary, 2007). Conversely, it could be assumed that this tendency to easily forgive themselves might allow self-compassionate individuals to accept their mistake without losing focus on their long-term



goals (Adams & Leary, 2007). Previous research supports the second claim, that self-compassion is likely to lead to self-forgiveness but not to the relinquishment of personal responsibilities or goals (Leary et al., 2007).

As increased self-compassion has been found to be related to an increased ability to cope with emotions (Allen & Leary, 2010; Gilbert, 2005; Leary et al., 2007) and decreased food consumption (Adams & Leary, 2007), the present study will examine the relationship between individuals' default association, their self-compassion, and their healthy eating behaviours, intentions, attitudes, and perceived behavioural control. Participants with chocolate cake-guilt associations in this study will probably report lower self-compassion compared to those with celebration associations. Individuals associating chocolate cake with guilt who have low self-compassion are expected to report unhealthier eating behaviours, intentions, attitudes, and perceived behavioural control. Similar to self-control, self-compassion is also expected to moderate the relationship between default association and hypothetical and actual food choices. Self-compassionate individuals with guilt associations will be more likely to make healthier food choices from the hypothetical food menu and are predicted to eat less than those with low self-compassion during the taste test. They are also expected to report experiencing lower guilt levels after the taste test as they will be more likely to forgive themselves and be less self-critical.

### **Neuroticism and Eating**

Neuroticism refers to a personality construct that measures an individual's likelihood of having extreme emotional reactions to negative life situations (Thomas, 2009). The research on neuroticism in relation to food and eating is currently limited. However, research suggests that individuals who are high on the trait of neuroticism are more likely to suffer from eating disorders, substance use or abuse, and other mental disorders (Lahey, 2009) and to have poorer eating behaviours (Kikuchi, Inoue, Ito, Masuda, Yoshimura & Watanabe,

1999). Additionally, Kikuchi and Watanabe (2000) examined the relationship between personality and eating habits, and found that neuroticism (among other personality variables) influenced the type of food consumption. Among males, neuroticism was related to sweet food preferences, and among females it was related to sweet, salty, and fatty food preferences.

Neuroticism has been related to an increased disposition to anxiety and stress levels (Steptoe & Pollard, 1995), both of which have been related to increased food consumption (see Stress and Eating section below). Steptoe and Pollard (1995) found that among men who are high in neuroticism, there is increased probability that they use food as a method to regulate emotional health and stability.

Based on previous research conducted on neuroticism and food, the present study will examine the relationship between individuals' default association, their neuroticism level, and their healthy eating behaviours, attitudes, intentions, and perceived behavioural control. It is hypothesised that individuals who associate chocolate cake with guilt will report higher levels of neuroticism and poorer eating behaviours, attitudes, intentions, and perceived behavioural control in comparison to individuals with chocolate cake-celebration associations. Also, neuroticism is expected to moderate the relationship between individuals' default association and their hypothetical food choice and food intake during the taste test. Individuals with guilt associations are predicted to make unhealthier choices from the hypothetical menu and to consume more food during the taste test, particularly in the Prime condition. As neuroticism measures emotional stability, those who are less emotionally stable (i.e., higher on neuroticism) might be more likely to cope with emotions by eating and therefore eat more after being primed with guilt.

## **Stress and Eating**

As previously mentioned, food and eating can be a major source of stress for individuals, particularly among some cultures (Rozin et al., 1999). Stress refers to a negative emotion that derives from experiences when individuals believe they are unable to meet requirements expected from them or when they perceived threats to their person (Lazarus, 1966).

The literature on stress in relation to food and eating indicates that increased eating or overeating patterns can be learned coping mechanisms for negative emotions, such as stress. This is particularly true among individuals with disordered eating patterns, including bulimia, restrained eating, or emotional eating (Groesz, McCoy, Carl, Saslow, Stewart, Adler, Laraia, & Epel, 2012; Polivy, Heatherton, Herman, 1988; Sassaroli & Ruggiero, 2005; Shea & Pritchard, 2007; Steptoe, 1991; van Strien, van de Laar, van Leeuwe, Lucassen, van den Hoogen, Rutten, & van Weel, 2007).

Stress-eating is more common among women than men (Greeno & Wing, 1994). Research by LeBel (2008) shows that there is a predictable maladaptive eating pattern among women, where they tend to prefer (high calorie) comfort foods when stressed in an attempt to cope with stress and other negative emotions which, in turn, may result in feelings of guilt.

It has been shown that heightened stress can result in increased unhealthy food consumption (high fat/sugar) and decreased healthy food consumption (e.g. vegetables), and disinhibited or binge eating (Groesz et al., 2012; Kuijter & Boyce, 2012; Oliver & Wardle, 1999; Oliver, Wardle, & Gibson, 2000; Wallis & Hetherington, 2009; Wansink, Cheney, & Chan, 2003; Zellner, Loaiza, Gonzalez, Pita, Morales, Pecora, & Wolf, 2006). Laboratory experiments have demonstrated that individuals show increased preference for high fat and sugar food when experiencing negative emotions following negative event (Epel, Lapidus,

McEwen & Brownell, 2001). In natural settings, individuals report increased consumption of snack foods when higher stress levels are experienced (Newman, O'Connor, & Conner, 2007).

Moreover, a recent study by Kuijer and colleagues (2014) examined the role of perceived life stress as a potential moderator in the relationship between chocolate cake-related guilt and different eating variables. This study investigated the moderating role of stress from a 'diathesis-stress' perspective. A diathesis-stress approach implies that psychological vulnerabilities in combination with stressful life circumstances produce negative results (Kuijer et al., 2014). Individuals can feel helpless or experience difficulties when coping with challenging situations when simultaneously experiencing significant stress levels (see Tangney et al., 2007). Thus, the authors hypothesised that guilt would have more maladaptive rather than adaptive effects when individuals were experiencing high stress levels, resulting in lower levels of perceived behavioural control, poorer eating behaviours, and increased importance of mood regulation through food. The findings of the study demonstrated that perceived life stress did moderate the relationship between guilt and eating variables. Associating chocolate cake with guilt was related to unhealthier eating behaviours and lower perceived behavioural control only when individuals were simultaneously experiencing high perceived stress.

Based on the literature on food, stress, and guilt, the present study will examine the relationship between perceived stress and chocolate cake-related guilt in regard to different eating variables. Individuals with chocolate cake-guilt associations are expected to report higher stress levels, unhealthier eating behaviours, attitudes, intentions, and lower perceived behavioural control. Additionally, the present study will attempt to replicate the findings by Kuijer et al. (2014) in regard to the moderating role of perceived stress when examining the relationship between chocolate cake-related guilt and eating variables. The present study will

also investigate whether perceived life stress moderates the relationship between guilt and a hypothetical and an actual food choice. Individuals with chocolate cake-guilt associations who report high perceived stress are expected to make unhealthier choices based on the hypothetical food menu and to eat more food during the taste test.

### **The Present Study**

Previous research conducted on food-related guilt and its correlates has mainly focused on disordered eating patterns (e.g. Cartwright & Stritzke, 2008; Cramer & Hartleib, 2001; de Witt Huberts et al., 2013; LeBel, 2008; Rodgers et al., 2011). However, this research will focus on examining food-related guilt and its correlates among a healthy, student sample. Based on Rozin and colleagues (1999, 2003), Kuijer and Boyce (2014), and Kuijer and colleagues (2014), the present study will examine factors relating to individuals' default association with a 'forbidden' food item (chocolate cake): *guilt* or *celebration*. The first aim of this study is to explore the relationship between individuals' default association and eating behaviours; attitudes, intentions, and perceived behavioural control in relation to healthy eating. Stress and individual difference variables including self-control, self-compassion, and neuroticism, will also be examined.

Previous research has found that 22% of a student sample (Rozin et al., 2003) and 20% and 27% (Kuijer et al., 2014; Kuijer & Boyce, 2014, respectively) of a community sample reported their default chocolate cake association to be *guilt* (i.e., they feel guilty when thinking about chocolate cake). Therefore, it is estimated that approximately one fourth of this study's sample will associate chocolate cake with *guilt*.

Research by Kuijer and Boyce (2014) and Kuijer et al. (2014) indicated that it is more likely for guilt to have maladaptive consequences in terms of healthy eating behaviours, attitudes, intentions, and perceived behavioural control. Individuals with guilt associations

tend not to report healthier attitudes or eating intentions, and they tend to report lower levels of perceived behavioural control and unhealthier eating behaviours. Thus, it is hypothesised that individuals in the present sample who associate chocolate cake with guilt will report lower perceived behavioural control and unhealthier current eating behaviours, and they will not have healthier eating attitudes or intentions compared to individuals who associated chocolate cake with celebration. Individuals with guilt and celebration associations are not expected to differ in regard to a hypothetical food choice, because neither is likely to report healthier eating intentions.

In addition, negative emotions, including guilt, have been associated with decreased capacity for emotional regulation, self-control, self-esteem, and poorer quality of life (Hofmann & Fisher, 2012; Rozin et al., 1999, 2003; Tangney et al., 2007). Therefore, individuals with guilt associations in this study are expected to report lower self-control and self-compassion, and higher neuroticism and stress.

The second aim of this study is to examine the relationship between individuals' default association and their food intake during a bogus taste test, particularly investigating the effect of priming individuals with guilt before eating. The relationship between participants' default association, pre-test to post-test affect change, and guilt experienced after eating will also be examined. The possible moderating effects of self-control, self-compassion, neuroticism, and perceived stress will be evaluated.

Based on the literature suggesting that guilt can have adaptive effects on food intake (e.g., Giner-Sorolla, 2001), individuals with chocolate cake-guilt associations are expected to show decreased food intake during the taste test when assigned to the Prime condition, compared to the No Prime condition. However, if guilt has maladaptive consequences as most research suggests (e.g., de Witt Huberts et al., 2013; Kuijer & Boyce, 2014; Kuijer et

al., 2014), individuals with guilt associations should display increased levels of food consumption, particularly in the Prime condition.

Additionally, this study predicts that individuals' positive affect will decrease from the pre-test to the post-test measure for individuals with chocolate cake-guilt associations, whereas it will likely increase for individuals with chocolate cake-celebration associations. This is expected because individuals with celebration associations might be more likely to associate food with positive emotions compared to those with guilt associations. Conversely, negative affect is expected to increase after food intake for individuals with guilt associations and to decrease among those with celebration associations. Guilt experienced after eating is expected to be higher among the guilt group compared to the celebration group. If guilt has adaptive effects, it is predicted that those with guilt associations in the Prime condition will eat less, and therefore will report lower levels of guilt based on food intake.

Based on Kuijer and colleagues (2014), when examining the moderating effects of stress, it is expected that individuals with guilt associations who report higher pre-test stress levels will consume more food during the taste test. Self-control, self-compassion, and neuroticism are also expected to act as moderators in a similar way to perceived stress. Self-compassion is expected to buffer the impact of food intake of guilt experienced after eating.

Overall, it is not expected for individuals with chocolate cake-celebration associations to report high levels of post-test guilt, because it is unlikely that they associate 'junk' food with negative emotions, such as anxiety or guilt. In addition, it is not expected for stress, self-control, self-compassion, or neuroticism to have a moderating effect on food intake or post-test guilt levels among those with celebration associations.

## Method

### Participants

Participants were students from the University of Canterbury recruited to take part in a study on personality, eating behaviours, and food preferences. The study was a two-phase study (see Procedure for more detail) and was approved by the University of Canterbury Human Ethics Committee (HEC 2014/20; see Appendix A). All participants gave informed consent for the study. Recruitment took place over a period of six months and was undertaken in two ways. Introductory psychology students ( $N = 146$ ) and students enrolled in a 300-level health psychology course ( $N = 30$ ) were recruited to participate in Phase 1 of the study. At the end of Phase 1, participants were asked whether they would be willing to also participate in Phase 2. Participants either received course credit (2% for introductory psychology students) or went into a draw to win a gift voucher (300-level students) for their participation in Phase 1. Students received a \$5 voucher for participation in Phase 2 of the study. The remaining students were recruited via an email advertisement sent to students by administrators of other university departments. These participants ( $N = 68$ ) were recruited to participate in both phases and received a \$10 voucher upon completion of Phase 2. Participants who in Phase 1 reported having food allergies, or who had suffered from or received treatment for an eating disorder were not invited to take part in Phase 2.

### Phase 1

A total of 244 students completed Phase 1 of the study. Demographic characteristics are presented in Table 1. Participants were aged between 17 and 65 years. The sample was predominantly female and of European descent. The rest of the sample identified themselves with other ethnicities, including Chinese, NZ Maori, and Indian. Just over half of the sample consisted of first year students. Participants reported their living arrangements, with most of them living at home with their parents, flatting, or living at the university halls. The mean



Body Mass Index (BMI) based on participants' self-reported height and weight ranged from 16.49 to 53.78, with no significant differences between females ( $M = 23.46$ ;  $SD = 4.66$ ) and males ( $M = 23.76$ ;  $SD = 3.31$ ),  $t(230) = -.38$ ,  $p = .703$ .

