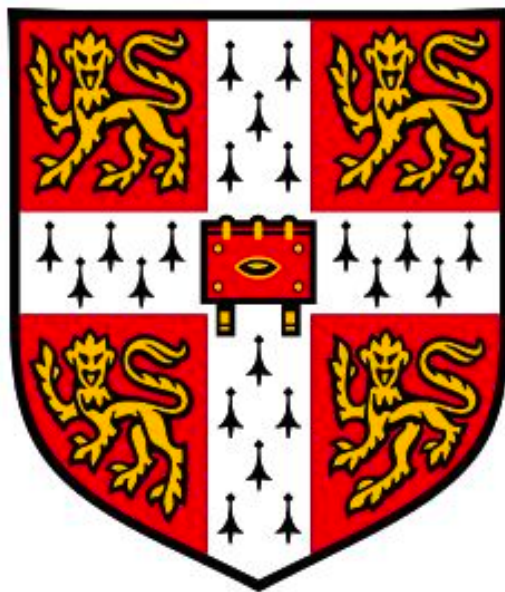# The Moralisation of Eating

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December 2018

This dissertation is submitted for the degree of Doctor of Philosophy

Declaration

This dissertation is the result of my own work and includes nothing which is the outcome of work done in collaboration except as declared below or specified in the text.

It is not substantially the same as any that I have submitted, or, is being concurrently submitted for a degree or diploma or other qualification at the University of Cambridge or any other University or similar institution. I further state that no substantial part of my dissertation has already been submitted, or, is being concurrently submitted for any such degree, diploma or other qualification at the University of Cambridge or any other University or similar institution.

It does not exceed the prescribed word limit for the relevant Degree Committee.

In Chapter 3, the data for Study 1 was collected by Kim Vassallo as part of her undergraduate research project while supervised by myself. Design of the study, analysis and interpretation of the data as presented here was all carried out by me.

In Chapter 4, the data for Study 2 was collected by Chloe Hutchings-Hay as part of her undergraduate research project while supervised by myself. Design of the study, analysis and interpretation of the data as presented here was all carried out by me.

In Chapter 6, the randomisation analysis and effect size estimate for Study 5 was assisted by Dominique-Laurent Couturier.

The Moralisation of Eating
Thea Sofie Schei

Morality, food and eating have been associated for centuries. However, little is known about the extent and impact of this association on how people relate to food and eating today. This thesis explores three questions in seven studies. The first question is: '*Do people compensate morally for unhealthy eating behaviours?*'. Moral compensation is the tendency for people to carry out an act perceived as 'good' following an act perceived as 'bad'. Chapter 3 and 4 address this question by measuring whether chocolate consumption is associated with moral judgements (Study 1), and investigating whether recalling an overeating episode makes people more likely to act prosocially (Study 2). The results reveal first, an association between eating behaviour and moral judgement such that the more chocolate people eat, the less harsh their moral judgements, and second, that those recalling an overeating (vs neutral) event were later more prosocial.

The second question is: '*How prevalent is the tendency to associate morality with eating and food?*'. Chapter 5 addresses this question by measuring the extent to which moral concepts are used to advertise food in women's magazines (Study 3). The results show that a third of food adverts use moralising concepts, a pattern that has remained stable over the last fifteen years.

The third question is: '*What is the impact on self-reported desire and observed behaviour of associating moral terms with food?*'. Chapter 6 presents experiments assessing whether moral labels on unhealthy and healthier food impact participants' desire to consume the food (Study 4), actual consumption of the food (Study 5) and selection of the food (Study 6). An internal meta-analysis of the three studies demonstrates that moral labelling has no effect on self-reported desire for food. However, in terms of the observed behavioural measures (selection and consumption), the results follow a pattern of congruency: moral labels increase behaviour (selection and consumption) towards healthy food and immoral labels increase behaviour towards unhealthy food.

Taken together, the findings indicate that the moralisation of eating has several consequences. First, people's unhealthy eating behaviour is associated with moral judgement and later moral compensation. Second, eating and food are associated with morality in about a third of food advertisements in women's magazines. Third, this association impacts self-reported desire and behaviour towards the morally labelled food: when a food has a moral label congruent with its healthiness, people are more likely to select and consume it.

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CHAPTER 1

Thesis Overview

1.1 Rationale

There is a long and significant link between morality and eating. In the Christian tradition, eating too much gained the status of a deadly sin, and most religions have clear rules often relating food to sanctity. Today, many individuals report struggling with their relationship with food and experience negative, often moral emotions such as guilt or shame after a meal. Furthermore, many diets use moral language, and food companies often sell their products using moral imagery. Despite this, very little research has been carried out on how this link might affect people's relationship with food. Because of the lack of research, this thesis asks three questions as a starting point for investigation: First, if unhealthy eating is considered immoral, does it have similar consequences to other immoral actions? There is a tendency for people to morally compensate for their transgressions. That is, people have a tendency to carry out an act perceived as 'good' following an act perceived as 'bad'. Thus, when people eat unhealthily, does moral compensation follow? Second, to what extent is morality associated with eating and food? Third, when morality is explicitly associated with food, through food labels bearing moral words, how does this affect the way people think about and engage with the food?

1.2 Aims and objectives

The overarching aim of the thesis is to examine the consequences of the moralisation of eating. This aim is addressed by three research questions:

1. Do people compensate morally for unhealthy eating behaviours? (Chapters 3 and 4);
2. How prevalent is the tendency to associate morality with eating and food? (Chapter 5);
3. What is the impact on self-reported desire and observed behaviour of associating moral terms with food? (Chapter 6).

1.3 Background to the thesis

Chapter 2 establishes the background to the thesis aims and objectives. It starts by introducing what is meant by morality alongside how people might make moral judgements and decision. It continues with an overview of the process of moralisation, whilst presenting the historical evidence of a link between morality, food and the body. Then, research on morality and eating is examined before discussing what potential consequences might arise from this link. Finally, the research aims and objectives are set forth.

1.4 Do people compensate morally for unhealthy eating behaviours?

Chapters 3 and 4 present Study 1 and 2 respectively which both test the relationship between unhealthy eating behaviours and changes in moral judgement and behaviour. Study 1 is a laboratory-based correlational study testing the relationship between chocolate consumption and moral judgement of others' wrongdoings. Study 2 is a laboratory-based experiment testing whether recalling past overconsumption leads to increased helping behaviour.

1.5 How prevalent is the tendency to associate morality with eating and food?

Chapter 5 presents Study 3 which explores the use of moral concepts in food advertising in women's magazines in the UK over a 15-year period. Advertisements from the June editions from 2002, 2007, 2012 and 2017 were sampled to assess whether there has been a change in the frequency of moral concepts used in food advertising over this period.

1.6 What is the impact on self-reported desire and observed behaviour of associating moral terms with food?

Chapter 6 presents Studies 4, 5, 6 and 7, which examine the effects of moral labels ('Angelic' vs. 'Devilish') on the desire, selection and consumption of food products depending on healthiness (cereal bar vs. chocolate bar). Study 4 is an online experiment assessing whether moral labels affect self-reported desire for cereal bars and chocolate bars. Study 5 is a laboratory-based experiment and follows from the results of Study 4 by investigating whether the moral labels differently impact self-reported desire and observed consumption of cereal and chocolate bars. Study 6 is a field-based experiment testing if moral labels impact participants' observed selection of cereal bars and chocolate bars. Study 7 is an internal meta-analysis of the effect of moral labels on self-reported desire to consume (Study 4 and 5) and observed behaviour (selection and consumption; Study 5 and 6).

1.7 Discussion and conclusions

Finally, in Chapter 7 the results of the present studies are integrated into a discussion of the historical and contemporary research context of the moralisation of eating, together with a summary of the implications of the present results for further research.

CHAPTER 2

Background to the thesis

Summary

This chapter presents the background to the topic of this thesis, by reviewing both the historical and cultural context of morality and food, as well as summarising relevant research literatures. The chapter starts by examining the definition of morality and how people might make moral judgements and decisions. This is then followed by a discussion of how a neutral concept such as food might become moralised before investigating how the process of moralisation pertains to views and ideas about the body, food and eating. An overview of the research evidence on morality and eating is then reviewed before discussing some possible consequences of this moralisation. Finally, the aims of the thesis are presented alongside an overview of each study that follows.

It is said that sin entered the world through the appetite of a woman. If we are to believe Christian mythology, Eve could have eaten anything she wanted, but she wanted the forbidden apple. She gave in to temptation and the world fell in to disarray. This thesis is about the moralisation of eating. Specifically, the moralisation of eating healthily or unhealthily. Despite a long and significant history associating morality and food, surprisingly little is known about how this link influences how people think about and behave with food. In this chapter, I start by introducing the current thinking around morality in psychology today. Then I will discuss what moralisation is and how and why it might occur. Finally, I will examine the evidence for the moralisation of eating and the potential consequences of this moralisation. This is achieved through an initial review of their interrelationships prior to discussing the modern conceptions of both morality and eating behaviours and their relevance in the current day.

2.1 Morality

Studies of morality are historically divided into two camps (Gert, 2016). There is normative morality on one side, which concerns the study of what, if anything, *should* be moral and would be accepted by all rational agents. Answers to this question have traditionally been sought by philosophers and theologians (Sayre-McCord, 2010). Psychologists, on the other hand, have been largely occupied with descriptive morality. That is, what do people either individually or in certain groups *consider* to be moral? Early psychologists were concerned with how adults reason about morality (Kohlberg, 1971) and how this changes throughout childhood development (Piaget, 1932). Kohlberg in particular argued for a singular morality, namely that of justice. However, subsequent research by his graduate students, expanded the moral realm to include care and harm concerns (Gilligan, 1982; Turiel, 1983). By interviewing women, and not only men as Kohlberg had, Gilligan established that for many morality also incorporated ideas of care, intimacy and interpersonal responsibility. Further increasing the search in scope, Shweder and colleagues looked at moral conceptions across cultures (1984; 1993; 1997). They argued that notions of community and divinity/sanctity, not just autonomy (care, harm and justice), were important moral concepts in many non-Western societies. The ethics of community included concepts such as duty, interdependence and hierarchy. Divinity/sanctity on the other hand, included ideas of pollution, sin, sacred order, natural order and tradition. Integrating this work, as well as research carried out by others (e.g. Brown, 1991; de Waal, 1996; Fiske, 1991; Schwartz & Bilsky, 1990), Haidt and Joseph (2004) presented their moral foundations theory and what they considered to be the five (subsequently six) most common moral concerns: care/harm, fairness/cheating, ingroup/loyalty, authority/subversion and

purity/sanctity. Haidt (2012) later argued for a sixth moral foundation related to liberty/oppression. Overall, what this prior research showed is that what people understand as moral is multifaceted and varies from group to group. The next section will present one theorised aspect of why these six concerns might be moralised.

Haidt and Joseph (2004; 2007) theorise that these foundations are the result of innate brain modules that amplify the likelihood of certain concerns becoming moralised. As is the crux of most evolutionary speculation, they argue that the groups who moralised these entities were more likely to successfully reproduce. This evolved preparedness would be the same as a fear of heights (DeLoache & LeBue, 2009), which would be a useful thing for someone to easily develop as it would minimise falling off a cliff or down from a tree. As such, aspects of the moral foundations, such as cooperation, respect for authority or punishing cheaters, in many ways facilitate societal living and thereby increase the chances of reproductive success. To explain why different cultures and societies may have different patterns of moralised entities, Haidt (2012) uses the metaphor of a stereo equaliser– everyone has the same buttons but the music they make depends on how culture presses the buttons. However, the study of morality is not just about the entities that people consider moral, but extends out to how individuals are thinking about morality and how they are making moral decisions. The next sections introduce two seemingly contrasting approaches to moral judgement and decision: reasoning and emotion.

A new view of moral cognition was re-introduced from the ideas of Hume (1777) in parallel to the expansion of a previously narrowly defined concept of morality. In comparison to previous decades (e.g. Inhelder & Piaget, 1958; Kohlberg, 1971; Peterson & Beach, 1967), where reasoning and rationality had taken centre stage, the intuitionist/affective view argued that people arrive at their moral judgements through an affective appraisal (Haidt, 2001). This view was part of a larger affective or 'irrational' shift within psychology. First, Schacther and Singer (1962) demonstrated that affective arousal can be misattributed to the situation, depending on whether the person has an immediate explanation for the arousal. Then, Tversky and Kahneman (1974) challenged the idea of people's rationality by pointing out a series of biases they display and heuristics that are present in their thinking. Not only were people no longer logical or making well-reasoned decisions and judgments, their emotions (the believed antithesis of reason) were in many ways responsible for the decisions people arrived at. Both Zajonc (1980) and Schwarz and Clore (1983;1988) argued that affect played a key part in the judgement and

decision process, where a person's affective state can be used to guide their perceptions and judgements.

In accordance with Hume, Haidt (2001) similarly contended that moral judgements were emotive sentiments in his social intuitionist model of moral judgement. Because emotion had been shown to impact on general cognition, it was very plausible to also impact on *moral* cognition. The social intuitionist model proposes that each moral foundation comes with a set of emotions and intuitions. For example, fairness transgressions would elicit anger, while violations of purity would result in disgust. Not only would these transgressions have set emotional outcomes, experiencing these emotions would also result in a moral judgement of the relevant foundation. Therein, the model proposes moral judgements and decisions are the product of emotive states, and any reasoning that occurs is seen as post-hoc justifications (Haidt, 2001; Haidt & Bjorklund, 2008). This extreme position however has received criticism. For example, Pizarro and Bloom (2003) argued that in many everyday scenarios people grapple with what is the right thing to do, and point to work carried out by Coles (1986) and Gilligan (1982) showing that in many situations (e.g. having an abortion) decisions are made with significant deliberations. As is reviewed in the next section, this has led to some researchers proposing a model in which both intuitive/emotional and rational systems are both part of the moral reasoning and decision-making process.

Instead of being in opposition, there is an argument for the moral rationalist and the moral intuitionist examining two different features of moral judgement and decision making. It is likely that people might use moral intuitions in one situation and moral reasoning in another. Monin and colleagues (2007a, 2007b) have made the point that different methods are resulting in different findings. In cases where participants are asked to judge someone's wrongdoing, the triggered emotion might be used as a guide as to how harshly to judge them. In moral dilemmas, on the other hand, where participants are asked to select the outcome of a situation that does not have a clear answer, people might be more prone to use reasoning. A dual process theory of moral judgement has also been suggested (Greene & Haidt, 2002; Greene, Nystrom, Engell, Darley & Cohen, 2004; Greene, Sommerville, Nystrom, Darley & Cohen, 2001), which proposes that much of moral judgement is based on automatic – quick, effortful and implicit – processes only some of which are controlled – slow, effortful and explicit. It is also claimed that emotional processing is automatic, while reasoning is controlled. It puts forward that when people are faced with a moral dilemma and they use their emotional, intuitive system, they

arrive at a deontological conclusion. When they use controlled reasoning, on the other hand, they arrive at a utilitarian conclusion. However, this model has also been criticised (Kahane, 2012; Moll & de Oliveira-Souza, 2007), such as arguing that the utilised, often unrealistic moral dilemmas are responsible for the pattern of findings (Bloom, 2011).

In sum, morality and emotion are interlinked, although the details of the involvement of emotions and reasoning is yet to be established. Furthermore, while the specific processes of moral judgement and decision making are unclear, it is reasonable to conclude that morality is multifaceted. If what is considered moral differs from one group to another and changes over time, this necessitates that something can *become* moral and *cease* to be moral. In the following section I will examine how this process unfolds.

2.2 Moralisation

What is considered moral is not constant across societies and across time. For example, in the UK homosexuality was for a long time considered immoral – as reflected in its criminal status - but has recently lost much of its moral implications. In the same way that something can cease to be moral or immoral, neutral objects or activities can gain moral significance. According to Rozin (1999), moralisation occurs when preferences are transformed into values. In comparison to preferences, values are internalised and more able to withstand changes over time. Their durability is usually sustained by accompanying laws and societal structures and norms. Moral values also tend to be more integral to a person's sense of self. This is evidenced by the finding that when someone acts in opposition to their values, self-conscious moral emotions such as guilt and shame are likely to occur (Tangney et al., 2007). In sum, moralisation is the transformation of a neutral entity to one that has moral value. The next section will briefly present how the process of moralisation might occur.