Table 1  
*Descriptive Characteristics of the Sample*

	Phase 1 ( $N = 244$ )		Phase 2 ( $N = 81$ )	
	<i>M</i> or %	<i>SD</i> or <i>N</i>	<i>M</i> or %	<i>SD</i> or <i>N</i>
Age	21.29	6.24	21.31	5.53
Gender				
Female	84%	205	87.7%	71
Male	16%	39	12.3%	10
Ethnicity				
NZ European	76.2%	186	70.4%	57
Chinese	5.7%	14	7.4%	6
NZ Maori	3.3%	8	2.5%	2
Indian	3.3%	8	3.7%	3
Samoan	1.2%	3	0%	0
Cook Island	.4%	1	0%	0
Tongan	.4%	1	0%	0
Other	17.6%	43	22.2%	18
First Year Students				
Yes	52.5%	128	43.2%	35
No	47.5%	116	56.8%	46
Living Arrangements				
Living at home	36.1%	88	22.2%	18
Flatting	32.0%	78	46.9%	38
University Halls	25.4%	62	27.2%	22
Living Alone	1.2%	3	1.2%	1
Other	5.3%	13	2.5%	2
BMI	23.51	4.46	24.59	5.52

## Phase 2

Of the 176 100- and 300-level psychology students who participated in Phase 1, 114 students agreed to be contacted to participate in the second part of the study. Of these students, 20 were not invited for Phase 2 because of food allergies ( $N = 13$ ) or because they had previously undergone treatment for an eating disorder ( $N = 7$ ). Out of the 94 who were contacted, 40 participated in Phase 2. Of the 68 participants who were recruited from other departments at university, three participants with food allergies were excluded from Phase 2,

as were two participants who had previously been treated for an eating disorder, and 41 students completed Phase 2.

A total of 81 students participated in Phase 2. Demographic characteristics are presented in Table 1. Differences between those who participated in Phase 2 ( $N = 81$ ) and those who did not ( $N = 163$ ) were examined. No significant differences were found in terms of age, gender distribution, ethnicity, or BMI, all  $ps > .276$ . Significant differences were found for living arrangements,  $\chi^2(4, N = 244) = 16.92, p = .002$ , and whether or not they were first year students,  $\chi^2(1, N = 244) = 4.16, p = .041$ . Those who did not participate in Phase 2 were more likely to still live at home (43%) and less likely to be flatting (25%) compared to participants who did participate in Phase 2. Additionally, a larger percentage of those who participated in Phase 2 were not first year students (57%). No significant differences were found between the groups regarding any of the dependent or personality variables measured in Phase 1, all  $ps > .193$ .

To ensure that roughly equal numbers of participants with each default association (i.e. guilt or celebration) were assigned to the Prime and No Prime conditions, participants with each default association were assigned randomly to each condition. This resulted in 16 participants associating chocolate cake with guilt being assigned to the Prime condition and 14 to the No Prime condition, and 25 participants associating chocolate cake with celebration being assigned to the Prime condition and 26 to the No Prime condition. Participants assigned to either the Prime condition or the No Prime condition did not differ on any of the demographic variables or on tests of pre-manipulation positive or negative affect or pre-manipulation perceived stress, all  $ps > .152$ . This indicates that random assignment to the experimental conditions was successful.

## Procedure

### Phase 1

In this phase, participants were recruited to complete an online questionnaire entitled ‘Personality, Eating Behaviours, and Food Preferences’ (See Appendices B to H). This title was used to disguise the real objective of the study: identifying participants who associated chocolate cake with guilt and comparing them on different psychological constructs to those who associated chocolate cake with celebration. Participants completed scales measuring demographic variables, different personality variables (e.g., self-control and self-compassion), and one item that assessed their default association for chocolate cake: *guilt* or *celebration*.

First year psychology students attended a session in a computer laboratory where they completed the questionnaire. Up to 25 participants completed the questionnaire simultaneously during each session, which lasted approximately 40 minutes (including 10 minutes for instructions). Upon arrival to the laboratory, participants were assigned to a computer. They were provided with an information sheet and consent form, which had their Participant Identification Number on the top right corner (see Appendix I). Participants then completed the questionnaire. After completion, they were provided with a debriefing sheet and a participation exercise, which was a requirement for individuals to obtain their 2% course credit.

As the 300-level health psychology students and participants recruited from other university departments did not receive course credit for their participation, it was not necessary for them to complete the questionnaire in person. Therefore, these participants accessed the questionnaire online via email and completed the questionnaire in their own time.

One week after completing the questionnaire, participants from the introductory psychology and the 300-level health psychology courses who agreed to be contacted for Phase 2 were emailed to schedule individual times for participants to come to the laboratory to complete the taste test. Participants from other departments who completed the study for \$10 were redirected to an online time sheet to sign up for the individual taste test session.

## **Phase 2**

Participation in Phase 2 involved individually attending a 20-minute taste test in the health psychology laboratory at the University of Canterbury. To disguise the true purpose of the experiment, participants were under the impression that they were completing a taste test examining the relationship between personality and food preferences. Upon arrival, participants were provided with an information sheet and consent form (see Appendix J).

Participants were then provided with the questionnaire for Phase 2 (see Appendix K), and were given approximately five minutes alone to complete a pre-test. The pre-test consisted of one item measuring stress, the positive and negative affect scale to assess their current mood, and a scrambled sentence test. The pre-test was identical for all participants, except for one item that was manipulated in the scrambled sentence test. Participants in the Prime condition received the item ‘guilty makes chocolate eating feel me happy’, whereas those in the No Prime condition received ‘tropical lately are oranges fruit a’. This manipulation was used to prime participants in the experimental group with their default chocolate cake association: *guilt* or *celebration*.

Once participants had completed the pre-test, they were instructed on how to proceed with the taste test. Then, the experimenter left for 10 minutes to allow participants to taste the food samples and complete food ratings on their own. After 10 minutes had elapsed, the experimenter returned and instructed participants to complete the post-test measuring their

current mood, the level of guilt experienced from eating the snacks and based on the amount of snacks eaten, their hunger level before the taste test, and the time since they had last eaten. Then, participants were questioned regarding their thoughts on what the real objective of the study was, which was done to ascertain whether participants were aware of the true purpose of the study.

Participants were then weighed and their height measured. Finally, the experimenter provided participants with a debriefing sheet and explained to participants the real objective of the study.

## **Measures**

### **Phase 1**

**Demographics.** Participants were asked about their age, gender, whether 2014 was their first year at university, their living arrangements, ethnicity, weight, height, past and current dieting status, and whether they suffered from or had received treatment for an eating disorder. Self-reported height and weight were used to calculate Body Mass Index (BMI). Self-reported BMI correlated strongly ( $r = .97$ ) with experimenter-measured BMI (assessed in Phase 2), indicating that participants accurately estimated their height and weight.

**Default Association Guilt/Celebration.** Based on Rozin et al. (1999) and Kuijer and Boyce (2014), participants' default association of a 'forbidden' food item (chocolate cake) with guilt or celebration was assessed using a forced-choice format. This was evaluated using one item 'Of which word do you think first when you read the words chocolate cake: *guilt* or *celebration*'.

**Healthy Eating Behaviours.** Participants were asked to recall their eating behaviours over the previous two weeks (based on Baker, Little, & Brownell, 2003; see also Kuijer &

Boyce, 2014; Kuijer, Boyce & Marshall, 2014). A sample item included ‘In the past 2 weeks, on how many days did you...’ followed by six items, such as ‘eat healthy amounts of food (not too much or too little)’ and ‘Eat fast food (e.g. fish and chips, McDonald’s, meat pies, KFC, etc.)’. Data from a small validation study showed that individuals’ retrospective recall of eating behaviours was highly correlated with a 2 week diary report of eating behaviours (see Kuijer & Boyce, 2012). Items were scored on a 5-point scale ranging from ‘1 = *Every Day*’ to ‘5 = *Less than once a week*’, and were scored in a way that healthier eating behaviours were indicated by higher scores on the summed scale (Cronbach’s alpha = .67).

***Attitudes, Intentions, and Perceived Behavioural Control in Relation to Healthy Eating.*** The questionnaire assessed participants’ attitudes toward healthy eating, eating intentions in the near future (healthy versus unhealthy), and the degree of difficulty they perceived from performing or restraining from performing certain behaviours (based on Ajzen, 1991; Armitage, 2005; Conner, Norman, & Bell, 2002; see also Kuijer & Boyce, 2014). Healthy eating attitudes were measured using five bipolar items on a 7-point scale. The items included were ‘For me healthy eating is ...’: good-bad, important-unimportant, boring-interesting, pleasant-unpleasant, and useful-useless. All items except boring-interesting were reverse scored (Cronbach’s alpha = .75). Five items on a 5-point scale were used to assess perceived behavioural control (‘1 = *Very difficult*’ to ‘5 = *Very easy*’). Sample items included ‘How difficult or easy are the following things for you at the moment: ...’, followed by five items including ‘Eating moderate amounts of food and stopping when I am full’, and ‘Eating breakfast every day’ (Cronbach’s alpha = .62). Participants’ intentions of healthy eating were measured using two items on a 7-point scale (‘1 = *Certainly Not*’ to ‘7 = *Certainly Yes*’). The two items were: ‘In the next four weeks, do you intend to eat a healthy diet (balanced diet, moderate amounts, and avoiding too much junk food)?’ and ‘In the next

four weeks, how determined are you to make sure you eat a healthy diet?' (Cronbach's alpha = .86).

***Hypothetical Menu Choice.*** Participants were given a menu and were asked to indicate which sandwich they would order from the following choices: Chicken Classic (334 calories), Chicken & Bacon Ranch (456 calories), Chicken Strips (275 calories), Turkey (253 calories), Tuna (266 calories), Italian B.M.T. (335 calories), Ham (258 calories), Breakfast Sandwich (425 calories), Veggie Delite (207 calories), Veggies patty (397 calories; adapted from Hoyt, Burnette, & Auster-Gussman, 2014; see Appendix D for a full description of each menu option). The 10 options were grouped into five categories: 200-250 calories (one sandwich option), 250-300 calories (four options), 300-350 calories (two options), 350-400 calories (one option), 400+ calories (two options).

***Self-Control.*** The Brief Self-Control Scale is a 13-item scale developed by Tangney, Baumeister, and Boone (2004) to measure dispositional self-control. Responses are made on a 5-point scale ranging from 1 = 'Not at all like me' to 5 = 'Very much like me'. Sample items were 'I am good at resisting temptations' and 'I wish I had more self-discipline' (Cronbach's alpha = .81). Previous research suggests that the brief version of the Self-Control Scale has high reliability and validity (Matthews, Youman, Stuewig, & Tangney, 2007; Tangney et al., 2004).

***Self-Compassion.*** The Self-Compassion Scale-Short Form was used to assess self-compassion. This 12-item measure was used to examine participants' compassion toward themselves. This scale assesses six different components of self-compassion: self-kindness, self-judgment, common humanity, isolation, mindfulness, and over-identification (Neff, 2011; Raes, Pommier, Neff, & van Gucht, 2011). The response options for this questionnaire range from '1 = Almost Never' to '5 = Almost Always'. The shortened version of the Self-

Compassion Scale has been validated, and has been found to be highly correlated ( $r \geq 0.97$ ) with the full Self-Compassion Scale (26 items; Raes, et al., 2011). Sample items included 'I try to see my failings as part of the human condition' and 'When something upsets me I try to keep my emotions in balance' (Cronbach's alpha = .89).

**Neuroticism.** The subscale of neuroticism of the 25-item version of the Big Five Inventory was used to assess this component (Cronbach's alpha = .81). Responses for five items were made on scale ranging from '1 = *Strongly Disagree*' to '5 = *Strongly Agree*'. A sample item included was 'I see myself as someone who worries a lot' (John, Donahue, & Kentle, 1991).

**Perceived Stress.** The Perceived Stress Scale (PSS) was used. This is a 10-item scale that assessed participants' perceived stress levels over the previous month (Cohen, Kamarck, & Mermelstein, 1983). Responses for this questionnaire range from '1 = *Never*' to '5 = *Very Often*'. One sample item is 'How often have you felt that you were unable to control the important things in your life?' (Cronbach's alpha = .90).

## **Phase 2**

**Positive and Negative Affect.** A 10-item version of the Positive And Negative Affect Scale (PANAS) (Watson, Clark, & Tellegen, 1988) was used to assess participants' mood before and after the manipulation and taste test. The response options for the items ranged from '1 = *Very Slightly or not at all*' to '5 = *Extremely*'. Sample items for positive affect include 'Interested' and 'Enthusiastic' (Pre-test Cronbach's alpha = .68; post-test Cronbach's alpha = .71). Sample items for negative affect include 'Hostile' and 'Irritable' (Pre-test Cronbach's alpha = .73; post-test Cronbach's alpha = .65). An affect change variable was created separately for positive and negative affect by subtracting each participant's post-test



PANAS average score from the pre-test PANAS average score to examine affect after eating in comparison to affect before eating.

**Food Intake.** Participants' food intake was measured using a 10-minute taste test. To avoid raising suspicion on the real objective of the study, participants were not asked to refrain from eating prior to the experiment (e.g. Boyce & Kuijer, 2014). Instead, participants were scheduled to complete the experiment during 'normal' snacking hours (10:30am - 12:00pm and 2pm - 5pm). They received a large glass of water and four bowls of unhealthy food: plain chocolate M&M's and Skittles (original flavours) were used as sweet foods, and potato chips (salt and vinegar flavour) and cheese corn chips were used as savoury foods. A small pilot study ( $N = 40$ ) determined that these four foods were the most craved foods among students at the University of Canterbury.

Participants rated each food on 14 dimensions (e.g., 'desirable', 'crunchy') using a 7-point scale (1 = *Certainly Not* to 7 = *Certainly Yes*). Participants were also asked to write which food they preferred and why. They were told they had to try every food sample at least once in order to complete the food ratings, and to complete the food ratings sequentially. Participants were instructed to drink water in-between samples to cleanse their palates and to feel free to eat as much as they wanted. Participants' ratings were not used in the analyses, they were only included as part of the bogus taste test. Each bowl was weighed before and after the taste test using a food scale.

Previous research has shown that participants respond differently to sweet and savoury foods (Dubé, LeBel, & Lu, 2005). Thus, M&Ms intake and Skittles intake was combined to form a 'Sweet' intake variable, and potato chips intake was combined with Doritos intake to form a 'Savoury' intake variable.

**Hunger.** Participants' hunger level was measured retrospectively after the taste test with one item. The item used was 'On a scale from 1 to 7, how hungry were you before you came to the lab today?'. The scale ranged from '1 = *Not hungry at all*' to '7 = *Extremely hungry*'.