As noted in a recent article by Skitka, Wisneski and Brandt (2018), little direct research on the process of moralisation has been conducted since Rozin's work twenty years ago. He theorised that moralisation can occur by two routes: piggybacking or expansion (Rozin, 1997). Through piggybacking, the new moralised entity is attached to something that is already moralised. In this case, the new moralised entity inherits the rules and conventions associated with the old moral code. Alternatively, through expansion a completely new moral code is created and the moral framework is expanded. More recent research has emphasised the potential role of reasoning and emotion in moralisation. For example, Wheatley and Haidt (2005) have argued

that emotional arousal, such as incidental feelings of disgust that occur outside of awareness, can moralise an entity previously understood as neutral. Horberg, Oveis and Keltner (2011) on the other hand have posited that it is necessary to perceive an entity as harmful for that issue to be moralised. From their more recent work, Wisneski and Skitka (2017) found support for the role of disgust in the moralisation process, but only when the emotion was integral to the presented concern. No support was found for recognition of harm being a necessary condition for moralisation to occur. Although there has been a lack of research into the specific processes involved in moralisation, Rozin (1997) draws attention to several aspects of a situation proposed to influence why something is likely to become moralised or not. As an extension of the body, Rozin (1999) proposes that health often becomes moralised due to the long-established link between morality and health that has been evidenced in history (Kleinman & Kleinman, 1997; Shweder, Much, Mahapatra & Park, 1997; Thomas, 1997). This link will be further discussed in the next section (2.3.1). Furthermore, Mintz (1997) argues that morality often attaches itself to concepts or behaviours that are evoked frequently, but at the same time involves some degree of personal choice. In the following sections I review some of these conditions and how they relate to eating. I will also examine the potential evolutionary basis for the connection between morality and food, and how emotions might be involved in this moralisation process.

2.3 Evidence for the moralisation of eating

2.3.1 History of a link in Western societies

Integral to understanding the moralisation of eating is to understand the linked history with the body. The human body has a complicated past. During its tumultuous history it has been both celebrated and despised (Vandereycken & van Deth, 1997). Here I briefly examine how the body has been associated with food, health and morality during Antiquity, the medieval times and the modern era. This is by no means a comprehensive analysis, but rather goes some way to highlight the longstanding relationship between ingestion and morality. In ancient Greece, Plato believed the body to prevent access to 'universal truths' (Plato's Phaedo in Gallop, 1993; Robinson, 2011). In this early conception of the body-mind duality, the mind was understood to be responsible for such activities as reasoning and learning, while the body would distract from these noble pursuits by its' appetites, desires and fears. The function of the soul would include regulating and controlling the body. Key to these views, however, was that of moderation or of balance between excess and restriction. Food was an important part of what was called 'dietetics'. Separate to ideas of 'diet' today, 'dietetics' meant 'the model of living' for the Greeks. Being moderate in one's appetites was, however, also seen as a means to develop

reason and reach the truth (Coveney, 2006; McHoul & Grace, 1993)

During medieval times, the previously maintained boundary between the body and food broke down (Kalof, 2010). On a larger scale, people now believed that the body was a product of what it consumed and its surroundings. Furthermore, in comparison to the stark division between body and soul presented in Antiquity, the body became seen as inseparable from the soul (Riches & Bildhauer, 2010). These views went hand in hand with the prevalent notion of self-punishment during medieval times. Never before had the mortification of the flesh been more common place. By punishing the flesh, the soul could be purified. One of the ways in which purification or salvation could occur was through fasting, taken to be a public display of penance. The medieval citizen was expected to fast on Wednesday, Friday and Saturday – although few fully adhered to these strict commands (Coveney, 2006). In comparison to the perceived 'ugliness' of overconsumption in Antiquity, bingeing on large volumes was now deemed serious enough to gain the status of a 'deadly sin' by early Christian thinkers.

The embodiment of this concept can be found in what has been later described as the 'Holy Anorexics'. Although caution should be made when applying modern diagnoses to historical behaviours, the 'Holy Anorexics' were a group of women saints who made fasting their forte. There were also fasting male saints (e.g. Francis of Assisi, Henry Suso) but the practice was primarily female. This is likely due to women being portrayed as symbols of the flesh through the process of conception (Bynum, 1987). Theresa Neumann for example was thought to not have eaten for over thirty years – if regular communion was not counted (Vogl, 1978). The most famous example, however, was that of Catherine of Siena whose fasting and hunger became a lived metaphor (Bell, 1987; Bynum, 1987). The function of the fasting was not only to redeem sinful flesh, but also to experience pain in unison with Christ and to achieve union with him (Bynum, 1987)

In recent times the influence and prevalence of religion has decreased in many Western societies. The move away from religion has at the same time seen a move towards a preoccupation with health and wellness (Brandt & Rozin, 1997; Cederström & Spicer, 2015). In such cases, there is a search for a new moral code to replace what has been lost. In the West, health has in many ways taken over as a new secular morality - 'healthism' (Crawford, 2006; Katz, 1997). Furthermore, the rising obesity epidemic has put the weight and food intake of individuals firmly on the political agenda, with increasing efforts of prevention and treatment being tested and implemented. However, it is not just those who are obese or at risk of obesity

who have become the centre of attention. In their book 'The Wellness Syndrome', Cederström and Spicer (2015) describe what they perceive to be a new social order in which individuals and organisations perpetuate the idea of self-care. Not only is taking care of one's own health seen as an important practice, it has become a moral imperative. In a recent BBC article (Jones, 2018), Susie Orbach, a psychotherapist who has written extensively on people's relationships with their bodies and food (1978, 1986, 2002, 2009) argues that the goal of a diet has shifted from simply making the dieter thin to having moral pursuits such as being purifying. Furthermore, dieting has increased in recent decades, with a recent systematic review finding that 42% of the global population has attempted to lose weight in the past year (Santos, Sniehotta, Margques, Carraca & Teixeira, 2017). Examining the terms people search for worldwide on Google reveals that since its inception in 2004, the search for 'healthy' has increased by roughly 50%, in comparison to searches for 'religion' that has shown a decreased search frequency (see Figure 2.1). However, although views of a healthy diet and a healthy or ideal body frame have occurred throughout human history, the 20th century saw a different kind of change.
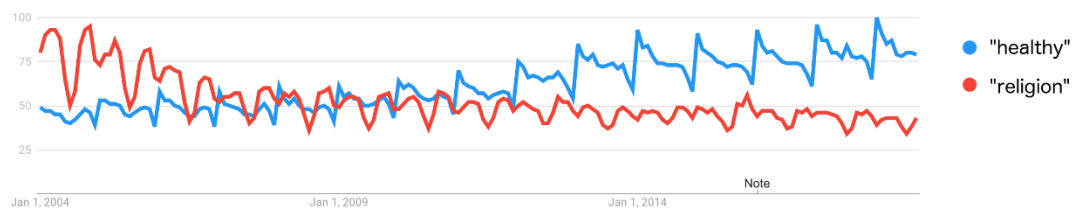
Figure 2.1. Relative change in worldwide Google searches for the term 'healthy' and 'religion' from 2004-2017.

Levenstein (2003) has traced the trajectory of health and slimness during the twentieth century. He describes a common pattern of how food shortages usually result in plumper ideals, while a slender frame is preferred in times of abundance. When there is not enough food to go around, a larger shape would indicate personal wealth. In comparison, when there is too much food a slimmer figure signals self-control in the face of indulgence. This pattern can also be seen in Nahoum's (1979) analysis of female body shapes in early modern European paintings. It follows then that in the excesses of the 1920s, the previous positive views on girth made way for ideas of sloth and a lack of self-control. However, in the 1930s, nutrition science changed how the public viewed body sizes and who was responsible for them (Levenstein, 2003). The slim figure of the 1920s was no longer understood as simply a fashion statement – it was a symbol of health.

When the Depression hit America, the larger body sizes predicted by previous food shortages failed to make an appearance. Instead, diets and slimming obsessions took over (Levenstein, 2003).

Not only had scientific research at the time communicated that being slim was healthy and being large was unhealthy, the individual was also in charge of their weight. Previously, the view of weight had been that it was largely down to forces beyond the individual's control. With the proposal of the 'calories in/calories out' model of weight gain, a person's weight was controlled by their own willpower (Alberti, 2016). Much of this thinking has survived - people who are obese are often portrayed as having low self-control (de Ridder et al., 2012; Gerbrand et al., 2004). It is an interesting parallel to note that self-control has for a long time been seen as central to morality. Baumeister and Exline (1999) called it the 'moral muscle' because many virtuous acts require a degree of quelling other desires. Thus, it is possible that self-control being central in the view of weight and obesity in the 20th century has contributed to the association between morality and food.

2.3.3 Uncertainty

Although the understanding of the human body is better than ever before, the twentieth and twenty-first century have also been filled with a multitude of different and opposing nutritional advice and knowledge. Everyone from governments, research scientists, retailers, companies and individuals can make dietary recommendations, in the absence of any genuine agreement (Hornik & Kelly, 2007). Research scientists have also reported they often find it difficult to communicate the complexities of their findings to the public in an effective manner (Folker & Sandoe, 2007), which in turn can blur the picture further. Although there has likely always been conflicting information available, in the current information age people are bombarded with health and nutritional findings, opinions and advice wherever they go. Research from the US has shown that 55-67% of adults go online for health information (Deloitte, 2010), and 20-34% use social media for the same purpose (Deloitte, 2010 and National Research Corporation, 2011 respectively, as cited in Tobey & Manore, 2014). In addition to this, the public's trust in experts fell to be equal with the trust of 'people like me' in 2017 (Edelman, 2017), making them potentially more vulnerable to untested opinions. The trust in experts has since then increased slightly (Edelman, 2018). Some research from Canada (Marquis, Dubeau & Thibault, 2007) and Australia (Cash, Desbrow, Leveritt & Ball, 2015) has suggested that the most utilised sources of nutrition information, such as the internet, friends, family and

magazines, are often not the most trustworthy or credible. When anyone can post and publish anything online, this can result in consumer confusion, caused by an overload of misinformation (Spiteri-Cornish & Moares, 2015).

Such chaotic times, Rozin (1997) and Brandt (1997) argue, are likely to be especially vulnerable to moralisation. Moralising and controlling the body, which is intimately related to the idea of healthy eating, is often the fall-back in such contexts.

3.2.4 Social benefits

As seen above, in Western societies the twentieth century saw a shift towards a preference for a slim body. This links to what will here be described as the functional value of a thin body. In cases where moralisation occurs, there is a tendency that adhering to the norms and rules have social benefits. For women, the thin body is idealised both in Western societies (Anschutz, Spruijt-Metz, van Strien & Engels, 2011; Brown & Slaughter, 2011) and increasingly elsewhere (Talukdar, 2012). Engeln-Maddox (2006) describes how women associate a range of rewards with a slim body. The surveyed women believed that if they were to achieve a slim body they would also become more socially competent, well-adjusted and successful. However, these beliefs are not simply wishful thinking. Body size is one of the main contributors to attractiveness for women (Singh & Young, 1995; Swami & Tovée, 2005) and research has shown that for women physical attractiveness is strongly related to career success (e.g. Baum & Ford, 2004; Biddle & Hamermesh, 1998; Cawley, 2004; Kim & von dem Knesebeck, 2018). For example, Judge and Cable (2011) found that thinner women were paid more for the same work than larger women. For men on the other hand, even though there are still benefits, they are less well pronounced (Baum & Ford, 2004; Frieze, Olson & Russell, 1991).

2.3.5 Associated with stigmatised groups

When self-care becomes a moral demand, those who do not engage accordingly, either out of choice or out of circumstance, can become stigmatised (Metzl & Kirkland, 2010). This is the other side of the social benefits accompanying a slim body. Those who are obese face stereotypes, bias and discrimination in most areas of life, from health care and education, to work, media and personal relationships (see Puhl & King, 2013, for a review). A range of negative characteristics are attributed to, in particular, the heavier woman. A review by Puhl & Brownell (2001) demonstrated how they are perceived by employers as lacking self-control and professionalism, but also being lazy and emotionally unstable. Not only are those who have

a larger body frame susceptible to prejudice and negative stereotypes, they are also heavily discriminated against. A large body of research has shown that a range of negative life factors are associated with a higher BMI. For example, Sartore and Cunninham (2007) found that employers can show more interest in choosing a thinner, less qualified than a larger, more qualified individual. Similarly, larger individuals have also been found to be less well educated (Gortmaker et al., 1993).

It is not only in the workplace that larger people face a range of bias and discrimination. Even in the health care system, where employees might be expected to have a better grasp of the complex reasons for obesity, heavier individuals face many of the same stereotypes. Tomiyama and colleagues (2015) reported that healthcare professionals think that obese people are lazier, more stupid and more worthless than thin people. These negative beliefs are likely to influence the quality of care given, with research showing that physicians are less motivated to provide help and think it is more of a waste of time than helping slimmer individuals (Hebl & Xu, 2001; Huizinga et al., 2009).

However, it should be noted that these groups could have become stigmatised due to overconsumption of food having immoral associations. As such, it could be either a cause or a consequence or is reinforced through a feedback loop. Taken together, the benefits associated with a slim body frame and the disadvantages associated with a larger size provide a multitude of reasons for why people would be motivated to adhere to a norm of healthy eating – even if they might not always succeed at doing so.

2.3.6 Evolutionary aspects

Even though a long history between body, food and morality is evident, it is possible that this moralisation did not only occur with the advent of religion. The moralisation of the body and food in religious thinking and practice is likely to have occurred alongside evolutionary pressures. To avoid contamination and disease, it is generally advisable to avoid food that might be rotting or poisonous. The emotion of disgust is understood as having developed in order to achieve pathogen avoidance of all types, from infectious diseases to spoilt food (see Curtis, de Barra & Aunger, 2011 for a review). Many definitions of disgust exist (e.g. Angyal, 1941; Darwin, 1872/1965; Plutchik, 1980; Rozin & Fallon, 1987), but they generally center on the functional properties of avoiding or expelling an unacceptable or contaminated object which is usually digestible. Disgust is a universal emotion that shows similarities across species and over

time in aspects such as facial expressions (Curtis, 2007; Curtis & Biran, 2001). It is argued that through evolutionary pressures the disgust evaluation system was expanded to include moral concerns (see Chapman & Anderson, 2013 and Landy & Goodwin, 2015 for two recent reviews), such as violations of divinity (Rozin, Lowery, Imada & Haidt, 1999) or fairness (Chapman, Kim, Susskind & Anderson, 2009). A disgust response that would cause withdrawal from the people who committed these kinds of violations would have been adaptive as they would threaten group cohesion (Rozin, Haidt & Fincher, 2009; Rozin, Haidt & McCauley, 1993)

The relationship between disgust and morality is usually posited in three ways: Moral transgressions can trigger feelings of disgust (elicitation hypothesis), disgust can make a moral transgression be perceived as more wrong (amplification hypothesis) and experiencing disgust can moralise an entity (moralisation hypothesis). For example, Hutcherson and Gross (2011) found that participants felt disgusted by a broad set of moral transgressions, while Horberg, Oveis, Keltner and Cohen (2009) only found that participants reported significantly more disgust than anger in response to vignettes detailing purity violations but not to justice violations. In terms of amplification, Schnall, Haidt, Clore and Jordan (2008) demonstrated how a disgusting smell made participants judge others' wrongdoings more harshly. Similar findings have been reported using a disgusting video (Ugazio, Lamm & Singer, 2012) or bitter tastes (Eskine, Kacinik & Prinz, 2011). For the moralising effect of disgust, however, there is little published evidence. In a meta-analysis by Landy and Goodwin (2015) including non-published research they found support for the moralising hypothesis, such that experiencing disgust made participants judge non-moral actions as more morally wrong. They also calculated that there was support for the amplification hypothesis among published literature, but not when unpublished experiments were included.

As such, it is possible that one source of the moralisation of eating was a disgust response to certain food products that were perceived as harmful. The special case of food is that it becomes you. 'You are what you eat' is not just a saying but a statement of fact. Today much of the food that has a moral association is not rotten or directly poisonous. However, it can be argued that this food is still perceived as harmful through an association between 'sinful' foods such as those high in sugar, fat and salt, and medical outcomes such as obesity, heart disease and diabetes. Although as discussed by Wisneski and Skitka (2017) harm might not be a necessary condition for moralisation to occur.

2.4 Research on moralisation of eating and its consequences

As I have presented in the previous section, several lines of evidence point to a moralisation of eating. In the following section I review the relevant research carried out in this area including the potential consequences of such moralisation.

Some researchers have explored how people think about and relate to food and the people who consume it. Interviewing a group of Canadian teenagers on their views of fast food, McPhail, Chapman and Beagan (2011) found that morality was intimately linked with how they approached fast food. Most teens at some point had felt guilty about eating fast food and perceived those who consumed it as 'out of control' and 'disgusting. They also associated 'good' and 'bad' food with 'good' and 'bad' people. Furthermore, many perceived the food in these restaurants to be 'bad', but that one could choose 'better' options by selecting the healthies item on the menu. On the other end of the lifespan, Delaney and McCarthy (2014), interviewed adults aged between 50-70 years on the 'moral space of food'. Corresponding to religious notions of food consumption, the interviewees believed that too much involvement with food was 'wrong' and rather that the 'right' approach was to simply focus on its nourishing properties. They also perceived eating unhealthily as a transgression from the ideal norm presented by healthism.

There is some evidence that companies are drawing on this association in their advertising of food products (see Box 2.1 for examples). In the UK there is a 'Heavenly' chocolate mousse (Nestlé), an 'Innocent' smoothie (Coca Cola), 'seven deadly sins' Magnum ice creams (Unilever) and a 'Divine' chocolate (Twin). Furthermore, dieting company 'Slimming World' are using the term 'syn' (Slimming World, June 2017), previously called 'sin' (Slimming World, June 2002), to denote food points, indicating how many 'syns' one can have in one day and what products are 'syn' free. This tendency to market food using moral terms and images has previously been highlighted by Kilbourne (1994) who wrote that healthy food products are often sold as virtuous while unhealthy products are presented as sin. Similarly, Griffin and Berry (2003) analysed a series of food advertisements in women's magazines and found that religious imagery associated with morality is used to sell products. In their analysis they highlighted the tendency for diet version of traditionally unhealthy products to be exhibited as salvation.

Box 2.1 *Moral concepts in the marketing of food and non-alcoholic drink*

Moral concepts are used in both the labels of and the marketing for food and non-alcoholic drinks. Below are examples from both television advertisements and print advertisements showing a combination of both moral concepts in labels and in the concept of the advertisements.

Photos removed due to copyright reasons.

Copyright holder is Nestle

Copyright holder is Coca Cola

a) Marketing campaign for 'Aero' Heavenly chocolate mousse by Nestlé

b) Marketing campaign for 'Innocent' smoothies by Coca Cola

Photos removed due to copyright reasons.

Copyright holder is Unilever

Copyright holder is Twin

c) Marketing campaign for 'Magnum' ice cream by Unilever

d) Marketing campaign from 'Divine Chocolate' by Twin

2.4.1 Emotional consequences

To further explore the moralisation of eating, the use of moral emotions in relation to food and eating could be thought of as a signal indicating whether or not something may have taken on moral value. When people perceive the breaking of a moral rule, a series of emotions are likely to be triggered. Although a variety of emotions can occur, the most common indications of

moral transgressions are guilt, shame, disgust and righteous anger. Guilt, shame and disgust are often self-conscious and come about when the individual carries out the wrongdoing themselves. It is theorised that guilt occurs when the individual has behaved in what they perceive to be an immoral way, while shame is triggered by the perception that their whole being is immoral (Niedenthal, Tangney & Gavanski, 1994; Tangney, Stuewig & Mashek, 2007).

Using data collected from student women via a one-week food diary, Steenhuis (2009), found that most participants reported feeling moderately guilty throughout. This was specifically the case when they were snacking after lunch or after dinner, and particularly when eating sweets or ice cream. Schuster and colleagues (2017) also showed that their participants felt guiltier about eating typical 'unhealthy' snacks such as chips, candy and cookies in comparison to more typical 'healthy' snacks such as nuts. Chocolate is seen as a 'guilty pleasure', where being exposed to chocolate induces both desire and guilt (Rogers & Smit, 2000). Rozin and colleagues (1999) and later Kuijer and Boyce (2014) found that among those surveyed, 22% associated chocolate cake more with guilt than with celebration. Furthermore, in comparison to eating an apple or nothing, women who ate a chocolate bar reported more guilt (Macht & Dettmer, 2006). Examining the gender difference, Wansink, Cheney and Chan (2003) found that feelings of guilt after chocolate consumption were more pronounced for women (51 %) than for men (24 %). Other studies have replicated these gender differences (Kuijer & Boyce, 2014; Rozin, Bauer & Catanese, 2003). Not only do people report feeling guilty after eating what they deem to be unhealthy food, they also anticipate feeling guilty before doing so. When presenting participants with advertisements showing varying degrees of healthy foods, Hur and Jang (2015) found that the less healthy the product the more likely they were to say they would feel guilty eating the food item presented in the picture.

Guilt and shame are commonly associated with overeating in those who value remaining thin or restraining their food intake (Burney & Irwin, 2000). Chocolate cake has also been found to be more associated with guilt than celebration among those who want to lose weight (Kuijer & Boyce, 2014). Taken to the extreme, feelings of guilt and shame are frequent in those who suffer from eating disorders such as anorexia nervosa, bulimia nervosa and binge eating (e.g, Cartwright & Stritzke, 2008; Sassaroli, Bertelli, Decoppi, Crosina, Milos & Ruggiero, 2005). Burney and Irwin (1999) found that shame and guilt associated with eating behaviour was one of the strongest predictors of eating disorder symptomatology. A proneness to shame or guilt, on the other hand, was not a significant predictor. Furthermore, during episodes of binging

and purging many report the involvement of guilt and shame in maintaining the cycle (e.g. Tachi, Murakami, Murotsu & Washizuka, 2001).

Again, this relates to the process of moralisation. Rozin (1997; 1999) postulates that in cases of moralisation, the object or activity tends to become internalised – meaning that it is incorporated into the person's sense of self. The internalised concept in turn formulates a moral standard or a set of rules. The findings that eating too much or the wrong thing brings about feelings of guilt would indicate that the activity has become internalised and a moral standard surrounding what is 'right' eating behaviour has been created. Furthermore, as seen above, guilt and shame are triggered more frequently the more internalised the eating rules are, such as in those who are on a diet or those suffering from eating disorders.

Not only can eating too much or eating the wrong things trigger moral emotions, it can create an impression in the individual of being immoral. In the following section I will outline research on moral judgement of people based on what they eat and moral self-regulation in the context of food consumption.

2.4.2 Judgemental and behavioural consequences

Similar to a preference being transformed into a value through the process of moralisation, the law of contagion posits that properties can be transferred from one source to a receiver (Nemeroff & Rozin, 1992). What is transferred can be something behavioural, something physical such as germs or even something moral, such as the moral 'essences' of Hitler present in his old jumper (Nemeroff & Rozin, 1994). In relation to food, research has shown that contagion seems to occur between the food product and the consumer. In addition to the physical properties that are transferred in such an encounter, a series of studies have demonstrated that people believe moral essences can be transferred as well. Stein and Nemeroff (1995) conducted a study in which they described a person as either preferring unhealthy foods or healthy foods, but both being of average height and weight and physically active. They found that individuals who preferred healthy food were seen as more tolerant, considerate and virtuous than those who preferred the unhealthy food. Women who prefer low-fat products have also been judged as more conscientious (Mooney, DeTore & Malloy, 1994). Money and Amico (2000) have shown that a woman described as ordering a chicken sandwich and a salad was perceived as more moral than one ordering a hamburger and fries. Finally, although more

fun and easy going, pie eaters were also thought to be less responsible and less moral than oatmeal eaters (Oakes & Slotterback, 2004 - 2005).

Taken together, whether someone chooses to eat a salad or a burger is not only a health choice, but can signal moral status. Again, healthy food is being associated with good moral characteristics, while unhealthy food is associated with bad moral characteristics. Considering that eating unhealthily can trigger feelings of guilt and shame, and the knowledge of others' judgement, it is possible that these eating behaviours can result in a desire to undo impressions or self-evaluations.

2.4.2.1 Moral Self-Regulation

Box 2.2. *Definitions of key terms relating to moral self-regulation*

Moral Compensation: the tendency for people to carry out an act perceived as 'good' following an act perceived as 'bad' (Zhong, Liljenquist & Cain, 2009). Perceived 'good' acts are those that in some way are believed to make up for or balance out the 'bad' behavior, such as prosociality, purifying acts (cleaning), and self-punishment.

Moral Licensing: the tendency for people to carry out an act perceived as 'bad' following an act perceived as 'good' (Merritt, Effron & Monin, 2010).

Self-Licensing: the tendency to rely on reasons or justifications for gratification (de Witt Huberts et al., 2012). Moral licensing is an example of self-licensing where the justification is that one has been 'good'.

In their seminal study, Carlsmith and Gross (1969) showed that participants who believed they had done wrong in harming others by administrating painful electric shocks were more likely to comply with a later request for help. Moral compensation (see Box 2.2 for an overview of terms used in this section), the tendency for people to carry out an act perceived as 'good' following an act perceived as 'bad', has been shown in several experiments. For example, in a series of three studies, Jordan and colleagues (2011) showed that recalling a time they had acted immorally (vs. morally) led participants to want to demonstrate their moral status to others, report greater moral intentions and behave more morally by not cheating when given the chance. Similar findings have also been reported by Ding, Xie, Sun, Li, Wang and Zhen (2016) who found that guilt significantly moderated the effect between recalled wrongdoing and subsequent prosocial behaviour. Prosociality is here defined as acts carried out that benefits others but may sometimes occur at a cost to oneself.

Moral compensation is not only achieved by increased prosociality. Engaging in morally dubious behaviour has also been shown to increase a desire to physically cleanse oneself either physically or through 'pain'. Zhong and Liljenquist (2006) found that participants who recalled past unethical behaviour were more likely to fill out a word completion task using cleansing related words and to choose an antiseptic wipe over a pencil. The so-called 'Macbeth effect' is thought to come about due to the association in English language between concepts of purity and morality. Furthermore, like the self-flagellation of the Middle Ages, people who have done wrong can sometimes punish themselves. Bastian and colleagues (2011) found that after recalling a time they socially rejected another person, a behaviour that was perceived as unethical and elicited guilt, participants held their hands in painfully cold water for longer than those participants who recalled an everyday interaction with another person. This strategy was also effective in reducing feelings of guilt. Similar findings have been reported by Inbar and colleagues (2012), who also ruled out the alternative explanation that negative feelings in general (e.g. sadness) lead to self-punishment. However, there is some suggestion that self-punishment is first and foremost a strategy used to signal remorse to others. Nelissen (2012), who did not replicate the findings of Bastian and colleagues (2011) and Inbar and colleagues (2012), only found self-punishment in the presence of others.

In comparison to moral compensation, moral licensing is the tendency for people to carry out an act perceived as 'bad' following an act perceived as 'good' (e.g. Merritt et al., 2010 for a review). For example, Monin and Miller (2001) demonstrated that after having disagreed with sexist statements, men were more likely to show sexist discrimination in suggesting a male candidate for a job. Similarly, after recalling an unethical act they had carried out, participants were less likely to say they wanted to take part in prosocial activities (Jordan, Mullen & Murnighan, 2009). Or, after selecting environmentally friendly products, participants were more likely to cheat on a task to win money and to steal money in a trust situation (Mazar & Zhong, 2010). Although some effects have failed to replicate, with studies often reporting small sample sizes (Blanken, Van de Ven, Zeelenberg & Meijers 2014), a meta-analysis demonstrated a significant small-to medium moral licensing effect of perceived 'bad' acts to follow perceived 'good' behaviour (Blanken, Van de Van & Zeelenberg 2015).

Why do people act in such inconsistent ways? People have a need to perceive themselves as consistent (Festinger, 1957) and in a positive light (Allport, 1955, Steele, 1988). Being moral is central to many individual's identities (Aquino & Reed, 2002; Monin & Jordan, 2009) and in

large parts influences people's self-worth (Alicke, 1985; Dunning, 2007). As such, when people have broken a personal or societal moral rule a gap opens between an ideal or true self and the self who carried out the moral transgression. The gap has been explained either in terms of cognitive dissonance that may arise when the immoral actions have negative consequences (Cooper & Fazop, 1984, Festinger, 1957), or feelings of inauthenticity to the true self (Gino, Kouchaki & Galinsky, 2015). This gap can result in feelings of impurity or guilt (Gino et al., 2015; Tangney, Stuewig & Mashek, 2007), which for example can motivate the individual to engage in actions to communicate remorse (Nelissen, 2011) or re-establish a moral self-image or self-worth by moral compensation (Sachdeva et al., 2009).

Most models aiming to explain this moral self-regulation process take a form of a 'balance model'. For example, the moral *credits* model (e.g. Nisan, 1991; Zhong, Liljenquist & Cain, 2009), posits that someone's moral status is like a bank account. When people act immorally or unethically, they lose moral credits. To make up for this loss, they need to act morally to balance the scales and fill up the account again. If they have been good, however, they have some extra credits to spare and may feel licensed to act unethically subsequently. There is also a moral *credentials* model (Monin & Miller, 2001), which posits that after having been either good or bad, people have either established credentials as a good, moral person, or lost credentials as a bad, immoral person. In comparison to the more internal balancing of the moral credits model, the moral credentials model indicates that how we think others view us is essential. That is, if a person carried out a good act after having been bad, they hope this will change how others might view the initial unethical act. These two models likely describe two different processes that would come into play in different contexts and whether or not the initial and subsequent behaviour is in the same domain or not (Merritt et al., 2010).

Overall, although exact process of moral self-regulation is unclear (Blanken et al., 2015), what it demonstrates is a tendency for people to want to compensate for being bad or feel free to be bad after having been good. As such, if eating is moralised, similar self-regulation strategies should be used in an eating context. In the next section I will review the limited evidence of this.

2.4.2.2 Moral compensation in a food context
People sometimes compensate for failures in dieting by becoming more physically active (Fleig, Küper, Lippke, Schwarzer & Wiedermann, 2015) or eating less (Tomiyama, Moskovich,

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Haltom, Ju & Mann, 2009). This type of self-regulation is similar to the moral compensation reviewed in the previous section: both sets of behaviours are aiming to achieve a balance and to 'make up for' previous mistakes. There is some evidence to suggest, however, that not only do people compensate for increased calorie intake by reducing calorie intake, but they also compensate morally.

In the first experiment to establish this behavioural tendency, Sheikh and colleagues (2013) allocated participants to one of two groups: the first group was asked to recall a time they had eaten 'way too much', or a control condition in which they either completed no task (Study 1) or recalled an ordinary day (Study 2). They found that participants who had recalled eating too much reported more moral emotions and produced more cleansing related words, such as 'shower', 'wash' and 'soap', in a word-completion task (Study 1) and were more likely to choose a cleansing product over a pen (Study 2). These findings mirror the Macbeth effect shown by Zhong and Liljenquist (2006). Furthermore, overeating recall has also been found to lead to increased self-inflicted pain akin to self-punishment. Schei, Sheikh and Schnall (submitted) found that participants who recalled eating too much felt guiltier and more ashamed and held their hand in painfully cold water for almost twice as long as those who recalled their regular journey to work/study.

In sum, after doing wrong – or eating the wrong food – people have a tendency to try to make up for their transgressions by acting in otherwise moral ways. Study 2 in this thesis extends the work on moral compensation after overeating recall.

2.4.2.3 Moral- and self-licensing in a food context
In comparison to the research showing that unhealthy eating behaviour can lead to acts of moral compensation (Schei et al., submitted; Sheikh et al., 2013), another avenue of research has been that of moral licensing within a food context. A study by Eskine (2013) showed that simply being exposed to organic food in comparison to neutral (e.g. mustard, white rice) and comfort foods (e.g. ice cream, cookies) made participants less likely to volunteer time to help a stranger. They were also harsher in their judgements of other people`s moral transgressions, indicating a degree of moral superiority. Although Eskine`s study compared `organic` food, all the products were conventionally healthy items such as apples, spinach and carrots. Although this limits the degree to which statements can be made about the effect of `organic` food on prosociality and moral judgements per se, it does demonstrate an effect of healthy in

comparison to less healthy food products. However, a later, well-powered study (Moery & Calin-Jageman, 2016) did not replicate the findings of Eskine's small-sampled study ($N = 62$ divided in three groups). Eskine (2013) did also not provide any power calculations to justify the sample sizes. Although the direction of the effect was similar, the differences were not significant. With only two studies, uncertainty remains about whether moral licensing is present within the food domain in such a way that healthy foods might be associated with an increase in perceived 'bad' behavior. Study 1 in this thesis goes some way to address this uncertainty.