**Stress.** Participants' stress on the day of the taste test was measured prior to the taste test using one item. The item used was 'On a scale from 1 to 10, how stressful has your day been so far?'. Responses were made on a scale ranging from '1 = *Not stressful at all*' to '7 = *Extremely stressful*'.

**Guilt.** Participants' guilt was measured after the taste test using three items. The item 'Guilt' was added to the post-test PANAS. Two other items rated on a 5-point scale ('1 = *Very slightly or not at all*' to '5 = *Extremely*') also measured post-eating guilt. The items were 'How guilty do you feel about eating the snacks?' and 'How guilty do you feel about the amount of snacks you have eaten?'. The mean of these three items was calculated to find a main guilt measure (Cronbach's alpha = .87).

**BMI.** Participants' height and weight was measured by the experimenter after they had completed the taste test in order to calculate their BMI.

### **Statistical Analyses**

Descriptive statistics were calculated for each variable in Phase 1 and Phase 2 to gather information regarding the mean, standard deviation, and range of continuous variables. Cronbach's alphas were calculated to examine the internal consistency of each scale.

Correlation matrices were used to determine relationships between variables in Phase 1, Phase 2, and both Phases 1 and 2 together. Correlations were also used to examine variables for multicollinearity in preparation for further analyses.

For Phase 1, differences between those with guilt and celebration associations were examined through one-way analyses of variance (ANOVAs) and covariance (ANCOVAs) using participants' default association as the independent variable. The dependent variables were healthy eating behaviours, attitudes, intentions, perceived behavioural control, hypothetical food choice, perceived stress, and individual difference variables (self-control, self-compassion, and neuroticism). Demographic variables were included as covariates if they correlated significantly with the dependent variables. The individual difference variables and stress were included as covariates in the analyses with the eating related variables as the dependent variables if they correlated significantly with those variables.

For Phase 2, the food intake data were first analysed for outliers. Participants whose sweet or savoury food intake deviated more than three standard deviations from the mean ( $\geq 85$  grams for sweet food,  $N = 2$ ;  $\geq 70$  grams for savoury food,  $N = 2$ ; no participants scored more than 3 standard deviations below the mean) were excluded from further analyses using sweet and savoury food intake as the dependent variables. Differences between those with guilt and celebration associations in the Prime and No Prime conditions were examined through two-way ANOVAs and ANCOVAs. The dependent variables used were sweet and savoury food intake, guilt experienced after eating, and positive and negative affect change. The possible covariates were stress on the day of the taste test, hunger levels, and time since participants had last eaten. These variables were included as covariates if they correlated significantly with the dependent variables.

To examine the interaction effects of different variables, moderation analyses were conducted. To avoid high inter-correlations between predictors and the interaction term, the default association was coded as -1 for guilt and +1 for celebration, and moderators were centered (Aiken, & West, 1991). An interaction variable was created by multiplying the variables relevant for each analysis. For example, when examining whether self-control had a

moderating effect in the relationship between default association and healthy eating behaviours, the interaction variable was found by multiplying the mean-centered default association by the mean-centered self-control variable. Hierarchical regression analyses were conducted. The predictor variables were entered into the model in the following order: (1) any demographic covariates (i.e., age, gender, and BMI), (2) default association and possible moderator variable (i.e., self-control, self-compassion, neuroticism, or perceived stress), and (3) the interaction variable. A moderator effect is present if the interaction term accounts for a significant ( $p < .05$ ) amount of variance in the dependent variable over and above any variance explained by the covariates and the main effects of the predictors. Following Aiken & West (1991), interaction effects were further examined by calculating separate regression slopes for participants associating chocolate cake with guilt and celebration, and simple slope analyses were conducted to examine whether the regression slopes differed significantly from zero. Sibley's (2008) software was used to conduct the simple slope analyses.

Participants who completed every item of a scale were included in the analyses. Participants who had missing data but completed over 70% of a scale were also included in the analyses, with their missing data being replaced by the mean for the missing values. Participants who completed less than 70% of a scale were not used in analyses including that scale. All analyses were conducted using SPSS Statistics 22.

## Results

### Total Sample (Phase 1)

#### Preliminary Analyses

Descriptive statistics for all eating variables, individual difference characteristics and perceived stress are presented in Table 2. Correlations between demographic variables and the main variables in the study are presented in Table 3.

Table 2  
*Descriptive Statistics for Phase 1 Variables*

	<i>M</i>	<i>SD</i>	Potential Range	Actual Range
Healthy Eating Behaviour	3.79	0.66	1 – 5	1.83 – 5.00
Hypothetical Food Choice	2.88	1.27	1 - 5	1.00 – 5.00
Attitudes	5.65	0.91	1 – 7	2.20 – 7.00
PBC	3.37	0.76	1 – 5	1.00 – 5.00
Intentions	5.39	1.25	1 – 7	1.00 – 7.00
Self-Control	3.22	0.61	1 – 5	1.62 – 4.69
Self-Compassion	2.98	0.71	1 – 5	1.00 – 4.58
Neuroticism	3.32	0.41	1 – 5	2.00 – 4.40
Perceived Stress	2.95	0.67	1 – 5	1.20 – 4.50

In comparison to other student samples, similar average scores for the main variables were reported by participants in the present study. Previous research conducted with student samples using the Brief Self-Control Scale (Tangney et al., 2004), the Self-Compassion-Short Form (Neff, 2003b), and the Perceived Stress Scale (Cohen et al., 1983) have shown similar average scores to the ones in this study. Additionally, the neuroticism scores of the present sample are similar to previous research using the Big Five Inventory to measure neuroticism (Benet-Martinez & John, 1998).

As can be seen in Table 3, female students scored lower on perceived behavioural control over eating, lower on self-compassion and higher on perceived stress compared to

Table 3  
*Correlation Matrix for Phase 1 Variables*

	1	2	3	4	5	6	7	8	9	10	11	12
1 Age												
2 Gender	-.00											
3 BMI	.39**	-.00										
4 Hypothetical Menu	.05	.08	-.02									
5 Current Eating	-.02	-.02	-.21*	-.10								
6 Intentions	.04	.02	.02	-.23**	.48**							
7 Attitudes	.00	.05	-.04	-.11	.38**	.40**						
8 PBC	.02	.14*	-.26**	-.10	.74	.41**	.36**					
9 Self-Control	.03	.01	-.22**	-.02	.47**	.20**	.16**	.51**				
10 Self-Compassion	.12	.13*	-.02	-.09	.29**	.09	.19**	.40**	.36**			
11 Neuroticism	-.20	-.11	-.09	-.08	-.01	.02	-.01	.04	.01	-.10		
12 Perceived Stress	-.18**	-.18**	.07	.00	-.34**	-.12	-.19**	-.44**	-.41**	-.74**	.10	

\* $p < .05$ , \*\* $p < 0.01$

male students. Age was unrelated to any of the variables in Table 3. Participants with higher BMI reported unhealthier eating behaviours, lower levels of perceived behavioural control over eating, and lower levels of self-control. Table 3 further shows that individuals with healthier eating behaviours reported better attitudes and intentions in relation to healthy eating. Individuals with healthier eating intentions had higher perceived behavioural control and better eating attitudes regarding healthy eating. Those with healthier eating intentions also made healthier choices when choosing a sandwich from a hypothetical food menu.

In addition, Table 3 indicates that individuals with higher self-control tended to report higher self-compassion and lower perceived stress. Those higher on self-control and self-compassion reported having healthier eating behaviours and better attitudes and perceived behavioural control in relation to healthy eating. Individuals with higher perceived stress levels had unhealthier eating behaviours and poorer attitudes and perceived behavioural control regarding healthy eating.

### **Guilt and Celebration**

Forty percent of participants ( $N = 98$ ) associated chocolate cake with guilt and 60% with celebration ( $N = 146$ ). In contrast to previous research (Kuijer & Boyce, 2014; Kuijer et al., 2014; Rozin et al., 2003), females in the current study were not significantly more likely to associate chocolate cake with guilt (42%) than were males (28%)  $\chi^2(1, N = 244) = 2.76, p = .097$ . No significant differences were found with respect to age,  $t(240) = -1.57, p = .118$  or BMI,  $t(230) = -0.67, p = .500$  (cf. Kuijer & Boyce, 2014). Differences between participants associating chocolate cake with guilt and celebration are presented in Table 4. Participants with a default association of guilt reported healthier eating intentions compared to participants with a default association of celebration. No significant differences between groups were found for healthy eating behaviours, hypothetical food choice, perceived behavioural control or attitudes. These differences were largely contrary to the expectations

as a default association of guilt was expected to have maladaptive effects (i.e., unhealthier eating behaviour, unhealthier hypothetical food choice, lower levels of perceived behavioural control) and no adaptive effects.

Table 4  
*Differences Between Participants Associating Chocolate Cake with Guilt or Celebration*

	Guilt		Celebration		<i>F</i>	<i>pη</i> <sup>2</sup>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Intentions	5.67	1.26	5.21	1.21	8.13**	.033
Attitudes	5.64	0.92	5.67	0.92	0.05	.000
PBC	3.38	0.76	3.36	0.76	0.03	.000
Healthy Eating Behaviour	3.81	0.65	3.78	0.67	0.11	.000
Hypothetical Food Choice	2.71	1.21	2.99	1.30	1.19	.005
Self-Compassion	2.78	0.70	3.11	0.68	13.57***	.054
Neuroticism	3.39	0.39	3.27	0.42	4.73*	.019
Perceived Stress	3.12	0.68	2.84	0.64	10.70***	.042
Self-Control	3.15	0.57	3.26	0.63	1.77	.007

*Note:* PBC = Perceived Behavioural Control

\**p* <.05, \*\**p* <.01, \*\*\**p* <.001

Table 4 further shows that those associating chocolate cake with guilt reported lower levels of self-compassion, higher levels of neuroticism, and lower levels of perceived stress compared to those associating chocolate cake with celebration. These findings were in line with the hypotheses for the study. The two groups did not differ with respect to self-control, which was contrary to expectations. Those with guilt associations were expected to have significantly lower self-control.

Because gender and BMI were related to some of the variables in the study (see Table 3) ANCOVAs were conducted to examine whether any of the results presented in Table 4 changed when controlling for gender or BMI (i.e., gender or BMI were included as a covariate if they correlated significantly with a dependent variable). This was not the case. Importantly, the differences found between groups on perceived stress and self-compassion remained significant after controlling for gender,  $F(1, 241) = 9.12, p = .003$  and  $F(1, 236) = 12.42, p = .001$  respectively. Similarly, Table 3 shows that some of the individual difference



variables and stress were significantly related to some of the eating variables. ANCOVAs were therefore conducted to control for individual differences and stress if correlated with the dependent variable (i.e. the eating variables). Again, none of the results presented in Table 4 changed. Importantly, the difference between those with guilt or celebration associations regarding their intentions to eat healthily remained significant after controlling for self-control,  $F(1, 235) = 10.22, p = .002$ .

### Moderator analyses

Moderation analyses were conducted to explore the possibility that the individual difference variables or perceived stress moderated the relationship between the default association and healthy eating behaviours, attitudes, intentions, and perceived behavioural control. The results showed that there was only one statistically significant moderating effect for Phase 1 variables. Self-control was shown to moderate the relationship between individuals' default association and their intentions to eat healthily. The results with self-control as the moderator are shown in Table 5.

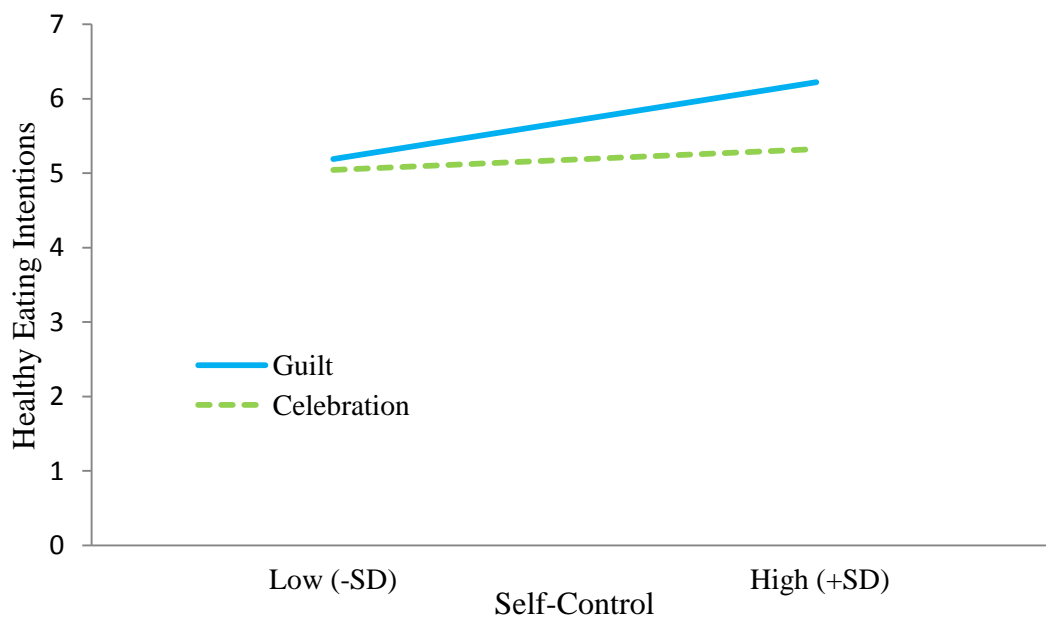


Figure 1. Interactive Effect of Default Association and Self-Control on Healthy Eating Intentions

The interaction effect for healthy eating intentions is displayed in Figure 1. For participants who associated chocolate cake with guilt, there was a significant positive relationship between self-control and their healthy eating intentions, ( $b = 0.85, t = 3.95, p < .001$ ). This did not occur for participants who associated chocolate cake with celebration ( $b = 0.23, t = 1.42, p = .156$ ).