There is limited available evidence for explicit moral licensing within the food domain. Rather, the majority of related research focuses on self-licensing, an overarching concept of justification-based gratification (See Box 2.2, De Witt Huberts, Evers & De Ridder, 2013). As seen previously, self-control plays an important part in moral behaviour. In many ways, self-control goals are seen as a virtue in themselves (Moijiman et al., 2018). Thus, it has been found that after having enacted self-control, people are more likely to choose an unhealthy chocolate cake over a healthier salad (Mukhopadhyay & Johar, 2009). It is unclear, however, whether people would be more likely to eat unhealthy after having carried out other ethical acts, or when feeling moral. Study 4, 5, 6 and 7 attends to this lack of research by examining whether giving a food item a label indicating moral goodness might act as a justification for consumption in line with moral licensing.

2.5 Conclusions and next chapter

The current chapter has outlined some of the historical and contemporary associations between food and morality, from religious notions of gluttony to the moral commands of eating healthy today. However, the consequence of such moralisation is little studied.

The thesis explores this by way of three research questions:

1. *Do people compensate morally for unhealthy eating behaviours?*
2. *How prevalent is the tendency to associate morality with eating and food?*
3. *What is the impact on self-reported desire and observed behaviour of associating moral terms with food?*

Each research question addresses a different side to the link between morality and eating. This is graphically represented in Box 2.3.

These questions are addressed in seven studies, summarised below:

Study 1 is a laboratory based experiment examining whether recalling an overeating memory in comparison to a neutral memory makes participants compensate morally by spending more time on a prosocial task.

Box 2.3 *Graphical representation of how the association between morality and eating has shaped each research question*

Morality ⟵——— **Eating**

The first research question concerns the association between and the impact of eating behaviour on morality. This is addressed in Study 1 and 2.

Morality ⟵———⟶ **Food/eating**

The second research question concerns the prevalence of the association between morality and food/eating. This is addressed in Study 3.

Morality ———⟶ **Food/eating**

The third research question concerns the impact of morality on desire for and consumption of food. This is addressed in Study 4, 5, 6 and 7.

Study 2 is a laboratory based correlational study examining the association between participants' own chocolate consumption and moral judgement of others' wrongdoings. The study also examines the moderating role of the moral foundation in which the wrongdoing takes place.

Study 3 is a review of moral concepts in food, non-alcoholic drink and nutritional supplement advertising from 2002 to 2017 in popular women's magazines. The study also examines whether the prevalence of the use of moral concepts in this context has changed over time or is dependent on the healthiness of the advertised product.

Study 4 is an online experiment which examines whether participants' desire for a healthy or unhealthy food is impacted by a moral or immoral label. The study also explores the potential moderating influence of individual characteristics including restrained eating tendency and moral identity.

Study 5 is a laboratory based experiment investigating whether participants' consumption of healthy and unhealthy food depends on whether they are labelled as moral or immoral. The study also explores the potential moderating influence of individual characteristics including restrained eating tendency, moral identity and impulse control.

Study 6 is a field-based experiment examining the effect of either a moral or immoral label on participants' selection of a healthy or unhealthy food.

Study 7 is an internal meta-analysis of Study 4, 5 and 6 examining the overall effect of either moral or immoral label on participants desire for and selection and consumption of healthy or unhealthy food.

The next chapter presents Study 1, which tests whether participants are likely to compensate for past overeating behaviour by acting more prosocially.

CHAPTER 3

Study 1

Amount of chocolate consumed and moral judgement: a correlational study

Summary

Background

Food consumption can affect leniency and harshness in judgment and treatment of others (Eskine, 2013) and previous research has shown that feeling virtuous leads to harsher judgements of others' wrongdoings (Zhong et al., 2010). Hence, the current study tests the postulate that chocolate consumption is associated with moral judgement, such that eating more chocolate is associated with less harsh moral judgements of other people's transgressions. It was further predicted that restrained eating moderates this relationship.

Methods

Eighty-eight student participants were recruited to take part. To increase the range of the amount of chocolate consumed, participants were randomised to receive either a large (150g) or small (75g) portion size of chocolates, a manipulation that affects amount consumed (Hollands et al., 2015). Participants were told they were free to eat chocolate while doing the study if they wanted. At the same time, they were asked to rate a range of moral foundation vignettes on wrongness of the behaviour. At the end of the study participants completed a measure of restrained eating.

Results

There was no statistically significant difference in the amount of chocolate consumed between the two portion sizes, $W = 841.5$, $p = .30$, $\Delta\hat{} = -3.00$, 95% CI [-10.00, 3.00]. Participants who ate less chocolate gave harsher judgements of transgressions overall, $\beta = -.12$, $SE = .06$, $t(85) = -1.94$, $p = .05$, 95% CI [-.24, .00]. Restrained eating did not moderate this association $\beta = .09$, $SE = .08$, $t(85) = 1.11$, $p = .48$, 95% CI [-.07, .26].

Conclusion

The results suggest that chocolate consumption and moral judgement are associated in a student population, but further research is needed in other populations, and to establish whether this association is causal and if so, the direction of causality.

3.1 Background

Moral judgements are not only arrived at through rational and effortful deliberation. Whether an action is judged as immoral or not can be affected by the affective state in which the person making the judgement finds themselves. This has been described as affect-as-information theory (Schwarz, 2010). These theories put forward the view that people use their physical state as an information heuristic when judging certain situations. For example, in a study by Schwarz and Clore (1983, Experiment 2) a female experimenter phoned unknowing participants on either a sunny or a rainy day. As she was supposedly calling from far away, she asked half of the participants what the weather was like before going on to asking everybody about how satisfied they were with their entire life at that moment. Participants who had been made to pay attention to the weather were not affected by whether the weather was sunny or rainy on their satisfaction ratings. Conversely, those who had not been asked the weather question were significantly less satisfied with their life on the rainy day than the sunny day.

Drawing on the theoretical framework of affect-as-information, Haidt (2001) put forward the theory that moral judgements often occur in much the same way as the person deciding whether their life is good or bad depending on the weather. That is, moral judgements are arrived at by the use of so-called 'moral intuitions'. These intuitions are quick, automatic and often occur outside conscious awareness. For example, Wheatley and Haidt (2005) found that when they hypnotically induced disgust in participants they became harsher in their judgements of moral transgressions, a finding that has also been shown by Schnall and colleagues (2008). Going beyond disgust, Horberg and colleagues (2009) found that anger also predicted harsher moral judgements, especially those related to breaches of justice. The physical state of being in pain has also been found to harshen moral judgements (Olatunji, Puncochar & Cox, 2016)

In the majority of these studies, the emotion is usually without a target, coming from an external target unrelated to the judgement or triggered by the event that is being judged. In these situations, the emotion can be misattributed to the moral transgression, in the same way as the weather influenced life satisfaction in the example by Schwarz and Clore (1983). There has been less focus on the effect of emotions that are triggered by personal behaviours or characteristics of the judge, in which case the emotion is less likely to be misattributed. Extending the research on emotion and moral judgement, Olatunji, David and Ciesleksi (2012) explored the effect of self-directed disgust on moral judgements. In opposition to the findings

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that feeling incidental disgust harshens moral judgements, they found that participants who felt disgusted at themselves rated other's wrongdoings as less disgusting and they felt the offender to be less deserving of punishment.

A similar field of research is that which explores the effect of cleanliness on moral judgement. In contrast to the finding that self-disgust lessens harshness of judgement, feeling clean has been shown to make people more judgemental. When Zhong, Strejcek and Sivanathan (2010) had participants clean their hands with an antiseptic wipe or engage in a visualisation task where they imagined themselves being clean, they found that participants rendered harsher moral judgements. They theorised that this is likely due to an association between a clean and moral self and a dirty and immoral self as an indication of moral standing. This concept is exemplified by the metaphor 'cleanliness is next to godliness'. Indeed, in the study by Zhong and colleagues (2010) participants in the clean conditions rated themselves as more moral than those in the control conditions – a sense of moral superiority - a self-characteristic that mediated the relationship between cleanliness and harsher moral judgements.

If, as was proposed in Chapter 2, there is a congruency between morality and health and immorality and ill health, feeling healthy should in line with the affect-as-information theory (Schwarz, 2010) and the moral intuition theory (Haidt, 2001) harshen judgements of moral transgressions. The aim of the current study was to test this presupposition by investigating the association between consumption of an unhealthy food (chocolate) and moral judgement. Looking at the relationship between food and moral judgement Eskine (2013) exposed participants to healthy foods such as apples, spinach and carrots, or to unhealthy foods such as brownies and ice cream. She found that those exposed to healthy foods judged other people's wrongdoings more harshly than those exposed to unhealthy foods. Moreover, Eskine, Kacinik and Prinz (2011) showed that experiencing different tastes also affected moral judgement. Participants were given either a sweet, bitter or control (water) beverage while completing a task assessing judgements of moral transgressions. They found that participants who drank the bitter drink rated the transgressions as significantly more wrong than the participants who drank the sweet and control drinks. The participants who received the sweet drink were most lenient in their judgments, although not significantly different from participants in the control condition. However, a more recent effort to replicate this effect proved unsuccessful (Moery & Calin-Jageman, 2016). The studies by Eskine and colleagues reveal that the types of foods we are exposed to and how they taste could have effects on our judgements of other people's moral

transgressions. Building on this research, it was predicted that the amount of chocolate consumption is negatively related to moral judgement.

The study also aimed to explore whether chocolate consumption is related to judgements of morality in general or specifically of certain issues. In trying to map out descriptive morality, researchers have put forward different categories into which moral considerations usually fall. As reviewed in Chapter 2, Turiel (1983) proposed that moral concerns could be grouped into either justice, rights or harm, but research from other non-western societies showed that people's moral domains were broader than this. Shweder, Mahapatra and Miller (1987) showed that what people considered moral included issues of respect and hierarchy and purity/sanctity. Wanting to describe the full range of moral issues across cultures, Haidt and Joseph (2004) reviewed the breadth of moral domain theories and concluded with their own set of five moral foundations: harm/care, fairness/reciprocity, ingroup/loyalty, authority/respect and purity/sanctity. Later, liberty/oppression has been argued to also be a moral foundation (Haidt, 2012; Iyer, Koleva, Graham, Ditto & Haidt, 2012). They argue that the human mind is organised in such a way that people, as they grow up and are exposed to a range of social issues, are likely to moralise these six.

However, few studies have measured moral judgements specified by moral foundation (e.g. Moran et al., 2011; Wheatley & Haidt, 2005; Schnall, Haidt, Clore & Jordan, 2008). This was the case of Eskine and colleagues, who used moral vignettes describing a range of moral transgressions from consensual second-cousin incest, to shoplifting and accepting bribes. The other most common approach to moral judgement has tapped into the sanctity/purity domain (Horberg, Oveis, Keltner & Cohen, 2009) with respect to the influence of disgust. Hence, to be able to analyse each moral foundation separately a stimulus set developed by Clifford, Iyengar, Cabeza and Sinnott-Armstrong (2015) was used in the current study. The stimulus set contains a series of moral vignettes in Care, Fairness, Loyalty, Authority, Sanctity and Liberty, which allowed for analysis of each foundation separately and overall.

The final aim was to investigate the moderating role of restrained eating in the relationship between unhealthy food consumption and moral judgement. Restrained eating, the degree to which someone restricts their food intake with the aim to either maintain or lose weight, has been previously shown to be related to moral characteristics. Schei and colleagues (submitted) found that women participants who restrained their food intake and felt guilty about breaking

their restraint were more likely to report putting other people's needs in front of their own and other behaviour characteristics of being a 'good woman'. It is likely that among a sample of participants who score highly on restrained eating, eating large amounts of chocolate is perceived as wrong, while restricting chocolate consumption is perceived as right. As such, it was predicted that the relationship between chocolate consumption and moral judgement would be moderated by restrained eating tendencies. To assess restrained eating a commonly employed measure was used, the Dutch Eating Behaviour Questionnaire (van Strien, Frijters, Bergers & Defares, 1986). This scale consists of three subscales: external eating behaviour, emotional eating behaviour and restrained eating behaviour. The scale was chosen due to its focus on everyday dieting behaviour rather than behaviour which is symptomatic of disordered eating. Only the restrained eating behaviour subscale was employed.

To increase the variance of consumption, portion size was manipulated. Larger portion sizes have been consistently shown to increase food consumption (see Hollands et al., 2015 for a review). For example, recruiting normal-BMI participants from a university population, Rolls and colleagues (2006) found that increasing portion size by both 150% and 200% significantly increased food intake across food types (entrées, starches, fruit and vegetable side dishes, desserts, condiments, beverages and snacks). Similarly, Raynor and Wing (2012) found that when they gave participants either a baseline portion of candies or a doubling of the portion size, participants ate approximately 60% more on average. This reflects a proportional increase in portion size and increases in food consumption. It is theorised that the increased food intake is because the portion size sets the standard of the right amount to eat (Herman & Polivy, 2005; Steenhuis & Vermeer, 2009) or because people perceive the portion size as a single unit. Thus, portion size was manipulated in the current study to increase the range of consumption among participants. In line with previous research (e.g. Raynor & Wing, 2012; Rolls et al., 2006) the large portion size of chocolate (150g) was twice the weight of the small portion size (75g).

The current study tested two hypotheses:
1. Eating more chocolate is associated with less harsh moral judgements of other people's transgressions.
2. Restrained eating moderates this relationship.

3.2 Methods

3.2.1 Participants.

To calculate sample size, the effect size for the difference between healthy and unhealthy food on moral judgements from Eskine (2013) was used as a guide, $r = .51$, which is conventionally understood as a large effect size. To account for differences between the two studies, sample size was calculated based on a more moderate medium effect size, $r = .30$. Using this effect size, a sample of 84 participants was calculated as the required minimum to find a statistically significant relationship between chocolate consumption and moral judgement with 80% power at 5% significance. Ninety-eight participants were recruited via online advertisements and volunteer mailing lists to take part in the study in exchange for £4. Ten participants had to be removed from the sample due to either guessing the purpose of the study or a technical malfunction, leaving a final sample of 88 participants. Four participants beyond the estimated 84 participants were included due to already being organised to take part in the research. The data was not examined until data collection finished.

3.2.2 Intervention.

Participants were given a bowl of chocolate pieces (Minstrels) before the start of the moral judgement task. The bowl was pre-weighed and contained either 75g of chocolate or 150g of chocolate. Participants were randomly allocated to receive either the large portion size or the small portion size.

3.2.3 Measures

3.2.3.1 Moral judgement.

Moral judgements were measured using an adapted version of the Moral Foundations Vignettes developed by Clifford et al. (2015). The vignettes reflect each moral foundation: Care (e.g. "You see a girl laughing at another student forgetting her lines at a school play."), Fairness (e.g. "You see someone cheating in a card game while playing with a group of strangers."), Liberty (e.g. "You see a man telling his girlfriend that she must convert to his religion."), Sanctity (e.g. "You see a family eating the carcass of their pet dog that had been run over."), Authority (e.g. "You see a girl repeatedly interrupting her teacher as he explains a new concept.") and Loyalty (e.g. "You see a man leaving his family business to go to work for her main competitor."), in addition to control vignettes describing non-moral behaviour.

Twelve vignettes were excluded due to not being relevant for a British audience (e.g. "You see a girl saying that another girl is too ugly to be a varsity cheerleader"), and vignettes using US terminology were adapted to British terms (e.g. "You see the US ambassador joking in Great Britain about the stupidity of Americans." was adapted to "You see the Prime Minister joking in America about the stupidity of British people."). Overall, participants rated the perceived wrongness of 105 vignettes by indicating their response to the question "How wrong do you find this?" on a slider scale from 0 ("Not wrong at all") – 100 ("Extremely wrong"). The survey was answered on a computer using the survey tool Qualtrics. Internal consistency was very high for all the moral foundations, a = .91 - .96.

3.2.3.2 Restrained eating.

Restrained eating was measured by the restrained eating subscale of the Dutch Eating Behavior Questionnaire (DEBQ), consisting of 11 items (van Strien et al., 1986). Participants rated the degree to which they engaged in food restriction (e.g. "When you have put on weight, do you eat less than you normally do?") by indicating their responses on a scale from 1 ("Never") – 5 ("Very Often"). Internal consistency was excellent in the current sample, a = .93.

3.2.4 Demographics

Participants were also asked to indicate their age, gender, ethnicity, height and weight and the time of their last meal.