Table 5  
*Interactive Effect of Participants' Default Association and Self-Control on the Dependent Variables in Phase 1*

		$R^2 \Delta$	$\beta$	$B$
<b>Healthy Eating Behaviours</b>				
Step 1	Gender	.01	0.08	0.14
Step 2	Default Association	.23	-0.07	-0.05
	Self-Control		0.49	0.54
Step 3	Default Association x Self-Control	.00	-0.05	-0.06
<b>Attitudes</b>				
Step 1	Default Association	.03*	-0.00	-0.00
	Self-Control		0.19	0.29
Step 2	Default Association x Self-Control	.01	-0.08	-0.13
<b>Intentions</b>				
Step 1	Default Association	.08***	-0.21	-0.26
	Self-Control		0.26	0.54
Step 2	Default Association x Self-Control	.02*	-0.15	0.31
<b>Perceived Behavioural Control</b>				
Step 1	Age	.02	0.03	0.00
	Gender		0.12	0.25
Step 2	Default Association	.26	-0.07	-0.05
	Self-Control		0.54	0.67
Step 3	Default Association x Self-Control	.01	-0.11	-0.13

*Note:* Apart from the  $R^2\Delta$  values, all other values were taken from the last step of each analysis. Any values  $<.001$  have been rounded to 0.00.

\* $p < .05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$

Figure 1 indicates that participants with guilt associations only reported healthier eating intentions compared to those with celebration associations when they had high levels of self-control (the difference in point at high levels of the predictor is significant,  $p < .001$ ). However, individuals with guilt associations did not report healthier eating intentions than

those with celebration associations when they had low levels of self-control (the difference in points at low levels of the predictor is not significant,  $p = .518$ ). These results indicate that it is possible for guilt to have adaptive effects, provided that those with guilt associations also have high self-control. However, if individuals have low self-control, guilt does not appear to have adaptive effects.

The remaining individual difference variables (self-compassion and neuroticism) and perceived stress did not moderate the relationship between individuals' default association and the dependent Phase 1 variables examined. Self-control did not moderate any other relationships.

## **Experiment Sample (Phase 2)**

### **Preliminary Analyses**

Main descriptive statistics for all the variables in Phase 2 and correlations between them are presented in Tables 6 and 7. In terms of positive and negative affect, the present sample reported similar average scores to previous research conducted with a student sample (Watson et al., 1988).

The correlations displayed in Table 7 show that participants' gender was not significantly correlated with any of the other variables. Age was significantly and positively correlated with BMI, but not with any of the other variables. Therefore, age and gender were not used as covariates. Individuals with higher BMI consumed a larger amount of savoury food ( $p < .05$ ); therefore, BMI was used as a covariate when analysing relationships with savoury food consumption. Individuals who consumed more savoury food also consumed more sweet food. The amount of sweet food intake was not significantly correlated with any other variable.

Table 7 further shows that increased levels of guilt were experienced after eating a larger amount of savoury food, but not sweet food. Additionally, participants with lower stress levels on the day of the taste test experienced a larger decrease in negative affect than those with higher stress levels. As a result, stress was used as a covariate for negative affect change. Participants who reported higher stress on the day of the taste test also reported being hungrier and higher pre and post-test negative affect. Hunger was significantly correlated with pre-test negative affect, but not post-test negative affect. Stress, time since participants had last eaten, and hunger were not significantly correlated to the amount of food eaten during the experiment or to the levels of guilt experienced after eating; therefore, they were not used as covariates in further analyses.

Table 6  
*Descriptive Statistics for Phase 2 Variables*

	<i>M</i>	<i>SD</i>	Potential Range	Actual Range
Sweet food intake	25.35	19.97		
Savoury food intake	22.58	15.71		
Pre-Positive Affect	3.01	0.63	1 – 5	1.20 – 4.60
Pre-Negative Affect	1.40	0.53	1 – 5	1.00 – 3.20
Post-Positive Affect	3.00	0.74	1 – 5	1.60 – 4.80
Post-Negative Affect	1.17	0.33	1 – 5	1.00 – 2.80
Positive Affect Change	-0.01	0.58		
Negative Affect Change	-.023	0.39		
Guilt Experienced After Eating	2.06	1.04	1 – 5	1.00 – 5.00
Stress on Day	4.57	2.26	1 – 10	1.00 – 9.00
Hunger	3.70	1.40	1 – 7	1.00 – 7.00
Time Last Eaten	151.47	109.06		

*Note:* Time Last Eaten is presented in minutes.

The correlations in Table 7 further show that pre-test positive affect was positively and significantly correlated with post-test positive affect. In other words, individuals higher

Table 7  
*Correlation Matrix for Phase 2 Variables*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1 Age															
2 Gender	-.00														
3 BMI	.44**	-.13													
4 Sweet	-.04	.22	.03												
5 Savoury	.06	.13	.24*	.55**											
6 Pre-pos. affect	-.10	.06	.05	.03	.01										
7 Pre-neg. affect	-.10	-.11	.02	-.04	.00	-.23									
8 Post-pos. affect	.01	.01	-.03	.09	.08	.65**	-.17								
9 Post-neg. affect	-.05	-.13	.00	-.21	-.15	-.16	.66**	-.19							
10 Pos. Affect $\Delta$	.11	-.06	-.10	.08	.10	-.26	.03	.57	-.08						
11 Neg. Affect $\Delta$	.10	.05	-.02	-.12	-.13	.17	-.77	.06	-.04	-.10					
12 Guilt	-.08	.01	.09	.09	.37**	.03	.12	-.09	.11	-.15	-.07				
13 Stress on Day	-.09	-.18	.04	-.13	-.06	-.14	.49	-.18	.37	-.09	-.34**	.12			
14 Hunger	-.15	-.00	-.11	.18	.18	-.08	.26*	.02	.22	.10	-.16	-.02	.36**		
15 Time last ate	.06	.10	.17	.14	.12	.01	.05	.04	.09	.03	.01	-.05	.16	.16	

\* $p < .05$ , \*\* $p < 0.01$

on positive affect before the taste test were likely to maintain their positive affect until after the experiment. Equivalently, those with higher negative affect were likely to continue to experience similar levels of negative affect following the taste test. Conversely, those with higher pre-test positive affect tended to experience lower pre-test negative affect. However, the same was not observed for post-test affect measures. After the taste test, positive affect was not significantly related to negative affect experienced.

### **Default association and experimental manipulation**

Two (Default association: guilt or celebration) x 2 (Prime: Prime vs no prime)-analyses of variance were conducted with food intake (sweet and savoury), changes in positive and negative affect, and guilt experienced after eating as dependent variables. The results are presented in Table 8. This table shows that there were no main effects for Prime condition or Default association when examining sweet food intake. There was also no significant interaction effect. Thus, individuals with a default association of guilt did not eat more or less sweet than did those with a default associations of celebration. Moreover, whether or not participants were primed with guilt/celebration did not influence their sweet food intake.

As Table 7 shows that participants with higher BMIs consumed more savoury food, BMI was included as a covariate in the analysis with savoury food intake as the dependent variable. In terms of savoury food, after controlling for BMI, the two-way ANOVA showed no main effects for Default association (see Table 8) or Prime condition. There was a marginally significant effect for Prime condition and the interaction effect between condition and default association was also marginally significant. Post Hoc tests showed that individuals with guilt associations in the Prime condition ate a significantly larger amount of savoury food in comparison to those with guilt associations in the No Prime group,  $t(27) = -$

2.13,  $p = .043$ . The differences between those with celebration associations in the Prime and No Prime conditions were not significant,  $t(48) = 0.40$ ,  $p = .691$ .

The correlations shown in Table 7 indicated that the amount of sweet and savoury food consumed during the taste test was significantly correlated with guilt experienced after eating; these variables were controlled for in the analysis with guilt after eating as the dependent variable. The effects of condition and default association on guilt experienced after eating were also examined, while controlling for sweet and savoury food intake. The results showed that there was no main effect of Prime condition. There was a significant main effect of default association: individuals with guilt associations experienced higher levels of guilt after eating in comparison to those with celebration associations. The interaction effect was not significant.

The results also showed that there was no significant main effect of Prime condition on positive affect change. However, there was a significant main effect of Default association on positive affect change. Individuals with guilt associations experienced a significant decrease in positive affect after food consumption compared to those with celebration associations. The interaction effect was not significant. In terms of negative affect change, there were no significant main effects of Prime condition or Default association. The interaction term was statistically significant. Post Hoc tests showed that negative affect change among individuals with celebration associations was significantly different to the negative affect change among those with guilt associations when they were in the Prime condition,  $t(39) = 2.07$ ,  $p = .045$ , but not for those who were in the No Prime condition,  $t(38) = -0.58$ ,  $p = .566$ . Negative affect decreased significantly more from the pre-test to the post-test measure among those with celebration associations in the Prime condition in contrast to those with guilt associations (i.e., those associating chocolate cake with celebration experienced a larger negative affect change).

Table 8  
*Default Association and Experimental Manipulation ANOVA Results*

		Prime		No prime			<i>F</i>	<i>p</i> $\eta^2$
		<i>M</i>	<i>SE</i>	<i>M</i>	<i>SE</i>			
Sweet food	Guilt	25.69	3.84	19.71	4.10	Default:	0.05	.000
	Celebration	20.17	3.13	26.81	3.07	Prime:	0.01	.001
						Default x Prime:	3.13	.040
Savoury food <sup>1</sup>	Guilt	27.04	3.25	15.40	3.62	Default:	0.10	.907
	Celebration	20.95	2.62	20.77	2.65	Prime:	3.73	.057
						Default x Prime:	3.43	.068
Positive affect $\Delta$	Guilt	-0.13	0.14	-0.24	0.15	Default:	4.22*	.052
	Celebration	0.05	0.12	0.13	0.11	Prime:	0.02	.000
						Default x Prime:	0.57	.007
Negative affect $\Delta^4$	Guilt	-0.12	0.09	-0.29	0.10	Default:	0.27	.004
	Celebration	-0.35	0.07	-0.14	0.07	Prime:	0.06	.001
						Default x Prime:	4.91*	.061
Guilt after eating <sup>2,3</sup>	Guilt	2.46	0.23	2.66	0.24	Default:	14.08***	.158
	Celebration	1.81	0.18	1.73	0.18	Prime:	0.09	.001
						Default x Prime:	0.44	.006

*Note:* Where appropriate, means were adjusted for covariates (<sup>1</sup>BMI, <sup>2</sup>sweet food, <sup>3</sup>savoury food, <sup>4</sup>stress on the day).

\**p* <.05, \*\**p* <.01, \*\*\**p* <.001



### Exploratory Analyses

No significant main effects for Prime condition, nor any significant interaction effects between Default association and Prime condition were found with food intake and guilt after eating as dependent variables. Therefore, moderator analyses were conducted to explore the possibility that the individual difference variables or perceived stress might moderate the relationship between the default association and actual food intake and guilt reported after eating. Table 9 presents the correlations between the individual difference variables and perceived stress (assessed in Phase 1 of the study), and food intake and guilt after eating.

Table 9  
*Correlations Between Individual Difference Variables, Perceived Stress, and Food Intake and Guilt After Eating*

	1	2	3	4	5	6	7
1 Self-Control							
2 Self-	.36**						
3 Neuroticism	.02	-.10					
4 Perceived	-.41	-.74**	.10				
5 Sweet	-.08	.10	-.08	-.20			
6 Savoury	-.13	.01	-.08	-.07	.55**		
7 Guilt	-.21	-.09	.06	.13	.09	.37**	

\* $p < .05$ , \*\* $p < 0.01$

The results showed that there was only one statistically significant moderating effect when examining dependent variables from Phase 2. Self-control was shown to moderate the relationship between individuals' default association and their savoury food intake, after controlling for BMI. The results are shown in Table 10. The interaction effect for savoury food intake is displayed in Figure 2. For participants with guilt associations, there was a marginally significant negative relationship between self-control and savoury food intake, ( $b = -8.91$ ,  $t = -1.94$ ,  $p = .056$ ). This did not occur for participants who associated chocolate cake with celebration ( $b = 2.26$ ,  $t = 0.82$ ,  $p = .417$ ).

Table 10  
*Interactive Effect of Participants' Default Association and Self-Control on the Dependent Variables in Phase 2*

		$R^2 \Delta$	$\beta$	$B$
<b>Sweet Food Intake</b>				
Step 1	Default Association	.03	0.12	1.88
	Self-Control		-0.20	-5.02
Step 2	Default Association x Self-Control	.02	0.16	4.05
<b>Savoury Food Intake</b>				
Step 1	BMI	.02	0.14	0.31
Step 2	Default Association	.01	0.05	0.69
	Self-Control		0-.17	-3.33
Step 3	Default Association x Self-Control	.06*	0.28	5.58
<b>Guilt Experienced after Eating</b>				
Step 1	Sweet	.09**	-0.12	-0.01
	Savoury		0.34	0.03
Step 2	Default Association	.11**	-0.30	-0.31
	Self-Control		-0.08	-0.13
Step 3	Default Association x Self-Control	.01	-0.10	-0.15

*Note:* Apart from the  $R^2\Delta$  values, all other values were taken from the last step of each analysis. Any values  $<.001$  have been rounded to 0.00.

\* $p < .05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$

Figure 2 indicates that participants with guilt associations only consumed less savoury food compared to those with celebration associations when they had high levels of self-control (the difference in point at high levels of the predictor approaches significance,  $p = .063$ ). However, individuals with guilt associations did not consume less savoury food than those with celebration associations when they had low levels of self-control (the difference in points at low levels of the predictor is not significant,  $p = .214$ ).

These results suggest that guilt can have adaptive effects in terms of food intake, but only when individuals have guilt associations and also have high self-control. Conversely, guilt does not appear to have adaptive consequences for individuals with guilt associations who have low self-control.

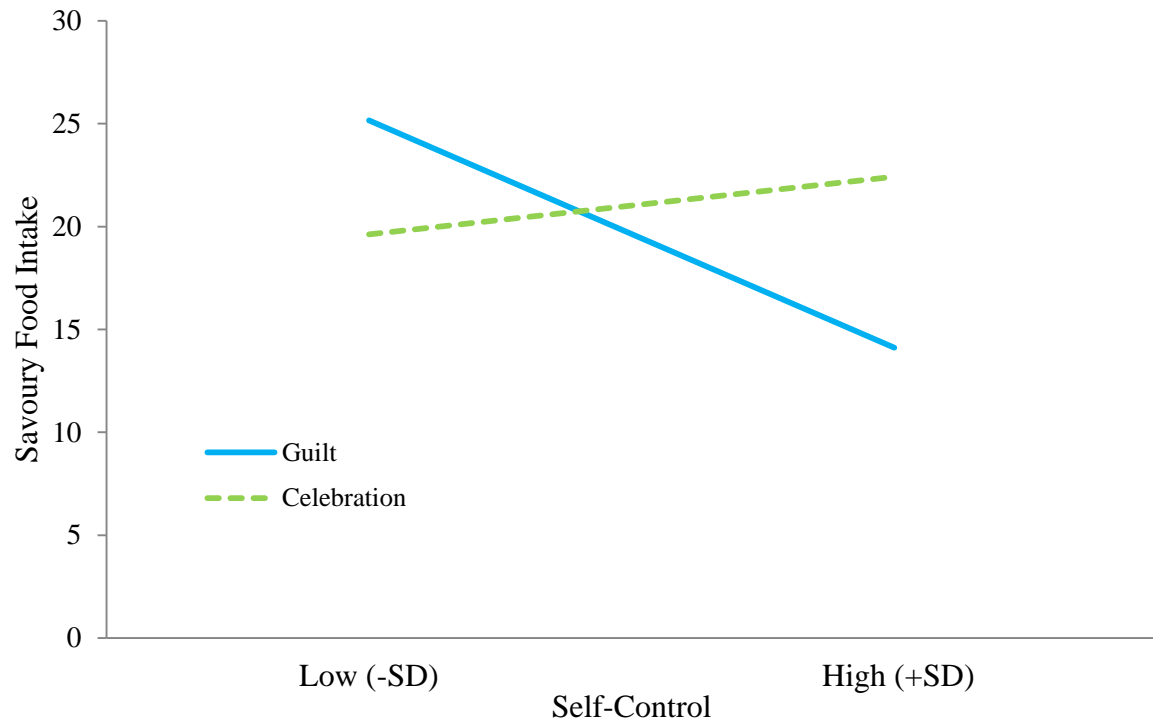


Figure 2. Interactive Effect of Default Association and Self-Control on Savoury Food Intake

The remaining individual difference variables (self-compassion and neuroticism) and perceived stress did not moderate the relationship between individuals' default association and sweet or savoury food intake or guilt experienced after eating. Self-control did not moderate any other relationships.

## Discussion

Research suggests that campaigns and programs addressing the improvement of health behaviours can have adverse consequences, resulting in feelings of worry and guilt (Rozin et al., 1999, 2003). It remains unclear whether experiencing guilt in relation to food and eating is adaptive, maladaptive, or both. While some researchers conclude that guilt can have adaptive effects (e.g., Giner-Sorolla, 2001), others find that it can be both adaptive and maladaptive (e.g., Hofmann & Fisher, 2012). However, most do find that guilt only appears to have maladaptive consequences (e.g., de Witt Huberts et al., 2013; Kuijer & Boyce, 2014; Kuijer et al., 2014).

### Guilt Findings

As previously stated, Rozin and colleagues (2003) found that 22% of their student sample reported chocolate cake-guilt associations, while Kuijer and Boyce (2014) and Kuijer et al. (2014) found that 27% and 20%, respectively, associated chocolate cake with guilt when studying a community sample. In the present study, 40% of individuals associated chocolate cake with guilt rather than celebration. In comparison to the previous studies, particularly Rozin et al. (2003) who also used a student sample, the present study found that almost twice as many people had chocolate cake-guilt associations. This possibly indicates that young adults are at an increased risk of experiencing the consequences of food-related guilt.

The increased number of individuals associating chocolate cake with guilt in this study in comparison to Rozin et al. (2003) might be related to the increased availability of mobile technology (e.g., smartphones and tablets) and social networking sites (e.g., Facebook and Twitter). It is possible that this increased accessibility might leave individuals who are vulnerable to the negative effects of health products and programmes at a heightened risk for unhealthy behaviours.

Although gender differences were not significant in the current study, the differences found were in the expected direction based on Kuijer and Boyce (2014) and Rozin and colleagues (2003). The lack of significance could have resulted from insufficient power (i.e., using a predominantly female sample.).

### **Healthy Eating Behaviours, Attitudes, Intentions, and Perceived Behavioural Control**

Based on previous research, it was hypothesised that individuals who associated chocolate cake with guilt would not report healthier eating behaviours, attitudes, intentions, or perceived behavioural control in relation to healthy eating. As hypothesised and in agreement with Kuijer and Boyce (2014), individuals with chocolate cake-guilt associations did not report healthier eating attitudes. Kuijer and colleagues (2014) and Kuijer and Boyce (2014) also found that individuals with guilt associations reported unhealthier eating behaviours and lower perceived behavioural control. In comparison, no significant differences between those with guilt or celebration associations were found in the current study in regard to healthy eating behaviours or perceived behavioural control.

Contrary to hypothesised and unlike Kuijer and Boyce (2014), significant differences were found regarding healthy eating intentions in the present study. Healthier eating intentions were reported by individuals with guilt associations in comparison to those with celebration associations. This could indicate that guilt has the potential to be adaptive, because individuals with chocolate cake-guilt associations intended to eat healthier compared to those with chocolate cake-celebration associations. However, results also showed that even though those with guilt associations had healthier eating intentions, this failed to be translated into behaviour when these individuals were making a hypothetical food choice (or were consuming junk food in the taste teste – see discussion below). Those with guilt or celebration associations did not differ significantly regarding their hypothetical food choices. Both groups chose sandwiches with a medium amount of calories. Neither of the groups

showed a preference for the options with the lowest or highest amount of calories. Taken together, these results are in line with Hoffman and Fisher (2012), who found that guilt can simultaneously have adaptive as well as maladaptive consequences.

Theoretically, the gap between individuals' intentions and their subsequent behaviour could be a result of them having unstable intentions, that is, although those associating chocolate cake with guilt (vs. celebration) had healthier eating intentions, these intentions may have lacked commitment or stability. According to the theory of planned behaviour (TPB; Ajzen, 1991), behaviour results from an individual's intentions to perform the behaviour and their perceived behavioural control concerning that behaviour (Conner et al., 2002). Previous research conducted on the TPB has shown that intentions are only good predictors of behaviour when they are stable (Conner et al., 2002; Conner, Sheeran, Norman, & Armitage, 2000; Sheeran, Orbell, & Trafimow, 1999). In other words, intentions are likely to result in behaviour as long as an individual consistently maintains these intentions until the behaviour is completed (Ajzen, 1996). However, when intentions lack stability, it is more likely for past behaviour to predict future behaviour instead (Ajzen, 1996; Conner et al., 2000, 2002). The stability of intentions can be affected by unexpected circumstances or general difficulties that individuals encounter in the process of accomplishing a target behaviour (Ajzen, 1996). As a result, individuals may have to alter how they intend to achieve behaviour performance.

For example, research examining the 'intention-behaviour gap' (i.e., whether intentions transform into behaviour) suggests that behaviour planning and self-efficacy (similar to perceived behavioural control) are important to close this gap (Sniehotta, Scholz, & Schwarzer, 2005). If individuals believe they possess the skills necessary to perform a behaviour (i.e., high self-efficacy and perceived behavioural control), they will be more likely to set precise goals, monitor their progress closely, and pursue these goals with more

determination (Sniehotta et al., 2005). However, in the current study, although those associating chocolate cake with guilt reported healthier eating intentions, they did not report higher levels of perceived behavioural control. Strategies for goal achievement are more often planned by those who believe they can accomplish their goals (Bandura, 1997). Thus, it is possible that the observed intention-behaviour gap among those with guilt associations in the present study resulted from poor behaviour planning. This lack of behaviour planning could be addressed by teaching individuals to develop implementation intentions.

Research suggests that having established ‘if—then’ behavioural plans indicating what behaviour is to be performed when encountering a specific situation (i.e., implementation intentions; Gollwitzer, 1999) can effectively encourage health behaviours, including healthy eating and exercising (Gollwitzer & Sheeran, 2006; Mann, de Ridder, & Fujita, 2013). Therefore, the intention-behaviour gap present in this study could be addressed by teaching individuals to create healthy eating implementation intentions. For example, individuals could be taught to repeat ‘*If I think about chocolate cake, then I will eat an apple instead*’ (Adriaanse, de Ridder, & de Wit, 2009), which would allow an automatic response to be readily available for when the thought of eating chocolate cake comes to their mind. Thus, individuals could be guided through the process of creating implementation intentions to plan for future situations where they might be tempted to make unhealthy eating choices.

## **Experimental Findings**

### **Food Intake**

The present study hypothesised that if guilt had adaptive effects, individuals with guilt associations would consume less food during the taste test compared to those with celebration associations, particularly among those in the prime condition. However, the opposite effect was expected if guilt had maladaptive effects: individuals with guilt associations would

consume more food than those with celebration associations, especially when primed with guilt. In relation to sweet food, the results demonstrated that guilt did not have adaptive effects as individuals with guilt associations did not consume less sweet food than those with celebration associations. In regard to savoury food intake, the results showed that there was a trend indicating that those with guilt associations increased their intake after being primed with guilt, suggesting that guilt had maladaptive consequences for this group. Therefore, even though those with guilt associations reported healthier eating intentions in Phase 1, priming them with guilt did not motivate them to eat less in comparison to those with guilt associations in the no prime condition. In agreement with Hoffman and Fisher (2012), these findings suggest that guilt has both adaptive and maladaptive effects.

### **Guilt Experienced After Eating**

Individuals with guilt associations were expected to report experiencing higher levels of guilt after the taste test in comparison to those with celebration associations. The results supported this hypothesis: higher guilt was experienced by those with guilt associations. The findings further indicated that there was no effect of condition (Prime or No Prime) on post-test guilt. Irrespective of whether they were reminded of their default association, individuals with guilt associations experienced higher post-consumption guilt in comparison to those with celebration associations, regardless of the amount of food consumed during the taste test.

### **Affect Change**

The hypothesis that individuals with guilt associations in comparison to celebration associations would experience a decrease in positive affect from the pre-test to the post-test positive affect measure was supported. The prediction that negative affect would increase for those with guilt associations and would decrease for those with celebration associations was partly supported. The findings showed that the effect of default association on negative affect



also depended on the condition that participants were assigned to. In the No Prime condition, no significant differences were found between those associating chocolate cake with guilt or celebration in terms of their change in negative affect. However, individuals with guilt associations in the Prime condition experienced a significant increase in negative affect after eating compared to those with celebration associations in the Prime condition. These results are in line with previous research claiming that food and eating can be a source of negative emotions for some individuals and positive emotions for others (Rozin et al., 1999).

The overall findings suggest that reminding individuals with guilt associations about their default association was maladaptive because it did not decrease food intake and it increased the levels of negative emotions experienced after eating, including guilt. The results also indicated that priming individuals with celebration associations with happiness improved their mood, which was maintained after eating. In other words, individuals with guilt associations might be worse off because they do not eat less than those with celebration associations and they experience more guilt after eating compared to those with celebration associations.

## **Guilt and Individual Difference Variables**

### **Self-Control**

The hypothesis that those with guilt associations would report lower self-control scores was not supported. Individuals with guilt or celebration associations did not display statistically significant differences on their self-control. This finding was unexpected because the literature suggests that those with guilt associations are more likely to report decreased self-control (Tangney et al., 2007).

### **Self-Compassion**

As hypothesised, those with chocolate cake-guilt associations reported lower levels of self-compassion in comparison to those with chocolate cake-celebration associations. As previously mentioned, research has shown that guilt is a negative emotion that can be experienced before or after eating a ‘forbidden’ food item such as chocolate cake. Guilt before eating may occur when individuals anticipate performing an unwanted behaviour (e.g., eating chocolate cake) or after eating when individuals might regret a behaviour (same example applies; Cartwright & Stritzke, 2008). In addition, research has shown that self-compassion is negatively and significantly related to self-criticism, depression, anxiety, and rumination (Neff, 2003b). Taking these findings into account, it could be assumed that those with guilt associations may have reported lower self-compassion because they might be more likely to ruminate in regard to their food-related behaviours and attitudes in comparison to those with celebration associations. It is possible that low self-compassion results from eating ‘forbidden’ food items because individuals feel disappointed by their behaviour, which in turn results in feelings of guilt and self-judgement. Another possibility is that individuals with low self-compassion consume ‘forbidden’ food items because they are unable to regulate their emotions or behaviour and turn to food for comfort. More research is required in this area as self-compassion is a concept that has only recently been applied in the field of psychology.

### **Neuroticism**

Regarding the personality construct of neuroticism, individuals with guilt associations were predicted to report higher levels of neuroticism compared to those with celebration associations, which was supported by the findings. Research has shown that higher levels of neuroticism (Kikuchi et al., 1999) and guilt in relation to eating (Kuijer & Boyce, 2014; Kuijer et al., 2014) are related to poorer eating behaviours. Therefore, it is not surprising that

those who associate chocolate cake with guilt also reported high levels of neuroticism. Perhaps, individuals who are high on neuroticism use food as a method to regulate emotions, which might result in feeling of guilt. However, the literature has only shown that food can be used to regulate emotions among neurotic men, not women (Steptoe & Pollard, 1995). Thus, more research is required in this area because, as far as the researcher is aware, no other studies have looked at the relationship between neuroticism, food-related guilt, and eating behaviours, attitudes, intentions, and perceived behavioural control.