3.2.5 Procedure

The study procedure was approved by the Department of Psychology Ethics Committee at the University of Cambridge (ref. 2015-16[16]). Participants took part in what they believed to be a study on how personality influences moral judgements. While reading and signing the informed consent form, the experimenter opened a packet of chocolate, poured the contents into a bowl and placed it next to the participant. When placing the bowl, the experimenter said that "the researchers in the lab next door have just finished running their study and have given us all their unused leftover chocolate, so I will give you some in case you want a snack during the study". The experimenter then proceeded to launch the Moral Foundation Vignettes via Qualtrics and left the participants alone to follow the instructions on the screen. When the participants finished, the experimenter re-entered the room, moved the chocolate away from the participant and replaced the bowl with a face-down sheet of paper concerning receipt of payment. This was done to stop the participant from continuing to snack while completing the

rest of the study and distract the participant with use of the sheet of paper. Thereafter, the participants completed the DEBQ and demographics. The DEBQ was distributed after the chocolate consumption and Moral Judgement Vignettes to avoid suspicion of the role of the chocolate offered to participants. At the end of the study all participants were probed for suspicion of the study aims, debriefed, compensated and thanked for their participation.

3.3 Data analysis

All analyses were carried out in R (version 3.3.3). The effect of the portion size intervention on chocolate consumption was analysed using a t-test. The relationship between chocolate consumption and moral judgement was analysed using multiple regression, while controlling for the difference in portion size. All moderation analyses were also analysed by use of multiple regression models. For exploratory subgroup analyses of moral foundations, p-values were adjusted using a Bonferroni-Holm correction. In cases where test-assumptions were not met, transformations were first attempted. When transformations did not correct violation of assumptions, a non-parametric test was used instead.

3.3.1 Assumptions

The key dependent variable, moral judgement, was assessed in both portion size conditions for normality. The variable was found to meet assumptions of normality (small, $W = .98$, $p = .48$, large: $W = .97$, $p = .18$), and the variance did not differ significantly between groups, Levene's test $F(1, 93) = 2.33$, $p = .13$. The consumption variable (grams of chocolate eaten) was found to be positively skewed in both conditions (small: $W = .83$, $p <.001$, large: $W = .81$, $p <.001$), and there was a trend for the variance to differ between groups, Levene's test $F(1, 86) = 3.68$, $p = .08$. No transformation (square root, logarithm, cube root, box cox) reduced the skew to approach a normal distribution, thus a non-parametric test was used in lieu of a t-test to analyse the effect of portion size on the consumption variable. When this variable was used in regression analyses, the residuals for the models were found to be normal and no further transformations were used.

3.3.2 Randomisation checks

To check that randomisation had been successful, demographic characteristics of the two randomised groups were compared. Using a Mann-Whitney U test to account for the negative skew of age and BMI, it was found that participants in the two groups did not differ in terms of age, $W = 958$, $p = .20$, or BMI, $W = 921$, $p = .57$. Chi-square tests also showed that the two

groups were not statistically different in terms of gender, $\chi^2 (2) = 1.08$, $p = .58$, ethnicity, $\chi^2 (6)$ = 5.60, $p = .47$, or the time of their last meal, $\chi^2 (5) = 4.919$, $p = .43$.

3.4 Results

3.4.1 Participants

The sample comprised 59 women and 28 men. One person did not disclose their gender. The mean age was 24.08 ($SD = 7.17$) years, with a normal average BMI ($M = 21.82$, $SD = 3.04$). The ethnicity composition of the sample was majority Caucasian *(n = 57)*. See Table 3.1 for a breakdown of demographics in each condition.

Table 3.1

Participant demographic characteristics across the two randomised groups and overall

Demographic characteristics	Small portion size $n = 46$	Large portion size $n = 42$	Total $N = 88$
Gender % (*n*) (female)	38.03 (30)	25.76 (29)	67.05 (59)
Age *M* (*SD)*	22.13 (3.36)	26.21 (9.36)	24.08 (7.17)
BMI *M* (*SD)*	21.59 (3.21)	22.09 (2.86)	21.82 (3.04)
Ethnicity % (*n*) (White)	31.82 (28)	32.95 (29)	64.77 (57)

3.4.2 Manipulation check

A Mann-Whitney-Wilcoxon test revealed that participants did not eat more chocolate in the large portion size condition ($M = 24.88$, $SD = 17.52$) than in the small portion size condition ($M = 16.37$, $SD = 17.52$), $W = 841.5$, $p = .30$, $\hat{\Delta} = -3.00$, 95% CI [-10.00, 3.00]. Thus, the manipulation to vary amount of chocolate consumed was not successful and the two groups were combined for further analyses.

3.4.3 Hypothesis 1: Eating more chocolate leads to less harsh moral judgements of other people's transgressions

In order to test the first hypothesis, a linear regression between amount of chocolate eaten (g) and moral judgement rating across all moral foundations was carried out. Portion size was included in the model because it systematically varied between groups. The correlation between chocolate consumption and moral judgement, without controlling for portion size, was not significant, $r = -.14$, $p = .19$. For the regression model, including the portion size variable as a covariate, the results showed a significant negative association between amount of chocolate eaten and harshness of moral judgement, $\beta = -.12$, $SE = .06$, $t (85) = -1.94$, $p = .05$,

95% CI [-.24, .00]. This means that the less chocolate participants ate, the harsher their moral judgements were. See Figure 3.1 for a plot of the relationship.
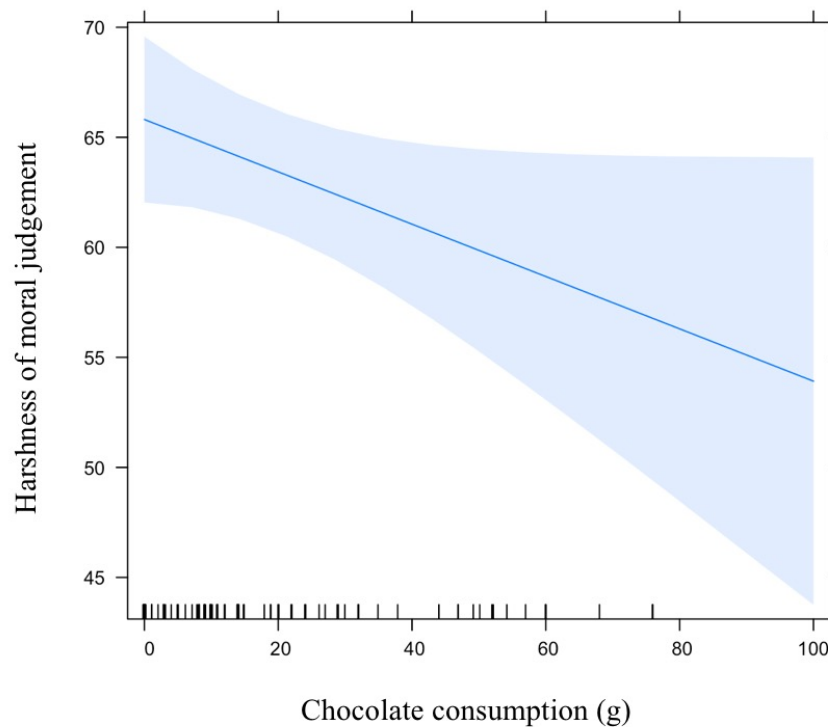
Figure 3.1. Association between chocolate consumption (g) and harshness of moral judgement with 95% CI.

Portion size was also significantly associated with moral judgements, $\beta = 7.78$, $SE = 2.88$, $t(85) = 2.7$, $p = .008$, 95% CI [2.05, 13.50], such that participants who ate from a large portion size ($M = 65.07$, $SD = .14.86$) judged the vignettes as significantly more wrong than participants who ate from the small portion size ($M = 60.09$, $SD = 12.39$). The R^2 of the model was .10.

An exploratory analysis of the effect of the interaction between portion size and amount of chocolate eaten on the moral judgement of vignettes was also conducted. The regression model showed that there was no significant interaction effect between portion size and amount eaten, $\beta = -.047$, $SE = .14$, $t(84) = -.34$, $p = .73$, 95% CI [-.31, .22], $R^2 = .07$.

To assess whether there was a difference in judgements between moral foundations, linear regression analyses for each foundation was run separately. Portion size was controlled for in each analysis. To address the inflated rate of Type II error due to multiple comparisons, Bonferroni-Holm corrections were applied. The results showed a negative relationship between chocolate consumption and moral judgements within the Care foundation, and a trend towards

a relationship within the Fairness foundation. No other signification relationships were found between the chocolate consumption and the other moral foundations (see Table 3.2)

For the Care vignettes, several were related to body-shaming, which might have been driving the relationship between the chocolate consumption and the Care foundation. However, the Care foundation remained significantly correlated with chocolate eaten after the body-shaming vignettes were separated out β = -.15, SE = .06, t (85) = -2.51, p = .05, 95% CI [-.27, -.03].

Table 3.2

Linear regression results for chocolate consumption (g) and moral foundations overall and separately for each foundation.

Moral Foundation	β	SE	t	p	95% CI
Across moral foundations	-.12	.06	-1.94	.05	-24, .00
Care	-.17	.06	-2.83	.04	-.29, -.05
Fairness	-.15	.07	-2.26	.06	-.29, -.02
Loyalty	-.18	.09	-1.23	.10	-.37, .01
Authority	-.12	.09	-1.32	.26	-.31, .06
Sanctity	-.07	.08	-.91	.43	-.24, .09
Liberty	-.02	.07	-.25	.81	-.15, .12

Table 3.3

Linear regression results for moderation analyses between restrained eating and chocolate consumption (g) on moral judgement overall and separately for each moral foundation.

Moral Foundation	β	SE	t	p	95% CI
Across moral foundations*Restrained Eating	.09	.08	1.11	.48	-.07, .26
Care*Restrained Eating	.14	.08	1.69	.44	-.02, .30
Fairness*Restrained Eating	.13	.09	1.49	.44	-.04, .31
Loyalty*Restrained Eating	-.01	.13	-.10	.92	-.27, .24
Authority*Restrained Eating	.16	.12	1.32	.44	-.08, .41
Sanctity*Restrained Eating	.09	.11	.79	.61	-.13, .31
Liberty*Restrained Eating	.04	.09	-.47	.75	-.14, .22

3.4.4 Hypothesis 2: Restrained eating moderates this relationship.

In order to test whether restrained eating moderated the association between amount of chocolate eaten and the harshness of moral judgement, regression models were carried out on

the harshness judgements of the foundations overall and separately. P-values were adjusted with Bonferroni-Holm corrections and the portion size variable was kept in as a control. No statistically significant interactions between chocolate consumption and restrained eating were found on any moral foundation or overall. See Table 3.3 for an overview of test statistics.

3.5 Discussion

3.5.1 Summary of findings

The results of Study 1 revealed no statistically significant effect of portion size on chocolate consumption, but portion size was associated with moral judgement. Participants who were given the large portion size were also found to judge the moral transgressions as more wrong, while those who were given the small portion size were also found to be more lenient. There was a negative correlation between chocolate consumption and moral judgements. This means that the more chocolate participants ate, the less wrong they thought other people's moral wrongdoings were, or the less chocolate they ate, the harsher they were in their judgements. Because the results are correlational, it could also mean that the harsher participants judged others' wrongdoings, the less chocolate they ate. For each individual moral foundation, there was only a significant relationship between chocolate consumption and care, and a trend towards significance for fairness and loyalty. Finally, restrained eating did not moderate any of the associations.

The finding that portion size did not predict amount of food consumed is contrary to previously established findings (Hollands et al., 2015). It could be that the voluntary nature of the consumption, in which participants did not have to eat any chocolate, meant that a larger proportion of participants did not eat any chocolate. The role of portion size in this type of scenario is not well established. The majority of studies require participants to eat some of the food, to answer questions about characteristics of the food (e.g. Argo, & White, 2012; Cavanagh, Vartanian, Herman & Polivy, 2014), or the portions are varied in situations where participants would eat food in any case, such as in a restaurant (Diliberti, Bordi, Conklin, Roe & Rolls, 2004) or at mealtimes (e.g. Ahn, Han, Kwon & Min 2010; Burger, Fisher & Johnson, 2012; Jeffery et al., 2007; Koh & Pilner, 2009; Levitsky & Youn, 2004; Rolls, Morris & Roe, 2002, Wansink, van Ittersum & Painter, 2004). In these cases, food consumption is either necessary to complete the set task or in accordance with the situation, i.e. one eats food at meals such as dinner or lunch. Another study using a similar setup as the current study, where participants were told they could eat some M&Ms if they wanted while they watched a TV

show, found no difference in consumption between the two portion sizes (Marchiori, Corneille & Klein, 2012).

No effect of portion size on consumption was found, and there was no interaction between portion size and amount eaten on the judgement of moral transgression. Rather, the results showed that portion size was associated with moral judgement. Participants who were given a large portion size were also harsher in their moral judgements than those who were given a small portion size. This would seem to go against the negative correlation between actual consumption and moral judgement. There could be several explanations for this finding. Because portion size did not affect the amount of chocolate consumed, it is possible that the association between portion size and moral judgement is simply down to chance. It could also be due to a failure of randomisation on an explanatory variable that was not measured. Alternatively, it could be that a large portion size might make participant believe they have eaten proportionally less chocolate than a small portion size because their intake would be less noticeable in the bowl. If one piece of chocolate is taken from a bowl containing a large amount it will make less of a dent than if it is taken from a bowl with a small amount. It also follows that in the later situation, participants could be more able to gauge their food intake. When participants then perceive they have eaten less from the large portion size as opposed to more from the small portion size this should influence their moral judgement in line with the negative relationship between consumption amount and harshness of judgement. Another explanation could be that a small portion size might invite thoughts of moderation, while a large portion size could bring about thoughts of gluttony and excess. The portion size could set a standard for consumption (Steeinhuis & Vermeer, 2009), making participants think the average portion is larger or smaller depending on the condition. Thus, a large portion size could make participants believe the average person would eat a larger amount, and when they do not they could feel more morally superior, which could influence their judgements. However, these interpretations would need further testing.

The finding that amount of chocolate consumed was negatively associated with harshness of moral judgement can have several meanings, due to the correlational nature of the test. First, it could be that participants' chocolate consumption led to changes in moral judgement. This would be in line with the study by Eskine (2013) where she found that being exposed to healthy food made participants' moral judgements harsher than being exposed to unhealthy food. Building upon the findings by Zhong et al. (2010) in which participants who cleaned themselves

also felt morally superior and subsequently gave harsher moral judgements, it is possible that a similar process is taking place in the current study. In the western dieting context pride is often presented as a consequence of resisting unhealthy temptation and it has also been found to be associated with resisting in people with eating disorders (Skårderud, 2007). Furthermore, as seen in Chapter 2, people often view those who consume healthy food as 'better' people than those who consume unhealthy food (Stein & Nemeroff, 1994). Taken together, it is possible that participants' chocolate consumption was negatively related to their own positive self-concept, which in turn may have influenced how they viewed others' wrongdoings. Participants might have reframed others' wrongdoings as less bad to feel better about themselves. On the other end of the consumption scale, it is possible that participants who consumed a large amount of chocolate might have felt disgusted at themselves making them judge others' transgressions less severely. This would go in line with the findings of Olatunji et al. (2012) presented in the introduction and the theories of moral intuition (Haidt, 2001) and affect-as-information (Schwarz, 2010).

At the same time, it is possible that severity of moral judgement affected chocolate consumption instead. Drawing on the disgust literature presented in the introduction, it could be that the more wrong participants thought the behaviour presented in the moral vignettes was the more disgusted they felt. Several strands of research have shown that moral transgressions can trigger feelings of disgust (e.g. Rozin, Lowery, Imada & Haidt, 1999; Tybur, Lieberman & Griskevicius, 2009). Feeling disgusted is most likely an appetite suppressant (Legget, Cornier, Rojas, Lawful & Tregellas, 2015), thereby possibly reducing the amount of chocolate participants ultimately consume. Finally, a third interpretation of the relationship could be that people who eat a certain amount of chocolate also judge moral transgressions in a certain way, with no causal relationship between the two. Instead, a third variable could be responsible for both chocolate consumption and moral judgement. Therefore, to establish a causal relationship, further research should be carried out.

Not only was chocolate consumption associated with moral judgement across moral foundations when controlling for differences in portion sizes, but consumption was particularly associated with judgements of care and fairness transgressions. There could be several explanations for this. First, it is possible that the sample size was not sufficiently powered and that these differences are spurious findings. Second, if the differences in moral foundations are reflections of an underlying relationship, there could be two potential reasons. It has been

shown that people from western cultures are more sensitive to transgressions of care or fairness (Haidt & Graham, 2007). This is theorised to be the case for WEIRD (western, educated, industrial, rich and democratic) individuals in particular, which would describe the majority of the current sample (Henrich, Heine & Norenzayan, 2010). In this case, if there is an association between unhealthy eating behaviours and morality, it could be that chocolate consumption affects issues already included within participants' moral domain. Alternatively, the relationship between chocolate consumption and care could be explained by the idea that maintaining a slim figure and being healthy is part of the concept of the 'good person' (Stein & Nemeroff, 1994). In women, it has been shown that restrained eating is associated with a desire to put other people's care in front of one's own, a stereotypical image of a 'good woman' (Schei et al., submitted). If participants are restraining their own intake by eating less chocolate, it could be that they subsequently find harm to others more wrong.