### **Guilt and Perceived Stress**

Higher perceived stress was found among those with guilt associations, which is not surprising as food and eating can be a source of worry, guilt, and stress (Rozin et al., 1999). As previously mentioned, eating can occur as a response to stress because some individuals tend to eat in order to cope with negative emotions (e.g., Groesz et al., 2012; Polivy et al., 1988). Items considered 'forbidden' foods are constantly present in individuals' lives, whether it is on television programmes, advertisements, at supermarkets, restaurants, or other places. This can pose a challenge for individuals who associate negative emotions with food and eating. The constant presence of these food items may exacerbate stress as it can be a continuous reminder of competing approach/avoidance inclinations. Individuals might desire a particular food but are simultaneously being reminded of the negative consequences that might result from the consumption of that product. Therefore those who associate chocolate cake with guilt may experience higher stress (and guilt) as a result of either eating 'forbidden' food items or they eat these 'forbidden' food items to cope with stress, which might in turn aggravate stress and result in feelings of guilt.

## **The Moderating Role of Individual Difference Variables and Perceived Stress**

### **Perceived Stress**

As previously mentioned, Kuijer and colleagues (2014) found that the relationship between individuals' default association with perceived behavioural control and eating behaviours was moderated by perceived stress levels. These results were not replicated by the present study: perceived stress was not found to moderate the relationship between default association and perceived behavioural control or healthy eating behaviours. In addition, the results showed that perceived stress did not moderate the relationship between individuals' default association and sweet or savoury food intake during the taste test or the amount of guilt experienced after eating. Even though individuals with guilt associations reported higher stress levels, stress did not affect the amount of control they believed to have over their eating behaviours or the eating behaviours themselves (healthy eating behaviours or actual food intake during the taste test), or the level of guilt experienced after eating.

### **Self-Control**

The present study examined the possibility that self-control had a moderating role in the relationship between individuals' default association and their eating behaviours, attitudes, intentions, and perceived behavioural control in regard to healthy eating. However, the results indicated that self-control did not moderate these relationships, with the exception of healthy eating intentions. Individuals associating chocolate cake with guilt who had high self-control reported healthier eating intentions than those with celebration associations and those with guilt associations with low self-control.

Furthermore, it was examined whether self-control moderated the relationship between the default association and amount of food eaten. Individuals with guilt associations with higher self-control levels were expected to eat less food than those with lower self-

control. This was particularly expected to occur in the prime condition because individuals would be aware of the guilt that could result from eating 'junk' food. This hypothesis was partly supported by results; no significant differences were found in regard to sweet food consumption based on individuals' guilt association and their self-control level. Significant differences were found regarding savoury food intake. Those with guilt associations who reported high self-control consumed less savoury food during the taste test than those with guilt associations who had low self-control, and they also ate less than those with celebration associations. These results indicate that it is possible for guilt to have adaptive effects among individuals with high self-control in regard to eating behaviours. This suggests that, perhaps, mass media campaigns encouraging healthier eating that result in feelings of guilt can motivate behaviour change among those with high self-control, but might not affect or may hinder behaviour change among those with low self-control. However, more research is required in this area to determine if these results could be generalised to a broader range of eating behaviours and beyond immediate food consumption following priming. Also, further research is required to determine if this could be applied to diverse types of food rather than just some of the unhealthy snacks such as the ones used in this study.

### **Self-Compassion**

It was expected that self-compassion would moderate the relationship between eating behaviours, attitudes, intentions, and perceived behavioural control in relation to healthy eating. Self-compassion was also hypothesised to moderate the relationship between having a chocolate cake-guilt association and food intake. This expectation was formed based on the literature showing that self-compassion can help individuals cope with emotions, such as anxiety and guilt (e.g., Allen & Leary, 2010; Leary et al., 2007), which would leave more self-regulating resources available to cope with other situations, such as facing temptation to eat unhealthy foods. It was predicted that self-compassion would buffer the impact of guilt

associations on guilt experienced after eating. This prediction was founded on research suggesting that self-compassionate individuals tend to be less critical and more forgiving toward themselves (Neff, 2003). As a result, they may not feel as guilty after eating a ‘forbidden’ food item in comparison to those with lower self-compassion. However, the findings did not support this hypothesis: self-compassion did not moderate the relationship between chocolate cake-guilt association and any of the dependent variables used in both phases of this study.

### **Neuroticism**

The findings from the present study did not support the hypothesis that neuroticism would act as a moderator variable. Individuals high on neuroticism tend to emotionally overreact to life events (Thomas, 2009). Therefore, they were expected to report unhealthier eating behaviours and attitudes, intentions and poorer perceived behavioural control in regard to healthy eating. Individuals higher on neuroticism who were primed with guilt before the taste test were predicted to either control their eating (if guilt was adaptive) or overeat (if guilt was maladaptive) during the taste test in response to the manipulation (i.e., overreact to guilt priming). However, these patterns of behaviour were not present in this study. Even though individuals with guilt associations reported higher levels of neuroticism, neuroticism did not moderate the relationship between default association and any of the dependent variables measured in the study.

### **Strengths**

The present study used a ‘healthy’ sample in comparison to most of the literature, which has focused on individuals with disordered eating patterns. This study has also expanded the literature on the relationship between food-related guilt and healthy eating behaviours, attitudes, intentions, and perceived behavioural control. Some of the findings supported previous research (e.g., healthy eating behaviours in Kuijer & Boyce, 2014 and

Kuijer et al., 2014), while other findings challenged some of the previous research (e.g., no significant gender differences in comparison to Rozin et al., 2003; significant differences in healthy eating intentions among those with guilt associations compared to Kuijer & Boyce, 2014; Kuijer et al., 2014). An increased amount of individuals had guilt associations in comparison to Rozin et al. (2003), which could indicate that individuals' relationship with food has worsened over the past decade, which might have detrimental effects for society in a larger scale.

In addition, several variables were measured in the present study, allowing the exploration of the relationships between the individuals' default association and these variables. As far as the researcher is aware, this was the first study to examine the relationship between individuals' default association with a 'forbidden' food item and self-compassion, finding a significant relationship between them.

A particular advantage of the present study was that it did not rely solely on self-report. This study presented participants with a hypothetical food choice to test whether their intentions and attitudes regarding healthy eating would translate to hypothetical behaviour. An experimental component was also used to determine the influence of pre-food consumption guilt on food intake and emotions. The study found evidence to support the claim that guilt can have maladaptive consequences for individuals in terms of eating and emotions, particularly in regard to savoury food. The findings suggest that pre-consumption guilt can have adaptive effects in relation to food intake only when individuals have high self-control

### **Limitations and Future Direction**

The present study had several limitations. First, the study used a student sample, which limits the generalisability of the findings. It is possible that using this type of sample

explains some of the differences found in this study compared to previous research (e.g., Kuijer & Boyce, 2014; Kuijer et al., 2014). Future research should use a young adult, community sample to determine if these results can be generalised among this age group. Also, it was a cross-sectional study and most of the data collected for the study was self-reported, which might not been completely accurate.

Second, the hypothetical food choice used in Phase 1 only consisted of different sandwich options. No sweet food options were offered. Perhaps using a chocolate bar menu would allow for more accurate comparisons as the study examined chocolate cake-guilt associations. Future research should consider using a hypothetical food menu with more varied savoury and sweet food options.

Third, Phase 2 had a small sample, which could have influenced the results as only a small number of individuals could be randomly assigned to the Prime or No Prime conditions based on their default association. Only 30 individuals with guilt associations (and 51 with celebration associations) participated in the experiment which might have resulted in non-significant results in many of the relationships explored in this research. There was also an uneven distribution of participants in each condition based on their default association, which limits the conclusions that can be drawn from this study. Thus, future research would benefit from evenly distributing participants between conditions based on their default association. A larger experimental sample ought to be used to further investigate this topic.

Phase 2 also measured guilt; however guilt was only measured after the taste test instead of before and after, as it was done for the other negative and positive emotions. This limits the conclusions that can be drawn from the effects that the amount of food and type of food consumed had on guilt experienced after eating. Even though individuals with chocolate cake-guilt associations reported higher post-test guilt levels, there are no pre-test levels to



compare them with. Future research in this area would benefit from measuring guilt before and after food consumption to allow accurate comparisons.

Another limitation was that only unhealthy food options were used for the taste test, which could have influenced individuals' choices. According to Desmet and Schifferstein (2008), during an experimental eating procedure individuals cannot be held accountable for what they eat, but only for how much they eat because a third individual is choosing the food options for them. It is possible that individuals tend to avoid consuming the 'junk' foods offered during the taste test. However, they might have consumed a large amount of these foods because they were easily available during the experiment and there was a lack of healthier options. Thus, the finding that individuals with guilt associations did not eat less food than those with celebration associations even though they had healthier eating intentions, might not be generalisable as individuals were not provided with a healthier option (e.g., carrot sticks or raisins). Therefore, future research should consider providing both healthy and unhealthy food options to transfer control over food choice back to participants.

Furthermore, the present study assessed individuals' default association with chocolate cake. However, chocolate cake was not offered during the experiment, only chocolate (M&Ms). This could have influenced the results because it is possible that some individuals do not perceive the offered foods as 'forbidden' in comparison to chocolate cake. Also, individuals' default associations with potato chips or a savoury equivalent of chocolate cake were not assessed. Individuals' preferences may vary, while some individuals feel more tempted by sweet food, others are more tempted by savoury foods. Individuals' preferences could influence the effect of the manipulation and their food intake. Thus, the 'forbidden' food item used to assess individuals' default association should be provided in the taste test in future research.

It is possible that the time in which the experiment was conducted might have influenced food consumption. The present study measured hunger and the time since participants had last eaten before the taste test. This was done to determine whether these variables had a moderating role. However, these variables were found to be unrelated to food consumption.

### **Implications**

Healthy and responsible lifestyle choices are being promoted in different ways as a result of the current increase in obesity and obesity-related diseases (Guttman & Salmon, 2004). Individuals are constantly surrounded by advertisements of programmes and products that transmit one main message: eat and live healthily. In many countries (including New Zealand), public health campaigns have been directed toward encouraging healthy and responsible lifestyle choices (Guttman & Salmon, 2004). These campaigns emphasise the personal responsibility each individual has to eat healthily and stay active. This focus on personal responsibility often intends to bring about behaviour change by prompting individuals with feelings of guilt, based on the assumption that a guilty conscience will encourage them to modify their health behaviours (Kuijer & Boyce, 2014).

There is some debate within the health literature on whether guilt has motivational or adaptive consequences, maladaptive consequences, or both. Some research suggests that guilt can have adaptive effects on health behaviours, resulting in positive change (e.g., Giner-Sorolla, 2001). Some evidence supports the claim that guilt can be both adaptive and maladaptive (e.g., Hofmann & Fisher, 2012). Nevertheless, most of the literature indicates that guilt is more likely to have maladaptive consequences on health behaviours. The results from the present study indicate that guilt can be both adaptive and maladaptive depending on individual differences.

The findings from this study showed that young, adult students with chocolate cake-guilt associations had higher healthier eating intentions. This appears to be an adaptive as well as maladaptive effect of guilt: these individuals intended to eat healthier, but did not report healthier eating behaviours and they did not make healthier eating decisions during the hypothetical food choice or the taste test.

The results from this study also indicated that there is one group that benefited from having food-guilt associations: individuals with high self-control. These individuals had healthier eating intentions in comparison to those with guilt associations with low self-control and those with celebration associations. This probably indicates that the guilt they experience in relation to food prompted them with the desire to make healthier choices. These individuals also displayed healthier eating behaviours during the taste test: they consumed less savoury food than those with low self-control and those with celebration associations. These findings indicated that for this particular group, food-related guilt led to healthier eating intentions and behaviours. This finding demonstrated that food-related guilt can be adaptive to some extent when individuals' self-control is a protective factor. It is possible that self-control protects these individuals from other maladaptive consequences of food-related and perhaps non-food-related guilt.

Through the experimental manipulation, the present study discovered that bringing individuals' default chocolate cake-guilt association to their awareness had maladaptive consequences (with the exception mentioned above). Priming individuals with guilt before they ate resulted in an increase in savoury food intake in comparison to those with guilt associations who were not primed. This suggests that the effort being made to improve health behaviours through prompting individuals with guilt might actually have the opposite effect to the one intended, unless individuals have high self-control.

Overall, the results from the study showed that having guilt associations was not particularly beneficial. Individuals with guilt associations reported lower self-compassion and increased stress and neuroticism levels. They did not make healthier hypothetical food choices and did not tend to eat less than those with celebration associations during the taste test. Although they did not eat more than those with celebration associations (except if primed and in relation to savoury food), they experienced higher guilt levels after food consumption. Individuals with guilt associations also experienced an increase in negative emotions after eating and a decrease in positive emotions. Therefore, overall maladaptive consequences of guilt were observed in the present study. Thus, alternative strategies to encourage healthy eating and living should be considered to reach those with food-guilt associations.

## **Conclusion**

The present study contributed to the literature on food-related guilt and health behaviours. The findings from this study demonstrated that guilt mostly has maladaptive effects. Individuals with chocolate cake-guilt associations reported unhealthier behaviours, attitudes, intentions, and lower perceived behavioural control in regard to eating. They also reported lower levels of self-compassion and higher levels of neuroticism and perceived stress.

The results from this study also indicated that if individuals associating chocolate cake with guilt were primed with guilt before eating, their behaviour did not improve, but instead could decline. Eating behaviour only improved if individuals with guilt associations also had high self-control. Individuals associating chocolate cake with guilt experienced more negative emotions and less positive emotions after eating in comparison to those with celebration associations.