3.5.2 Strengths and limitations of the current study

In comparison to the study by Eskine (2013) that used exposure to healthy or unhealthy food, the current study used actual food consumption. From her study it is unclear how exposure to certain food types would influence moral judgement. The results of the current study suggest that participants might imagine themselves eating the food, or otherwise engaging with it, which in turn influenced their judgement of other people.

However, because the relationship between chocolate consumption and moral judgement was correlational, it is not possible to make any conclusions with regards to causality. It is unclear whether the relationship is caused by different amounts of chocolate eaten, or whether some other underlying characteristic distinguishing the participants who ate a large vs. a small amount is responsible for the change in moral judgement. One of these characteristics could be tendency to restrain food intake, such that those who regularly restrain their food intake show different moral judgements than those who do not. The results did not reveal such a moderation by restrained eating. However, the study was likely underpowered to detect a significant moderation effect of restrained eating. Furthermore, the restrained eating measure was given at the end of the session. Although this was done to not cause any suspicion that the chocolate was part of the study, it is possible that having already been faced with a consumption choice changed participants' responses on the questionnaire. Thus, it might not have been a valid measure of an individual characteristic. Alternatively, other characteristics that might explain an association between chocolate consumption and moral judgement could be a

proclivity towards a healthy lifestyle that is not captured by the restrained eating measure: for example, those who tend to think unhealthy eating is wrong. As such, they should show temperance in chocolate consumption and might be more sensitive to moral transgressions in general, thus judging others more harshly. Order of moral vignettes presentation was not recorded in the current study. This would have been a useful variable to assess potential causality, by analysing whether moral judgements changed over time as participants consumed more chocolate. Future studies should include such a variable so that this link can be explored.

Similarly, although the results of the study would be in line with the affect-as-information (Schwarz, 2010) and moral intuition (Haidt, 2001) theories, affect was not measured directly, and it is unclear whether participants experienced certain emotions that could have influenced their judgements or food consumption. Future experiments to establish the causal direction of the effect should additionally measure affect to further understand how food consumption and moral judgements affect each other. However, it would be paramount to not draw participants attention to the reason for their affective reaction, as Schwarz and Clore (1983) previously found that when the source of the affect is known it no longer affects judgements. This could be controlled for by using an implicit measure.

A limitation of the current study is the sample. Even though the sample size was sufficient to detect previously found effect sizes, it was not large enough to test moderation analyses. Thus, the moderation analyses reported here were exploratory in nature. The participants were also recruited from a student population – sometimes described as WEIRD (western, educated, industrial, rich and democratic, Henrich et al., 2010). This population differs on a range of characteristics, such as moral judgement discussed above. This means that the findings cannot be generalised beyond this group.

3.6 Conclusions and the next chapter

The results suggest that chocolate consumption and moral judgement are associated in a student population, but further research is needed in other populations. Further research is also needed to establish whether this association is causal and if so, the direction of causality. Study 1 focused on moral judgement, which is not equivalent to moral behaviour. In exploring this further, the next chapter presents Study 2, which tested the effect of recalled unhealthy eating behaviour on prosociality.

CHAPTER 4

Study 2

Atoning Past Indulgences:
Recalling a past overeating event and
its impact on moral compensation

Summary

Background

Previous research showed that moral failures increase compensatory behaviours such as increasing prosociality and self-punishment, as strategies to re-establish one's moral self-image. Do similar compensatory behaviours result from recalling unhealthy eating episodes? It has been found that recalling an overeating event led participants to want to physically 'wash the sin off their hands' by selecting cleansing products (Sheikh et al., 2013) and to spend longer on a painful cold-pressor task (Schei et al., submitted). The current study examines whether recalling an overeating episode might also leads to increased prosocial efforts.

Methods

Sixty female participants took part in a laboratory-based experiment on 'life events and episodic memory'. Participants were randomly allocated to one of two recall groups: overeating event or neutral event. After their written recall, participants believed they would complete an episodic memory task on a computer. When the computer task ostensibly failed, participants were paid and told they were free to leave. Upon exiting the testing rooms, they were asked whether they would be willing to help the experimenter with a different task, involving a long mathematics questionnaire. Helping behaviour was recorded as time spent on the mathematics questionnaire.

Results

All participants said yes to helping with the mathematics questionnaire. As predicted, participants recalling an overeating (vs. neutral) event provided more help, $t(58) = 3.60$, $p < .001$, $\eta^2 = .18$, 95% CI [5.42, 19.13].

Conclusion

In sum, recalling an overeating episode elicited compensatory prosocial behaviour in terms of helping the experimenter with a mathematical questionnaire. In conjunction with previous research showing that recalling an overeating event leads to increased levels of moral emotion such as guilt and shame and subsequent compensatory efforts, these results provide support for the hypothesis that overeating is perceived as a transgression of moral standards.

4. 1 Background

As outlined in Chapter 2 (section 2.4.2.1), people who had committed an unethical act were found to behave more prosocially thereafter (e.g. Carlsmith & Gross 1968; Ding et al., 2016; Jordan et al., 2011). There is some evidence that overeating leads people to compensate for their behaviour by acting in moral ways more generally. For instance, recalling an overeating event has been shown to increase a desire to physically 'wash the sin off one's hands' by choosing cleansing products over non-cleansing products (Sheikh et al., 2013). Recalling an overeating event has also been found to lead participants to inflict more pain on themselves in a cold-pressor task (Schei et al., submitted). In Study 1 (Chapter 3), it was found that chocolate consumption was negatively associated with moral judgement, with those eating smaller amounts of chocolate also judging moral scenarios to be more morally bad than those who ate larger amounts of chocolate and vice versa. In sum, food consumption does not seem to be morally neutral, but rather it seems to have judgemental and behavioural consequences in the moral realm. Thus, the aim of the current study was to investigate whether people act more prosocially because of unhealthy eating practices.

Prosocial behaviour is a broad classification of acts that are beneficial to others but may incur a cost to the self. Examples of prosocial behaviour can be varied and include actions such as offering to help a friend move, sharing your food with a sibling, assisting a stranger whose car has broken down, donating money to charity or recycling containers for environmental reasons. Several subgroups of prosociality have been identified; from altruism and volunteerism to helping and cooperation (Schroeder & Graziano, 2015). In much of the social psychology literature, however, prosociality has been operationally defined as one person helping another person (Schroeder, Penner, Dovidio & Piliavin, 1995).

Similarly, in the current study prosociality was operationally defined as the participant helping the experimenter. Helping was assessed using a paradigm developed by Bartlett and DeSteno (2006) and later used in several experiments (e.g. Schnall et al., 2010; Schnall & Roper, 2012; Ding et al., 2016). In the paradigm, participants are given the chance to help the experimenter with a tedious task: a questionnaire consisting of 68 multiple choice mathematics problems. Because research has shown that many people find mathematics both boring and difficult (Brown, Brown & Bibby, 2008; Onion, 2004), filling out the questionnaire would constitute a cost to the participant. In addition, using a paradigm that allows for helping behaviour rather than intentions to help has several advantages. Although intentions

are a pretty good indicator of later behaviour, people's intentions are not a perfect predictor of the behaviour that they might carry out (see Sheeran 2002 for a meta-analysis of meta-analyses). Manipulations that change intentions have also been found to have smaller effects on actual behaviour (Fife-Schaw, Sheeran, & Norman, 2007; Webb & Sheeran, 2006). Furthermore, reported intentions could be influenced by impression management motives rather than a desire to help.

Why would people carry out a behaviour that is beneficial to another person but at times costly to themselves? There are several theories as to why people behave prosocially, with the majority classified as either altruistic or egoistic. Batson (2011) helpfully distinguished between these two types of prosociality depending on the primary target of the behaviour: the performer or the receiver. According to him, in altruistic theories, the receiver's welfare is in focus and the performer is understood to be driven by their experience of empathic concern for the receiver. In egoistic theories, the focus is on the performer and the motivations are to increase personal welfare or decrease personal adversity. Cialdini's negative state relief model (e.g. Cialdini, Darby & Vincent, 1973; Cialdini et al., 1987) posits that people are motivated to engage in prosocial behaviours because they want to reduce negative emotional states such as sadness, distress and guilt. He found that people who experienced negative mood states after having harmed another person were more likely to offer help than those whose negative mood states were improved before being given the chance to help (Cialdini et al., 1973).

One such negative emotion, guilt, has been particularly researched in terms of motivating prosocial behaviour. In comparison to other negative emotions, guilt is often triggered by a failure to uphold a personal or social moral standard and drives the individual to make amends for their wrongdoings (Ortony, Clore & Collins, 1988; Tangney & Dearing, 2002; Tangney et al., 2007) by confessing, apologising or acting prosocially (e.g. Baumeister, Stillwell & Heatherton, 1994; Baumeister, Stillwell & Heatherton, 1995; De Hooge, Zeelenberg & Breugelman, 2007; Ketalaar & Au, 2003; Nelissen, Dijker & De Vries, 2007).

Guilt has been shown to accompany unhealthy eating behaviours (e.g. Kuijer & Boyce, 2014; Steenhuis, 2009), especially in situations where the individual believes they have eaten the 'wrong' type of food (e.g. chocolate, Benton, Greenfield & Morgan, 1998) or too much food (Schei et al., submitted; Sheikh et al. 2013). For example, showing images of chocolate has been found to trigger feelings of guilt in dieters but not in non-dieters (Fletcher, Pine, Woodbridge

& Nash, 2007) and eating a chocolate bar was followed by guilt, while eating an apple was not (Macht & Dettmer, 2006). In Sheikh and colleagues' (2013) studies and Schei and colleagues' (submitted) studies, guilt was also elicited by recalling a past overeating event in comparison to a neutral event. However, the current study did not directly assess participants' mood states, because drawing attention to how they are feeling might attenuate any possible effect of the overeating manipulation on helping behaviour (Schwarz & Clore, 1986). Furthermore, it has been shown in two separate studies that recalling an overeating episode results in increased levels of guilt (Schei et al., submitted; Sheikh et al., 2013).

In line with previous research (Schei et al., submitted, Sheikh et al., 2013) the current study uses memory recall in lieu of actual overeating behaviour. Recalling a specific life event is a method that has been used consistently in the moral research literature (e.g. Barkan, Aval, Gino & Ariely, 2012; Bastian et al., 2012, Estrada-Hollenbeck & Heatherton, 1997; Mulder & Aquino, 2013, Jordan et al., 2011; Zhong & Liljenquist, 2006). Asking participants to recall an overeating memory has been previously demonstrated to trigger feelings of guilt in participants (Schei et al., submitted; Sheikh et al., 2013) and the autobiographical method minimises the ethical considerations associated with guilt-related events (e.g. Baumeister et al., 1995; McGraw, 1987; Tangney, 1992). Furthermore, in comparison to other methods such as making participants copy a story involving others' unethical behaviour (Zhong & Liljenquist, 2006, Study 2), recalling a personal event ensures that any consequences that occur are due to behaviour carried out by the participant, rather than a judgement of others' behaviour. There is evidence suggesting that recalling another person's unethical act has little or different effects on one's own later moral behaviour (Conway & Peetz, 2012; Jordan et al., 2011; Sachdeva et al., 2009). It has been suggested that remembering behaviour performed by other people activates a different process because it is not self-relevant (Conway & Peetz, 2012; Sachdeva et al., 2009).

By using the recall of an overeating event rather than making participants eat large amounts of food circumvents potential confounds related to individual difference in blood-glucose levels and prosociality. Xu and colleagues (2014) found that when they gave one set of participants a sugary beverage and another set of participants a diet beverage (which does not increase blood-glucose), the sugary beverage group felt guiltier after a game in which their errors harmed another person and as a consequence were more likely to help another participant. This implies

that available blood glucose might be necessary for prosociality and using a recall task keeps the groups more comparable in terms of blood glucose levels.

Although specific advantages of using the autobiographical method exist, the method also has the disadvantage of memories being biased through distortion and self-serving motives. Recent research suggests that memories of moral deeds are more vivid, detailed and fade less over time than memories of moral transgressions (Kouchaki & Gino, 2016). Negative memories of past behaviour can often conflict with the person's motivation to uphold a positive self-image (Alicke, 1985) and are likely suppressed through a process of motivated forgetting (Anderson & Hanslmayr, 2014). Kappes and Crockett (2016) propose that this motivated forgetting of immoral actions could to some extent explain why remembering ethical acts leads to stronger consistent moral behaviour than remembering unethical acts. As such, in the current study the group recalling an overeating event, previously established as a negatively valenced memory (Schei et al., submitted, Sheikh et al, 2013), was compared with a neutral control rather than a memory of a positively valenced event. However, a neutral event can still be positive in comparison to a negative event. To assess the contribution of valence, each recalled event was coded for general positive and negative affect by two independent research coders.

Only female participants were recruited to take part in this study for two reasons. First, the gender of the experimenter (female) might interact with that of the participant – with existing evidence suggesting greater helping behaviour from males when the experimenter is female (Eagley & Crowley 1986). This would have reduced the power of the study to detect an effect. Second, the behaviour of interest may be unique to women. For example, Sheikh et al., (2013) found that the effect of recalling an overeating event on moral cleansing was only found among women.

In summary, moral transgressions have been found to lead to guilt and subsequent compensatory prosocial actions. Overeating has also been shown to lead to guilt and compensatory actions such as cleansing and self-punishment. Thus, based on the previous literature reviewed here and in Chapter 2, it was predicted that in the current study participants recalling an overeating memory would help the experimenter with the mathematical questionnaire for a longer time than those recalling a neutral control memory.

4. 3 Methods

4.3.1 Participants

Sixty-three female students from the University of Cambridge participated in the study in exchange for monetary compensation of £7.50. One participant withdrew from the study before completion and two participants were removed due to guessing the purpose of the study, leaving a sample of 60. Based on the large effect size from Schnall and colleagues (2010, Study 2), $\eta^2_p = .32$, this sample gave .99 power at a .01 level of significance to detect a significant effect of type of memory recall on time spent on the mathematical questionnaire.

4.3.2 Manipulation

Participants were randomly assigned to recall a specific time they overate or a neutral memory, with instructions taken from Sheikh et al. (2013) and Schnall et al. (2010), respectively. The recall instructions were the same apart from where the overeating recall instructed participants to "please think back to a time you *ate too* much" while the neutral recall read "please think of your typical journey to *work/place of study*". Participants were told to describe the memory in as much detail as possible and that they would have eight minutes to do so.

4.3.3 Procedure

The study procedure was approved by the Cambridge Psychology Research Ethics Committee at the University of Cambridge (ref. Pre.2013.91). A female experimenter tested participants individually in a laboratory. Participants were given a cover story that the study concerned episodic memory, involving the recall of an autobiographical memory and then carrying out a memory task on a computer. Importantly, it was specified at recruitment that the study would last one hour. Participants were randomly assigned to recall either an overeating memory or a neutral memory and were given eight minutes to write down their assigned memory. The experimenter was not present while the participants completed the memory task to ensure the potentially sensitive memories remained as anonymised as possible. The experimenter was also blind to group assignment. Once the allotted time was up, the experimenter returned to the room and went on to initiate the ostensible episodic memory task on a computer. The experimenter unsuccessfully tried to launch the computer task three times with each time resulting in a technical error that had been pre-programmed.

When the task did not launch, participants were paid and told they were free to leave. Upon gathering their things, the experimenter asked as an apparent afterthought whether they would be willing to help with a separate study in which the experimenter needed to establish some mathematical norms. The experimenter went on to explain that the mathematics questionnaire was unfortunately rather long and boring, but any help the participant could offer would be appreciated. It was emphasized to participants that there was no obligation to help and that they were free to stop whenever they wanted. If participants complied with the request for help they were given a questionnaire consisting of 65 mathematics problems. The experimenter remained in the room under the pretence of attempting to fix the technical computer error and secretly timed participants' work. However, the experimenter did not face the participant and could not see how many mathematical questions they had answered. This was done to minimise social desirability effects. The timer was stopped when participants indicated that they did not want to continue. At the end participants were probed for suspicion, debriefed and thanked for their time.