The overall findings from the present study indicate that individuals with food-guilt associations might experience the worst of both worlds: they do not eat healthier as a result of food-related guilt and they experience more negative emotions after eating. It appears that efforts to encourage healthier lifestyles should focus on changing individuals' attitudes toward food and eating. If individuals associate positive emotions with food and eating they might be more likely to enjoy the experience of eating and eat healthier than if they are constantly experiencing stress, worry, and guilt.

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**Appendices**  
**Appendix A**  
**Ethics Approval**



HUMAN ETHICS COMMITTEE

Secretary, Lynda Griffioen  
Email: [human-ethics@canterbury.ac.nz](mailto:human-ethics@canterbury.ac.nz)

Ref: HEC 2014/20

6 May 2014

Paola Castaneda  
Department of Psychology  
UNIVERSITY OF CANTERBURY

Dear Paola

The Human Ethics Committee advises that your research proposal "Personality, eating behaviours and food preferences" has been considered and approved.

Please note that this approval is subject to the incorporation of the amendments you have provided in your email of 5 May 2014.

Best wishes for your project.

Yours sincerely

A handwritten signature in black ink, appearing to read 'L. MacDonald'.

Lindsey MacDonald  
*Chair*  
*University of Canterbury Human Ethics Committee*





7. How difficult or easy are the following things for you at the moment?

	Very difficult	Rather difficult	Neither easy nor difficult	Rather Easy	Very easy
Eating in a balanced way with a lot of fruit and vegetables	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eating moderate amounts of food and stopping when I am full	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Staying away from junk food (e.g. potato chips, desserts, sweets, candy bars etc)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eating breakfast every day	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Staying away from fast food (e.g., fish and chips, McDonalds, meat pies, KFC etc)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

8. In the next four weeks, do you intend to eat a healthy diet (balanced diet, moderate amounts and avoiding too much junk food)?

1 certainly not      2                      3                      4                      5                      6                      7 certainly yes

9. In the next four weeks, how determined are you to make sure you eat a healthy diet?

1 not  
determined

2

3

4

5

6

7 very  
determined

## Appendix D

### Hypothetical Menu Choice

1. Imagine you are having lunch at a cafe. Which item on the sandwich menu below would you choose?

#### SANDWICH MENU

*All sandwiches available on white bread or wheat bread. Gluten free options available also.*

	Your Choice
<p><b>CHICKEN CLASSIC</b> New Zealand's favourite sub, mouth watering chicken fillet and your choice of freshly baked bread and salad, every chicken lover's dream, Sweet as! (334 calories)</p>	<input type="radio"/>
<p><b>CHICKEN &amp; BACON RANCH</b> Saddle up &amp; try the fresh toasted Chicken &amp; Bacon Ranch sandwich. Stuffed with melted cheese, tender all-white meat chicken, crispy bacon and your choice of salads on freshly baked bread (456 calories)</p>	<input type="radio"/>
<p><b>CHICKEN STRIPS</b> Enjoy this tasty sandwich of tender chicken strips by adding your favourite salads and condiments, between your freshly baked bread. This sandwich is delicious. (275 calories)</p>	<input type="radio"/>
<p><b>TURKEY</b> High in flavour and low in fat, our sliced Turkey Breast sandwich is great with crisp veggies and your choice of fat-free condiments. (253 calories)</p>	<input type="radio"/>
<p><b>TUNA</b> Delicious anytime, with tasty tuna and mayonnaise spread on our oven-fresh bread, and your favourite selection of salads and sauces. (266 calories)</p>	<input type="radio"/>
<p><b>Italian B.M.T.</b> The sandwich to conquer all hunger. Served on freshly baked bread, This sandwich is bursting with sliced salami, pepperoni, ham and your choice of vegetables and condiments. It's a sandwich you can really sink your teeth into (335 calories).</p>	<input type="radio"/>
<p><b>HAM</b> Simple and delicious, this sandwich is packed with lean ham and served on your favourite freshly baked bread. Enjoy mouth-watering taste. (258</p>	<input type="radio"/>

Your Choice

calories)

**BREAKFAST SANDWICH (available all day)**

Wake your taste buds up early with this sausage, egg and cheese breakfast sandwich. Hot out of the oven -made just the way you like it. (425 calories)

**VEGGIE DELITE**

Crispy, crunchy, and delicious. The veggie delite sandwich is a delicious combination of lettuce, tomatoes, green capsicums, onions, olives and pickles with your choice of fat-free condiments. Served on freshly baked bread. (207 calories)

**VEGGIE PATTY**

Whether by choice, or simply for a delicious change, a full-flavoured Veggie Patty with your favourite combination of oven-fresh bread, salad and sauces hits the mark! (397 calories)





## Appendix E

### Self-Control Scale

1. Using the scale provided, please indicate how much each of following statements reflects how you typically are.

	not at all like me	a little bit like me	reasonably like me	a lot like me	very much like me
I am good at resisting temptations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have a hard time breaking bad habits	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am lazy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I say inappropriate things	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I do certain things that are bad for me, if they are fun	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I wish I had more self-discipline	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
People would say that I have iron self-discipline	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pleasure and fun sometimes keep me from getting work done	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have trouble concentrating	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am able to work effectively toward long-term goals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I often act without thinking through all the alternatives	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I refuse things that are bad for me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sometimes I can't stop myself from doing something, even if I know it is wrong	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## Appendix F

### Self-Compassion Scale-Short Form

2. How you typically react toward yourself in difficult times.

	Almost never	Rarely	Sometimes	Often	Almost always
When I fail at something important to me I become consumed by feelings of inadequacy.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I try to be understanding and patient towards those aspects of my personality I don't like.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When something painful happens I try to take a balanced view of the situation.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I'm feeling down, I tend to feel like most other people are probably happier than I am.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I try to see my failings as part of the human condition.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I'm going through a very hard time, I give myself the caring and tenderness I need.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When something upsets me I try to keep my emotions in balance.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I fail at something that's important to me, I tend to feel alone in my failure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I'm feeling down I tend to obsess and fixate on everything that's wrong.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Almost never	Rarely	Sometimes	Often	Almost always
When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I'm disapproving and judgmental about my own flaws and inadequacies.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I'm intolerant and impatient towards those aspects of my personality I don't like	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## Appendix G

### Big Five Inventory Neuroticism

3. The following statements concern your perception about yourself in a variety of situations. Please indicate to what extent you agree with each statement.

I see myself as someone who...

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
...Is relaxed, handles stress well	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...Can be tense	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...Worries a lot	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...Is emotionally stable, not easily upset	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...Gets nervous easily	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## Appendix H

### Perceived Stress Scale

1. The questions in this scale ask you about your feelings and thoughts during the last month.

	Never	Almost never	Sometimes	Often	Very often
How often have you been upset because of something that happened unexpectedly?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often have you felt that you were unable to control the important things in your life?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often have you felt nervous and “stressed”?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often have you felt confident about your ability to handle your personal problems?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often have you felt that things were going your way?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often have you found that you could not cope with all the things that you had to do?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often have you been able to control irritations in your life?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often have you felt that you were on top of things?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often have you been angered because of things that were outside of your control?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often have you felt difficulties were piling up so high that you could not overcome them?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## Appendix I

### Phase 1: Information Sheet for Participant Pool

Participant ID:



Telephone : (03) 364 2987 ext. 3620  
 Department of Psychology  
 Email: [paola.castaneda@pg.canterbury.ac.nz](mailto:paola.castaneda@pg.canterbury.ac.nz)

### Personality, Eating Behaviours and Food Preferences: Questionnaire Information sheet

#### Project Description

The aim of this study is to understand the factors that influence people's eating behaviours and food preferences. We are particularly interested in the relationship between personality and eating. Participation in the study involves completing an online questionnaire in a computer laboratory. The questionnaire will assess a series of personality traits, and will ask questions about your eating patterns and behaviours, weight, and food preferences. The questionnaire will take approximately 40 minutes to complete (including time for instructions). This study will have a second phase, which will involve a taste test. You may be contacted and asked to participate in Phase 2. Also, as a follow-up to this investigation, you will be asked to report your weight five months from now.

#### Risks and Benefits

It is not anticipated that participation in the study will involve any risk to you. However, if after completing the questionnaire you are concerned about your eating behaviours or you experience distress and want to talk to someone, we suggest you contact your general practitioner or the Health Center on campus (364 2402). The Health Center on campus offers counselling services for university students and can be contacted by calling the Student Health Reception on (03) 364 2402 between 8:30 am and 5:00 pm every weekday or by calling into the reception area. Also, if you suffer or have suffered from an eating disorder and are concerned about the impact that answering this questionnaire might have on you, please let the experimenter know.

If you participate in this study in exchange for course credit for PSYC105/106, you will receive 2 points of course credit. Otherwise, you will receive a \$10 grocery or petrol voucher for participating.

#### Right to Withdraw

Participation is voluntary and you have the right to withdraw without penalty. If you start the questionnaire and decide that you do not want to continue, all you have to do is let the researcher know. Withdrawal of participation also includes the withdrawal of any information relating to you. However, once you have electronically submitted the questionnaire your data can no longer be removed.

### **Confidentiality**

The results of the project may be published, but you may be assured of the complete confidentiality of data gathered in this investigation: your identity will not be made public. To ensure anonymity and confidentiality, you will get a participant identification number for the duration of the study. Confidential information will be stored in a secured facility. Data will be securely stored for 5 years, and will then be destroyed. The data will be used for a thesis, which is a public document and will be available through the UC Library.

### **Researcher**

The project is being carried out as part of a Master's thesis project in Psychology by Paola Castaneda ([paola.castaneda@pg.canterbury.ac.nz](mailto:paola.castaneda@pg.canterbury.ac.nz)) under the supervision of Dr. Roeline Kuijer, who can be contacted at 364 2987 ext. 3401 or [roeline.kuijer@canterbury.ac.nz](mailto:roeline.kuijer@canterbury.ac.nz). If you are concerned about any of the information provided here or if you have any further questions please do not hesitate to contact us. If you wish to receive a summary of the results from this study please contact Paola who will be pleased to provide these once all the data analysis has finished.

### **Human ethics Committee**

This project has been reviewed and approved by the University of Canterbury Human Ethics Committee, and participants should address any complaints to The Chair, Human Ethics Committee, University of Canterbury, Private Bag 4800, Christchurch ([human-ethics@canterbury.ac.nz](mailto:human-ethics@canterbury.ac.nz)).

## Consent Form Participant Pool

Telephone : (03) 364 2987 ext. 3620  
 Department of Psychology  
 Email: [paola.castaneda@pg.canterbury.ac.nz](mailto:paola.castaneda@pg.canterbury.ac.nz)



### Personality, Eating Behaviours and Food Preferences: Questionnaire Consent form

I have been given a full explanation of this project and have had the opportunity to ask questions. I understand what is required of me if I agree to take part in the research.

I understand that participation is voluntary and I may withdraw without penalty. Withdrawal of participation will also include the withdrawal of any information I have provided. I understand that once, I submit my questionnaire electronically, I will no longer be able to withdraw from the study.

I understand that any information or opinions I provide will be kept confidential to the researcher and her supervisor, and that any published or reported results will not identify the participants. I understand that a thesis is a public document and will be available through the UC Library.

I understand that all data collected for the study will be kept in locked and secure facilities and/or in password protected electronic form and will be destroyed after five years.

I understand the risks associated with taking part and how they will be managed.

I understand that I am able to receive a report on the findings of the study by contacting the researcher at the conclusion of the project.

I understand that I can contact the researcher Paola Castaneda ([paola.castaneda@pg.canterbury.ac.nz](mailto:paola.castaneda@pg.canterbury.ac.nz)) or supervisor Dr. Roeline Kuijer ([roeline.kuijer@canterbury.ac.nz](mailto:roeline.kuijer@canterbury.ac.nz)) for further information. If I have any complaints, I can contact the Chair of the University of Canterbury Human Ethics Committee, Private Bag 4800, Christchurch ([human-ethics@canterbury.ac.nz](mailto:human-ethics@canterbury.ac.nz))

By signing below, I agree to participate in this research project.

Name: .....

Date: ..... Email .....

Signature:



## Information and Consent Form for online Participants

### Personality, Eating Behaviours and Food Preferences

#### Information sheet

Thank you for your interest in the study.

The aim of this study is to understand the factors that influence people's eating behaviours and food preferences. We are particularly interested in the relationship between personality and eating.

#### What does participation involve?

Participation in the study involves two parts: completing this online questionnaire and coming into the lab for a taste test. You will receive a \$10 voucher after completing both the online questionnaire and the taste test. The questionnaire and the taste test will each take approximately 20 minutes to complete. The questionnaire will assess a series of personality traits, and will ask questions about your eating patterns and behaviours, weight, and food preferences. The taste test will involve sampling 4 different foods, and rating each one on one different characteristic (e.g. tastiness, crunchiness). As a follow-up to this investigation, you will be asked to report your weight four months from now.

#### Who can participate?

Anyone over 18 years of age studying at the University of Canterbury can participate. However, if you suffer or have suffered from an eating disorder and are concerned about the impact that answering this questionnaire might have on you then it might be better not to participate. If this applies to you, please exit this questionnaire now.

#### Confidentiality

The results of the project may be published, but you may be assured of the complete confidentiality of data gathered in this investigation: your identity will not be made public. In order to be able to contact you, we will ask you for your email address and your UC username at the beginning of the questionnaire. We will not ask for any other identifying information. This information will be deleted once the data is downloaded from the online survey. Data will be securely stored for 5 years, and will then be destroyed. The data will be used for a thesis, which is a public document and will be available through the UC Library.

#### Risks

It is not anticipated that participation in the study will involve any risk to you. However, if after completing the questionnaire you are concerned about your eating behaviours or you experience distress and want to talk to someone, we suggest you contact your general practitioner or the Health Centre on campus. The Health Centre on campus offers counselling services for university students and can be contacted by calling the Student Health Reception on (03) 364 2402 between 8:30 am and 5:00 pm every weekday or by calling into the reception area.