4.3.4 Measures

4.3.4.1 Primary outcome measure

Helping was operationally defined as the time participants spent on a booklet consisting of 65 mathematical questions (Bartlett and DeSteno, 2006). The total possible time to spend on the mathematics tasks was estimated to take no longer than what remained of the study session after the recall task (40 minutes).

4.3.4.2 Secondary outcome measures

The number of items attempted was recorded, along with the number of items answered correctly.

4.3.4.3 Control variable

To rule out a potential confound we also assessed enjoyment of mathematics on a scale from 1("Not at all") to 7 ("Very much so").

4.3.4.4 Affect coding

A procedure developed by McAdams and colleagues (2008) to analyse open-ended life narratives was used to guide the coding of general negative and positive affect in the written memory recalls provided by participants. Any positive and negative emotional words or

pictures were used to guide the rating. All narratives were coded by two independent coders on the presence of the theme on a scale ranging from 1 ('very little presence') to 7 ('very much presence'). The ratings were averaged across the two coders and had acceptable interrater reliability, ICC = .70-.78.

4.4 Data analysis

All statistical analyses were carried out in R (version 3.3.3). The effect of memory recall on the time spent helping the experimenter with the mathematical questionnaire was analysed with an independent t-test. Analyses of effect of memory recall on the secondary outcome variables (number of items attempted and solved) and the difference between the two types of recall in terms of coded affective tone were also analysed using independent t-tests. In cases where test-assumptions were not met, transformations were first attempted. When transformations did not correct violation of assumptions, a non-parametric test was used instead.

4.4.1 Assumptions

The key dependent variable (time spent on the mathematics questionnaire) was assessed in both conditions for normality. The variable was found to meet assumptions of normality (overeating, $W = .99$, $p = .99$, neutral: $W = .95$, $p = .15$), and the variance did not differ significantly between groups, Levene's test $F(1, 58) = 1.61$, $p = .21$. The variables detailing the positive emotional valence of the recalled memory for each group (overeating, $W = .54$, $p <. 001$, neutral: $W = .76$, $p < .001$) and negative emotional valence for the overeating group (overeating, $W = .78$, $p <. 001$, neutral: $W = .92$, p = .03) did not meet assumptions of normality. No attempted transformation (square root, logarithm, cube root, box cox) was successful, thus a non-parametric test was chosen (Mann-Whitney-Wilcoxon test). All other test assumptions were met for the remaining analyses.

4.4.2 Randomisation checks

To make sure the participants were randomly allocated, differences between the two groups on relevant variables were assessed. It was found that participants in the two groups did not differ in terms of age ($t(57.78) = .63$, $p = .53$) or mathematics enjoyment, ($t(55) = .53$, $p = .59$). To test whether ethnicity differed between the two groups, a Fisher's exact test was conducted due to eight out of ten cells having a minimum expected frequency below 5. The test showed that ethnicity did not differ significantly between groups, Fisher's exact test, $p =$

.88.

4.5 Results

4.5.1 Participants

Participants were between the ages of 18 and 35 (M = 21.7, SD = 3.16). 71% identified as White, 15% as East-Asian, 4% as Asian-Indian, 6% as Mixed; 4% did not disclose their ethnicity.

4.5.2 Primary outcome measure

All participants offered to stay behind and help the experimenter. An independent samples t-test tested whether participants who recalled an overeating memory would help for longer than those who recalled a neutral event. The overeating group (M = 38.03, SD = 12.13) spent significantly more time on the mathematics questionnaire than the neutral group (M = 25.76, SD = 14.20), t (58) = 3.60, p < .001, η^2 = .18, 95% CI [5.42, 19.13]. See Figure 4.1 for the difference between the two groups on helping time and Table 4.1 for a breakdown of descriptive statistics and results.

Every participant had 40 minutes left of their allocated study session when they were free to leave. This means that staying beyond the 40 minutes would constitute a higher cost to individuals. As an exploratory analysis, looking at the number of participants who stayed beyond 40 minutes in each group revealed that more participants in the overeating group worked beyond the total study allocated time (n = 16) than in the neutral group (n = 6), χ^2 (1) = 4.04, p = .04, OR = 3.10, thus incurring a higher cost.

Table 4.1

Descriptive statistics and t-test results showing the difference between recall groups on the time spent on the mathematical questionnaire, the number of questionnaire items attempted and the number of questionnaire items solved correctly.

	Overeating M (SD)	Neutral M (SD)	t	df	p	η^2	95%CI
Time (min)	38.03 (12.13)	25.76 (14.20)	3.60	58	.001	.18	5.42, 19.13
No. items	52.80 (11.34)	41.48 (14.69)	3.05	58	.004	.14	3.54, 17.08
No. correct items	40.30 (10.65)	31.33 (12.29)	2.62	58	.01	.11	1.86, 14.06
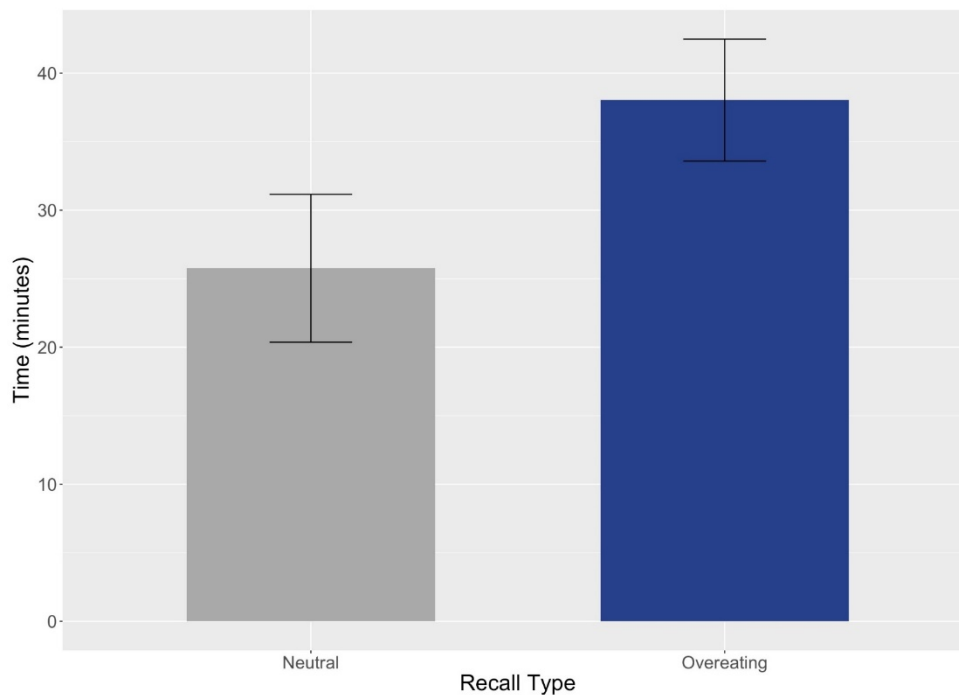
Figure 4.1. Minutes (mean (95% confidence intervals)) participants spent helping.

4.5.3 Secondary outcome measures

Number of items attempted and solved

It could be that increased completion time in the overeating group was not a reflection of helping, but due to exhaustion after recalling an emotional memory. Indeed, recalling an overeating event has previously been shown to elicit negative feelings such as guilt, shame, disgust and anger at the self (see Study 2, Sheikh et al., 2013) and negative emotions have been found to impair participants' working memory and problem solving capacity (Cavalera & Pepe, 2014). However, independent t-tests showed that the overeating group tackled more items ($M = 52.80$, $SD = 11.34$) than the neutral group ($M = 41.48$, $SD = 14.69$), $t(58) = 3.05$, $p = .004$, $\eta^2 = .14$, 95% CI [3.54, 17.08] and answered more questions correctly ($M = 40.30$, $SD = 10.65$) than the neutral condition ($M = 31.33$, $SD = 12.29$), $t(58) = 2.62$, $p = .01$, $\eta^2 = .11$, 95% CI [1.86, 14.06].

4.5.4 Qualitative analyses of emotions

Each written memory was coded for negative and positive valence. Several narratives did not have any overall valence and were simply either a list of what was eaten or a neutral recount of a daily commute. However, some narratives gave clear emotional accounts, with examples of positive and negative events in both conditions. In the overeating condition, several participants described negative feelings associated with the eating event. One participant described "I felt

sick stuffing myself – physically and emotionally disgusting (all the bad negative thoughts towards myself and my own body)…" However, several participants also gave details of what was a happy overeating occasion, such as "The food was so tasty that I felt extremely satisfied and excited to be eating a dish which would otherwise be too expensive for me to order. (…) Overall, I felt really happy. I'm a person who lives to eat, not eats to live."

In the neutral condition, in which participants were asked to describe their daily commute, many people recounted a daily journey without emotional content. For some, a specific event stood out, which was usually of an emotional nature. For example, one participants recalled a positive journey to Cambridge in which she was "Looking up at the board on the wall to see if the train to Cambridge was listed I recall a sense of anticipation: such that I was so looking forward to returning to share the experiences I had heard about with committee." Others recalled a journey with a more negative twist, "It was pitch black outside and I felt a sense of foreboding and anticipation, wondering what kind of shift would be in a store for me tonight".

Table 4.2

Descriptive statistics and intraclass correlations of positive and negative affect in recalled overeating and neutral memories

Affect	Overeating *M* (*SD*)	Neutral *M* (*SD*)	ICC
Positive Affect	1.19 (1.54)	1.56 (1.19)	.70
Negative Affect	2.07 (1.81)	1.88 (1.4)	.78

Table 4.2 presents the means and standard deviations for the overeating and neutral condition, along with intraclass correlations for the coding by two independent raters. To assess whether the increased helping behaviour in the overeating group was associated with a general change in affect, a Mann-Whitney-Wilcoxon test was carried out on the difference between the two conditions. The results revealed that the two groups did not differ in terms of general positive affect, $W = 506.5$, $p = .12$, and general negative affect, $W = 497$, $p = .22$.

An exploratory analysis was carried out to assess whether there was an association between memory valence and time spent helping. Neither positive affect, $r = .077$, p = .056, 95% CI [-.18, .33], nor negative affect, $r = -.15$, p = .25, 95% CI [-.40, .11] was significantly associated with helping time.

4.6 Discussion

4.6.1 Summary of findings

The results of the study support the hypothesis that recalling an overeating event increases prosocial behaviour. Participants asked to recall a time they overate helped for 12 minutes longer than those who were asked to recall a neutral memory, a statistically significant difference. Analyses also showed that not only did participants in the overeating condition help for longer but they also incurred a higher costs of time spent in the session: All participants had 40 minutes left of their study session to help with the mathematics questionnaire and significantly more participants in the overeating group stayed beyond the allocated time.

It could be argued that participants who recalled an overeating memory became more distracted and exhausted than those recalling a neutral memory. This side-effect could have made participants slower at solving mathematical problems and responsible for the increased time. However, participants put in more effort by correctly answering a greater proportion of the mathematical questions. This rejects the alternative explanation that increased time was due to poorer problem solving ability. Thus, the current findings indicate that among a female-only student sample, unhealthy eating behaviours such as overeating induce increased prosociality.

Consequently, the results add further evidence to the theory that moral behaviour is regulated via a balance model. When unethical acts are carried out, they are later compensated for by ethical behaviour (Jordan et al., 2011). Specifically, the findings presented here point to overeating having acquired similar connotations as other immoral behaviour. Overeating in this sample also leads to prosocial compensations in line with behaviour such as causing another individual pain (Carlsmith & Gross, 1969; Cialdini, Darby & Vincent, 1973), ruining an experiment due to negligence (Regan, 1971) or recalling general immoral activities (Jordan et al., 2011). It also provides further evidence to the distinction between theories proposed to explain the moral balance model: moral credits and moral credentials. Both models are moral balance theories but differ in the mechanism proposed to be driving the balancing. In the moral credits theory, the participants have a 'bank account' that contains moral credits, which can be drained or filled up. The aim is that the bank account contains a constant sum of credits, and the behaviour seen after either moral or immoral acts are understood to respond to a loss or acquisition of credits. This leads to filling up the account with moral behaviour after an immoral act has been committed, or licensing immoral behaviour through an excess of moral credits. In

comparison, the moral credentials theory explains a similar balancing of moral behaviours but proposes that the reason for the inconsistency of behaviour is that when an immoral act is carried out, the individual loses moral credentials in the eyes of others, or in contrast has an abundance of moral credentials when a moral behaviour has been enacted. In the current study, the participants were not observed by the experimenter when completing their overeating episode recall and their written material was anonymised. This goes some way to show that participants did not help for longer because they felt they had lost moral credentials in the eye of the experimenter, but rather lends support to a moral credits theory. However, further studies need to test this further, for example by manipulating the presence of an audience.

Although the overall function may be to wipe the slate clean and rebalance the moral scales, the mediating factors involved were not directly assessed. As reviewed in the introduction, there are many theories of what drives people to act prosocially. It is possible that the overeating recall prompted increased prosocial behaviours because participants wanted to reduce the negative emotions associated with doing something 'wrong'. In line with the negative state-relief model proposed by Cialdini and colleagues (1973), it could be argued that recalling an overeating event leads to increased general negative affect, causing participants to want to help the experimenter in an attempt to increase their positive mood. For example, in a study by Cialdini and Kenrick (1976), participants who were experimentally 'saddened' showed greater benevolence thereafter. In the current study, however, the written recalls in the overeating and neutral condition were not significantly different in terms of general negative affect This suggests that there was something about recalling an overeating event *per se*, rather than just a negative event, that resulted in the increased helping. Of course, it is possible that participants in the overeating group may have experienced a greater negative mood even if their written recalls did not reflect this.

Based on previous research using the same manipulation (Schei et al., submitted; Sheikh et al., 2013) it is likely that the women who recalled an overeating memory felt increased guilt, rather than a general negative mood. Guilt is categorised as a moral emotion and signals to the individual that they have broken a moral rule (Tangney et al., 2007). Research on guilt suggests a special relationship with compensatory tendencies and enacts reparative actions, including an urge to confess one's wrongs, apologise and attempt to reinstate one's moral status. Sheikh and Janoff-Bulman (2010) argued that guilt orients a person towards approaching the 'good'

through positive obligations such as helping others. The underlying mechanism in the current study is likely to be increased feelings of guilt triggered by the overeating event. However, because guilt was not measured in the current study this needs to be examined further.

4.6.2 Strengths and limitations

One strength of the current study was the use of a paradigm that provided participants with the chance to not only offer voluntary helping behaviour but also allowed a continuous measurement of helping, i.e. time. In comparison to research looking at intentions to help (e.g. Schnall et al., 2010, Study 1, Gino & Galinsky, 2012, Study 2 and 4), using a measure of behaviour circumvents questions about whether the intention will predict the behaviour (Baumeister, Vohs & Funder, 2007). However, one limitation of the use of a mathematics questionnaire is that participants might have been motivated by a need to demonstrate or test their own competency instead of a desire to help the experimenter. To test this alternative explanation, further research should be carried out with the use of a non-skill based measure of helping.

The use of a recalled overeating behaviour rather than real life food consumption has both benefits and limitations. One benefit is that by using recall of an overeating event rather than actual food consumption, differences in blood glucose levels did not vary systematically between the two groups. As discussed in the introduction, there is some evidence suggesting that available blood glucose, in comparison to depleted blood glucose levels, increases prosocial behaviour (Xu et al., 2014). For this reason, the finding that participants helped more after recalling an overeating memory cannot solely be explained by increased blood glucose in this group. A limitation of the manipulation was the large variety of memories recalled due to the open-ended instructions. Although they all described a time they ate what they perceived as 'too much', the appraisal of the behaviour ranged from positive to negative. This means that there is no direct evidence that it was an individual participant's judgement of wrongness that was driving their increased prosocial behaviour. However, it has previously been established that among female students, recalling an overeating memory triggers feelings of guilt compared to a more neutral memory. As such, the underlying factors for increased prosociality after overeating recall and the role of guilt, in particular, remains unknown and needs to be explored further.

A further limitation of the current study is the sample. Although the sample was powered to test for a significant difference between two groups in terms of time spent helping with the mathematical questionnaire, it is likely that the effect size used as a guide for sample size estimation (Schnall et al., 2010, Study 2) was larger than the true effect size (Button et al., 2013). Thus, further research needs to be carried out with a larger sample to establish the validity of the reported effect. Another limitation of the sample was that it comprised a female student-only sample. Although previous research has found that recalling an overeating memory only increased moral cleansing in a female sample (Sheikh et al., 2013), it is unclear from the current study whether increased prosociality after overeating recall would occur in the population at large. Research has shown that students are more likely to show eating disturbances and this prevalence has increased over time (White, Reynolds-Malear & Cordero, 2011). They are also more preoccupied with health and food consumption. An international survey carried out by Sodexo (2017) showed that students report healthy eating intentions at a higher rate than the global average. Even though this might not translate to actual healthy food consumption it signals a greater awareness and desire for healthy food. Studies have also found that individuals with a higher education have a lower average BMI than those without (Hermann et al., 2011). Together, these studies suggest that recalling an overeating memory might have different consequences in this sample than for the general population, who appear less preoccupied with food and health overall.