#### Right to Withdraw

Participation is voluntary and you have the right to withdraw without penalty. If you start the questionnaire and decide that you do not want to continue, please exit the questionnaire. Your

incomplete questionnaire will then be withdrawn from the data base. However, once you have electronically submitted the questionnaire your data can no longer be removed.

The project is being carried out as part of a Master's thesis project in Psychology by Paola Castaneda (paola.castaneda@pg.canterbury.ac.nz) under the supervision of Dr. Roeline Kuijer, who can be contacted at 364 2987 ext. 3401 or roeline.kuijer@canterbury.ac.nz. If you are concerned about any of the information provided here or if you have any further questions please do not hesitate to contact us. If you wish to receive a summary of the results from this study please contact Paola who will be pleased to provide these once all the data analysis has finished.

This project has been reviewed and approved by the University of Canterbury Human Ethics Committee, and participants should address any complaints to The Chair, Human Ethics Committee, University of Canterbury, Private Bag 4800, Christchurch (human-ethics@canterbury.ac.nz).

Your participation is much appreciated.

Kind regards,

Paola Castaneda  
Dr Roeline Kuijer

### **CONSENT**

I have read and understood the description of the above-named study. On this basis I agree to participate, and I consent to publication of the results of this study with the understanding that confidentiality will be preserved. I understand also that I may at any time withdraw from the study, including withdrawal of any information that I have provided.

- I agree to participate (please go to the next page to start the questionnaire)
- I have decided NOT to participate (please exit the questionnaire by closing this window)

## Appendix J

### Phase 2: Information Sheet and Consent Form

Telephone: (03) 364 2987 ext. 3620  
Department of Psychology  
Email: [paola.castaneda@pg.canterbury.ac.nz](mailto:paola.castaneda@pg.canterbury.ac.nz)



### Personality, Eating Behaviours and Food Preferences: Taste test Information sheet

#### Project Description

Not long ago you completed a questionnaire for our study examining the relationship between personality, eating behaviours and food preferences. As a requirement you also need to participate in a taste test in the lab for us to measure food preferences in a more reliable way. During the taste test you will be asked to taste four types of food (2 savoury and 2 sweet) and you will be asked to rate each type of food on a number of characteristics (for example, tastiness, appeal). You will not be asked to eat anything unpleasant. You will also be asked some questions before and after the taste test assessing your current mood and stress levels. The taste test (including answering the questions) will take approximately 20 minutes.

#### Risks and Benefits

There are no risks associated with participating in this study. However, if after completing the questionnaire you are concerned about your eating behaviours or you experience distress and want to talk to someone, we suggest you contact your general practitioner or the Health Center on campus (364 2402). The Health Center on campus offers counselling services for university students and can be contacted by calling the Student Health Reception on (03) 364 2402 between 8:30 am and 5:00 pm every weekday or by calling into the reception area.

You will receive a \$10 voucher in exchange for participating in this part (i.e. the taste test) of the study.

#### Right to Withdraw

Participation is voluntary and you have the right to withdraw without penalty. If you start the taste test and decide that you do not want to continue, all you have to do is let the researcher know. Withdrawal of participation also includes the withdrawal of any information relating to you. However, once you submit your questionnaire your data can no longer be removed.

#### Confidentiality

The results of the project may be published, but you may be assured of the complete confidentiality of data gathered in this investigation: your identity will not be made public. To ensure anonymity and confidentiality, you will get a participant identification number for the duration of the study. Confidential information will be stored in a secured facility. Data will be securely stored for 5 years, and will then be destroyed. The data will be used for a thesis, which is a public document and will be available through the UC Library.

### **Researcher**

The project is being carried out as part of a Master's thesis project in Psychology by Paola Castaneda ([paola.castaneda@pg.canterbury.ac.nz](mailto:paola.castaneda@pg.canterbury.ac.nz)) under the supervision of Dr. Roeline Kuijer, who can be contacted at 364 2987 ext. 3401 or [roeline.kuijer@canterbury.ac.nz](mailto:roeline.kuijer@canterbury.ac.nz). If you are concerned about any of the information provided here or if you have any further questions please do not hesitate to contact us. If you wish to receive a summary of the results from this study please contact Paola who will be pleased to provide these once all the data analysis has finished.

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Telephone : (03) 364 2987 ext. 3620  
Department of Psychology  
Email: [paola.castaneda@pg.canterbury.ac.nz](mailto:paola.castaneda@pg.canterbury.ac.nz)

**Personality, Eating Behaviours and Food Preferences: Taste test  
Consent form**

I have been given a full explanation of this project and have had the opportunity to ask questions.

I understand what is required of me if I agree to take part in the research.

I understand that participation is voluntary and I may withdraw without penalty. Withdrawal of participation will also include the withdrawal of any information I have provided. I understand that, once I submit my questionnaire, I will no longer be able to withdraw from the study.

I understand that any information or opinions I provide will be kept confidential to the researcher and her supervisor, and that any published or reported results will not identify the participants. I understand that a thesis is a public document and will be available through the UC Library.

I understand that all data collected for the study will be kept in locked and secure facilities and/or in password protected electronic form and will be destroyed after five years.

I understand the risks associated with taking part and how they will be managed.

I understand that I am able to receive a report on the findings of the study by contacting the researcher at the conclusion of the project.

I understand that I can contact the researcher Paola Castaneda ([paola.castaneda@pg.canterbury.ac.nz](mailto:paola.castaneda@pg.canterbury.ac.nz)) or supervisor Dr. Roeline Kuijer ([roeline.kuijer@canterbury.ac.nz](mailto:roeline.kuijer@canterbury.ac.nz)) for further information. If I have any complaints, I can contact the Chair of the University of Canterbury Human Ethics Committee, Private Bag 4800, Christchurch ([human-ethics@canterbury.ac.nz](mailto:human-ethics@canterbury.ac.nz))

By signing below, I agree to participate in this research project.

Name: .....

Date: ..... Email .....

Signature:

## Appendix K

### Phase 2: Taste Test Questionnaire

Participant ID:
-----------------

### Personality, eating behaviours, and food preferences: Taste test

#### Current mood and stress

1. On a scale from 1 to 10, how stressful has your day been so far?

<b>not stressful at all</b>										<b>extremely stressful</b>
1	2	3	4	5	6	7	8	9	10	

2. The scale below consists of a number of words that describe different feelings and emotions. **Please indicate to what extent you feel this way right now, that is, at the present moment.**

	very slightly or not at all	a little	moderately	quite a bit	extremely
interested	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
hostile	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
excited	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
irritable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
alert	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
afraid	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
strong	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
upset	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
enthusiastic	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
nervous	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Scrambles sentence test**

Make a grammatical sentence as quickly as possible out of each set of sentences below. You don't have to use all of the words in your sentence. Some of these sentences are about food, others are not.

1. morning and breakfast he every eats

.....

2. ball the throw toss silently away

.....

3. served lunch usual was than later dinner

.....

4. boy the stumbling to the ground tripped

.....

5. sunlight makes temperature wrinkle raisins

.....

6. tropical lately are oranges fruit a

.....

7. rainbow different seven made of colours a is

.....

**Instructions Taste test**

It is very important that we ensure accurate taste ratings. So please follow the instructions below exactly.

Please taste and rate the samples in the order that they are placed on the table (Bowl 1, followed by Bowl 2, Bowl 3, and Bowl 4). Have as much as is necessary to ensure accurate ratings. It is very important that you finish tasting and rating each type food before you move on to the next one (e.g., complete your ratings for the M&Ms in Bowl 1 before you begin rating the Skittles in Bowl 2).

You should also have a drink of water in between rating each type of food in order to cleanse your palate. Once you have moved on to the next bowl do not change your ratings for the previous Bowl.

Because this is a standardized task you will be given 10 minutes in order to make your taste ratings. The experimenter will not be returning until the end of the 10 minute period.

If you finish early, please feel free to help yourself to the food in the bowls.

**Before you turn the page and begin the 10 minute taste test please take this opportunity to ask the experimenter any questions that you may have. She will not be in the room for the following 10 minutes.**



Please now taste some M & Ms from Bowl 1 and rate them on the following dimensions. Please eat as many M & Ms as you need to in order to provide accurate ratings.

**Remember not to move on to rating Bowls 2, 3, or 4 until you have completed rating the M & Ms in Bowl 1.**

These M & Ms are:

	certainly not					certainly yes		
	▼						▼	
tasty	1	2	3	4	5	6	7	
desirable	1	2	3	4	5	6	7	
flavoursome	1	2	3	4	5	6	7	
appetising	1	2	3	4	5	6	7	
crunchy	1	2	3	4	5	6	7	
rough	1	2	3	4	5	6	7	
healthy	1	2	3	4	5	6	7	
chewy	1	2	3	4	5	6	7	
sweet	1	2	3	4	5	6	7	
enjoyable	1	2	3	4	5	6	7	
smooth	1	2	3	4	5	6	7	
sickly	1	2	3	4	5	6	7	
too sweet	1	2	3	4	5	6	7	
too crunchy	1	2	3	4	5	6	7	

**When you have completed rating the M & Ms in Bowl 1 please take a drink of water and turn the page to complete the taste test for Bowl 2.**

Please now taste some Skittles from Bowl 2 and rate them on the following dimensions. Please eat as many Skittles as you need to in order to provide accurate ratings.

**Remember not to move on to rating Bowls 3 or 4 until you have completed rating the Skittles in Bowl 2.**

These Skittles are:

	certainly not					certainly yes	
	▼						▼
tasty	1	2	3	4	5	6	7
desirable	1	2	3	4	5	6	7
flavoursome	1	2	3	4	5	6	7
appetising	1	2	3	4	5	6	7
crunchy	1	2	3	4	5	6	7
rough	1	2	3	4	5	6	7
healthy	1	2	3	4	5	6	7
chewy	1	2	3	4	5	6	7
sweet	1	2	3	4	5	6	7
enjoyable	1	2	3	4	5	6	7
smooth	1	2	3	4	5	6	7
sickly	1	2	3	4	5	6	7
too sweet	1	2	3	4	5	6	7
too crunchy	1	2	3	4	5	6	7

**When you have completed rating the Skittles in Bowl 2 please take a drink of water and turn the page to complete the taste test for Bowl 3.**

Please now taste some potato chips from Bowl 3 and rate them on the following dimensions. Please eat as many potato chips as you need to in order to provide accurate ratings.

**Remember not to move on to rating Bowl 4 until you have completed rating the potato chips in Bowl 3.**

These potato chips are:

	certainly not				certainly yes			
	▼						▼	
tasty	1	2	3	4	5	6	7	
desirable	1	2	3	4	5	6	7	
flavoursome	1	2	3	4	5	6	7	
appetising	1	2	3	4	5	6	7	
crunchy	1	2	3	4	5	6	7	
rough	1	2	3	4	5	6	7	
healthy	1	2	3	4	5	6	7	
chewy	1	2	3	4	5	6	7	
sweet	1	2	3	4	5	6	7	
enjoyable	1	2	3	4	5	6	7	
smooth	1	2	3	4	5	6	7	
sickly	1	2	3	4	5	6	7	
too sweet	1	2	3	4	5	6	7	
too crunchy	1	2	3	4	5	6	7	

**When you have completed rating the potato chips in Bowl 3 please take a drink of water and turn the page to complete the taste test for Bowl 4.**

Please now taste some corn chips from Bowl 4 and rate them on the following dimensions. Please eat as many corn chips as you need to in order to provide accurate ratings.

These corn chips are:

	<b>certainly not</b>				<b>certainly yes</b>		
	▼						▼
tasty	1	2	3	4	5	6	7
desirable	1	2	3	4	5	6	7
flavoursome	1	2	3	4	5	6	7
appetising	1	2	3	4	5	6	7
crunchy	1	2	3	4	5	6	7
rough	1	2	3	4	5	6	7
healthy	1	2	3	4	5	6	7
chewy	1	2	3	4	5	6	7
sweet	1	2	3	4	5	6	7
enjoyable	1	2	3	4	5	6	7
smooth	1	2	3	4	5	6	7
sickly	1	2	3	4	5	6	7
too sweet	1	2	3	4	5	6	7
too crunchy	1	2	3	4	5	6	7

**Thank you for completing the above ratings.**

Please now make a comparison between the four food samples. To answer this question, you are now welcome to mix and match tasting the samples in Bowls 1, 2, 3, and 4.

1. Please indicate (in the space below) which type of food you prefer, and please try and explain why. You are welcome to use any of the above words from the rating scales (e.g., crunchy, sweet) in order to explain your preference.

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Once you have finished answering the questions about the food, please feel free to help yourself to the food in the bowls until the experimenter comes back.

**Please do not turn over this page until the experimenter tells you to**

**CURRENT MOOD**

1. Please indicate to what extent you feel this way right now, that is, at the present moment.

	<b>very slightly or not at all</b>	<b>a little</b>	<b>moderately</b>	<b>quite a bit</b>	<b>extremely</b>
interested	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
hostile	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
excited	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
irritable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
alert	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
guilty	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
afraid	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
strong	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
upset	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
enthusiastic	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
nervous	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**FINAL QUESTIONS**

- |  | <b>very slightly<br/>or not at all</b> | <b>a little</b>       | <b>moderately</b>     | <b>quite a bit</b>    | <b>extremely</b>      |
|--|--|-----------------------|-----------------------|-----------------------|-----------------------|
| 1. How guilty do you feel about eating the snacks?                           | <input type="radio"/>                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 2. How guilty do you feel about the amount of snacks you have eaten?         | <input type="radio"/>                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 3. On a scale from 1 to 7, how hungry were you before came to the lab today? |  |                       |                       |                       |                       |

**Not hungry at all****Extremely Hungry**

1      2      3      4      5      6      7

4. Approximately, how long had it been since you last ate or drunk anything before you came to the lab today (apart from water): \_\_\_\_\_ Hours & \_\_\_\_\_ Minutes

**THANK YOU FOR YOUR PARTICPATION.**  
**Please let the experimenter know that you are finished.**