The design of the study was only able to assess whether recalling an overeating memory leads to increased prosociality. Although this could be indicative of overeating being construed as a moral transgression, it does not necessitate that it is. There could be other reasons why participants might have helped more in the overeating condition than in the neutral condition. For example, although the experimenter was not facing participants during the study, she was still in the room while they were completing the mathematics questionnaire. This means that there is a possibility that participants helped more due to affiliation affects. When people feel threatened, they are more likely to want to connect with others (Kulik & Mahler, 2010). It could be that the participants in the current study felt more threatened from recalling an overeating memory than a neutral memory and were more likely to seek affiliation with the experimenter by helping her for longer. Affiliation effects could be controlled for in future studies by not having an interpersonal helping measure. Furthermore, the next experiments in this study should assess directly whether participants judge unhealthy and healthier food to be different in terms of morality.

4.7 Conclusions and the next chapter

The results of Study 1 and Study 2 indicate that eating behaviours are not perceived as morally neutral among a student population. Rather, what and how much is eaten was found to have judgmental and behavioural consequences. Chocolate consumption was found to influence the harshness of moral judgements while memories of overeating motivated participants to behave more prosocially. In conclusion, the first section of this thesis provides some evidence that unhealthy eating behaviours have moral compensatory consequences.

In contrast to the focus on the moral consequences of unhealthy eating behaviours, the next section of the thesis focuses on the eating consequences of moralised food products. The overall aim is to assess the prevalence of moralised food products (Study 3) and the impact of moral food labels on desire, selection and consumption of the labelled food item (Studies 4, 5, 6 and 7). Study 3, reported in the next chapter, provides an estimate of the extent to which food is moralised in an everyday context by reviewing the frequency with which moral concepts have been used in food advertisements in women magazines over a 15-year period.

CHAPTER 5

Study 3

Moral concepts in food advertisements in UK women's magazines from 2002-2017: an analysis of content and change over time

Summary

Background. Moral language and imagery are sometimes used to promote and sell food (Griffin & Berry, 2003), but the frequency of this is unknown. The current study examined the presence of moral concepts in food advertisements in women's magazines published in the UK in 2002, 2007, 2012 and 2017.

Method. 17 magazines published in June in the years 2002, 2007, 2012, and 2017 were sampled and screened for food, non-alcoholic drink and nutritional supplement advertisements, resulting in 444 unique advertisements. Each advertisement was coded for the presence or absence of moral concepts as defined by Moral Foundations Theory or their likelihood of eliciting moral emotions. The healthiness of the products was also estimated, using (a) objective grouping of items by nutritional profile and (b) public perceptions.

Results. The percentage of food advertisements containing a moral concept was 29.50 % overall. The difference between the years (2002 = 29.06 %, 2007 = 31.82 %, 2012 = 32.14 %, 2017 = 25.49 %) was not significant, all ps > .1 Their use was also similar in adverts for food, non-alcoholic drinks and nutritional supplements, $\chi^2 (2) = 3.78$, p = .15. Neither healthiness grouped by (a) nutritional profiles, $\chi^2 (2) = .05$, $p = .98$, nor (b) public perception significantly predicted presence of moral concepts in advertisements, $\beta = .16$, $SD = .11$, $z = 1.42$, $p = .16$. The frequency of moral concepts present in advertisements varied across magazine types, $p = 0.009$, although pairwise comparisons showed that no comparisons were significantly different.

Discussion. Moral concepts were present in about one-third of food and non-alcoholic drink advertisements in women's magazines published in the UK, unchanged since 2002. Their presence did not differ by objective or subjective healthiness of the product or type of women's magazine.

5.1 Background

Study 2 and 3 showed that recalled and actual food consumption can have an influence on moral judgement and behaviour. To further assess the moralisation of eating, the current study is an exploratory analysis on the use of moral concepts in advertising for food, non-alcoholic drink and nutritional supplements. Moral concepts are sometimes used in everyday language about food and dieting (Mycroft, 2008; Spoel, Harris & Henwood, 2012): People are 'good' if they stick to a diet and 'bad' if they break it. This kind of language is also used by companies to brand their products, such as 'Innocent' smoothie, 'Halo top' ice cream or 'Divine' chocolate. Jean Kilbourne wrote a pertinent attack of food and non-alcoholic drink advertising aimed at women in 1994, highlighting the way food is often sold as both sinful temptation and as salvation. From her analysis, she found that unhealthy foods such as ice cream or chocolate was positioned as a decadent almost sexual indulgence, and the diet versions of such foods/drinks being marketed as the salvation.

In the same vein, in an analysis of Christian language and imagery in food advertisement, Griffin and Berry (2003) found that words such as 'heaven' and images of halos are used to market food in women's magazines in the UK. According to their analysis, the advertised food product is also often sold as salvation. However, the extent to which these moral concepts are used is unknown. Furthermore, moral concepts are not limited to Christian ideas. As discussed previously in Chapters 2 and 3, the common consensus in psychology is that the topics that people consider moral are multifaceted and include concerns such as care/harm, purity/sanctity and fairness/justice among others (e.g. Haidt & Joseph, 2004, 2007; Shweder et al., 1984, 1993). When such moral rules are either broken, or followed, certain emotions are likely to be triggered such as guilt, shame and pride (Tangney et al., 2007). Therefore, to extend the work of Griffin and Berry (2003) and Kilbourne (1994) the current study goes beyond Christian notions of morality and aims to perform a more comprehensive analysis of the use of moral concepts in food advertising.

To do so, the presence of moral concepts in food advertisements in UK women's magazines from 2002-2017 was measured. Examining advertisements is a commonly used method to explore societal trends in attitudes and beliefs (Dyer, 2015). Although much attention has recently been given to television advertising (Boyland et al., 2016), magazines remain a popular source of nutritional information (Cash, Desbrow, Leveritt & Ball, 2014), with the UK government highlighting magazines as a way to communicate information about diets

(Hansard, 2010). According to the National Readership Survey (October 2016 - September 2017), 71% of British people above the age of 15 years read magazines, 41% read women's monthly magazines and 23% read women's weekly magazines. This is a large proportion of the population that are exposed to advertisements for food, non-alcoholic drink and nutritional supplements. Furthermore, the foods and non-alcoholic drinks advertised in UK women's magazines often have a poor nutritional profile, contributing to an unhealthy diet (Adams & White, 2009; Adams, Simpson & White, 2011).

The study presented here specifically used women's magazines to examine the use of moral concepts in food, non-alcoholic drink and nutritional supplement advertisements. The term women's magazine is taken from the National Readership Survey. This includes celebrity magazines, cooking and food magazines, home and interior design magazines, supermarket publications and lifestyle, health and fitness magazines aimed at women. Women's magazines were chosen due to the larger proportion of food, drink and nutritional supplement advertisements in comparison to other types of magazine such as political, news or economics publications, or magazines traditionally marketed at men. Furthermore, by examining women's magazines a comparison can be made with previous analyses (Griffin & Berry, 2003).

People have become increasingly interested in what is healthy in recent years. For example, as seen in Chapter 2, Google searches for the term 'healthy' have increased by 50% since 2004. However, the available information on what is healthy is often unclear and often contradictory: Fat is presented as unhealthy but some diets such as the High Fat Low Carbohydrate diet argue for a large intake of high fat products. With a greater selection of food available, the choice is left up to the individual. Simultaneously, keeping healthy, or treating the body as a temple, has for a long time been understood as a virtue (see chapter 2 for a historical overview). The last ten years have also seen a rise in the health movement 'clean eating'. Like the Google searches for the term 'healthy', 'clean eating' have seen similar surges and subsequent falls (see Figure 5.1). As such, it is possible that the use of moral concepts in food advertisements has increased together with the interest in health. To test this, advertisements were sampled from the June edition of magazines from 2002, 2007, 2012 and 2017. A 15-year period was chosen to incorporate changes including both interest in 'healthy' and 'clean eating'. Only magazines every five years were sampled in order to make the number of advertisements to analyse feasible. The June edition was chosen out of convenience.
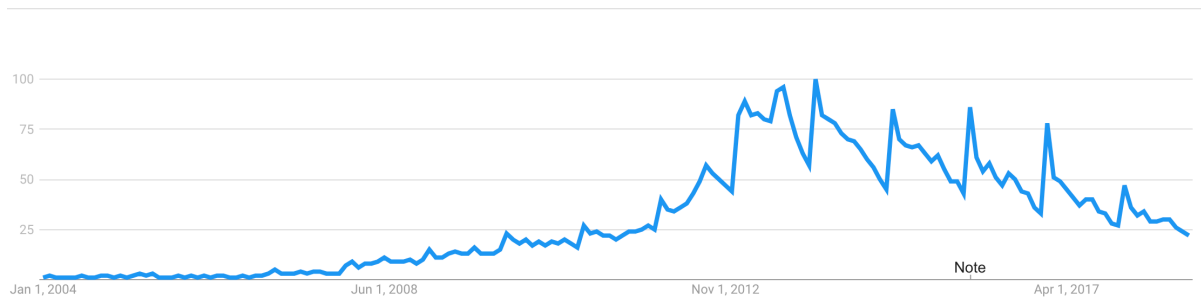
Figure 5.1. Relative change in worldwide Google searches for the term 'clean eating' from 2004-2017.

As seen in both Kilbourne (1994) and Griffin and Berry (2003), the use of moral concepts was often linked to the supposed healthiness of the product. A product would be presented as a healthier alternative by the use of Christian concepts such as halos – communicating that the product is 'innocent' or 'virtuous'. Thus, the current study also measured the healthiness of the advertised product (both objective and perceived) and whether the healthiness was related to the use of moral concepts. Both a subjective measure of healthiness, in which a group of participants were asked to rate how healthy they thought the product was, and an objective coding based on nutritional profiles was used. Using two measures of healthiness goes some way to address the often biased judgements of healthiness by the public. For example, cereal bars are often thought to be healthy while containing as much sugar as a chocolate bar (Vasiljevic, Pechey & Marteau, 2015). However, determining with certainty the objective healthiness of a food item is difficult. As such, a coding scheme developed by Johnson, Mander, Jones, Emmett and Jebb (2008) to roughly categorise products by healthiness was used. This scheme groups products into healthier, neutral and less healthy items based on their general nutritional profile and has been utilised in research on food purchasing (Pechey et al., 2013).

There is a large body of research showing that reading certain magazines, such as women's fashion magazines, can have a negative impact on women (López-Guimerà, Levine, Sánches-Carracedo & Fauquet, 2010). Specifically reading these magazines can decrease body image satisfaction (e.g. Botta, 2003; Thomsen, Weber & Brown, 2002) and contribute to eating disturbances (e.g. Thompson & Stice, 2001). There is also some research showing that specifically advertisements in such magazines can have negative effects on women and that advertisements differ between for example fashion and fitness/health magazines (Rudman & Verdi, 1993). Adams et al. (2011) for example showed that alcohol advertisements were more common in Lifestyle and Beauty magazines, while advertisements for starchy foods were more common in General interest women's magazines. To account for these differences and to

analyse whether moral concept use was more frequent in any one publication type, a selection of women's magazines with a readership above 250,000 (National Readership Survey, 2016-2017) was included. For the purpose of the current study, a women's magazine is defined as the magazines categorised as 'women's magazines' according to the National Readership Survey. These include for example magazines published by supermarkets (e.g. Sainsbury's, Tesco), women's fashion magazines (e.g. Marie Claire, Cosmopolitan), cooking magazines (e.g. BBC Good Food, Jamie), weight loss magazines (e.g. Weight Watchers, Slimming World) and general women's lifestyle magazines (e.g. Good Housekeeping, Yours). Women's magazines were also sampled because they contained a large proportion of food, non-alcohol drink and nutritional supplement advertisements, and are a frequent target of advertising analysis (e.g. Adams et al., 2011; Barr, 1989; Duerksen et al., 2005; Pitts, Burke & Adams, 2014).

The current study had two overarching aims:
1) to examine the extent to which moral concepts are used in food, non-alcoholic drink and nutritional supplement advertisements in women's magazines in the UK and whether this has changed from 2002 through 2007, 2012 and 2017; and
2) to examine whether the use of moral concepts in advertisements differs by (a) product type (food, non-alcoholic drink, nutritional supplement), (b) healthiness of the advertised product, and (c) the magazine type in which the advert appears.

5.2 Method
5.2.1 Sample
Women's magazines with a readership above 250,000 in the period October 2016 – September 2017 based on the National Readership Survey (NSR) were selected for initial screening. Only those with a publication date before June 2012 were included. For monthly publications June editions were chosen, for weekly publications editions published in the first week of June were chosen, and May/June for Bi-Monthly Magazines. June publications were chosen out of convenience. Only magazines that were available either online (Readly.co.uk, Pocketmags.co.uk) or in the Cambridge University Library or the British Library were included. If the weekly magazines did not include food or drink advertisements in the first week of June, the last week of May was selected instead to keep the time frame consistent with the monthly and bi-monthly magazines. Monthly Magazines that did not include at least one food or non-alcoholic drink advertisements in their June 2017 issue were excluded (Vogue, Glamour, Elle, Ideal Home, Country Living, House Beautiful, Prima, 25 Beautiful Homes,

Country Homes & Interiors, Homes & Gardens, House & Garden, Take a Break, Chat, Closer, Heat, Woman's Weekly, That's Life!, Woman's Own, Pick me Up, Woman, Bella, People's Friend). The remaining 17 publications were sampled in June across 2002, 2007, 2012 and 2017. Complete publications were only available for 12 of the magazines, due to two magazines being published after June 2002 (Tesco Magazine: 2004; Women's Health: 2012; Jamie: 2008), and two magazine publications missing from both the British Library and Cambridge University Library (BBC Good Food, June 2007; Women & Home, June 2007). This resulted in a total sample of 61 magazines (Table 1).

Table 5.1

Overview of sampled magazines

Magazine	Monthly readership (k)	Magazine Type	Missing years	No. advertisements
BBC Good Food	668	Food		57
Cosmopolitan	1021	Fashion		35
Good Housekeeping	1164	Lifestyle		57
Hello!	748	Celebrity		31
Homes & Gardens	376	Home		9
Jamie	263	Food	2002, 2007	12
Marie Claire	463	Fashion		36
Mother & Baby	281	Parenting		22
OK!	841	Celebrity		29
Red	323	Lifestyle		42
Sainsbury's Magazine	1220	Supermarket		111
Slimming World	1482	Weight loss		43
Tesco Magazine	3669	Supermarket	2002	59
Weight Watchers	384	Weight loss		56
Woman & Home	532	Home	2007	26
Women's Health	475	Health	2002, 2007	12
Yours	329	Lifestyle		12

5.2.2 Data abstraction.

All advertisements displaying food, non-alcoholic drink and nutritional supplements were included. Product placements in articles, breast milk replacement and advertisements for supermarkets were excluded. 649 advertisements were recorded across the 61 magazines. Of the 649 advertisements, 444 were unique (duplicates were discarded for coding).

5.2.3 Magazine type

Magazines were categorised according to content: Celebrity, Food, Health, Home, Parenting, Supermarket, Weight loss, Fashion, Lifestyle (Table 5.1)

5.2.4 Healthiness

Healthiness of the advertised food product was evaluated by two separate methods. One method aimed to establish an estimate of healthiness based on the nutritional profile of the advertised item, and another method obtained the perceptions of the public as regards to the healthiness of the advertised product.

5.2.4.1 Objective healthiness based on nutritional profile

Based on the 43 food and drink groups established by Johnson et. al. (2008) and later used by Pechey et. al. (2013), the food and drink advertisements were categorised into one of three categories: less healthy, neutral, and healthier. Categorisation was settled in terms of the products' nutritional profiles and the food categories used by Pechey et al. (2013) was used (see Appendix 5.2 for further details). For example, food products such as sweet snacks, processed meats, high-energy drinks and low-fibre bread products were categorised as 'less healthy', food products like morning goods, dairy drinks and spreads and condiments were categorised as 'neutral', and vegetables, food products like high-fibre bread products and low-energy drinks were categorised as 'healthier'. The nutritional supplements were not coded in terms of healthiness due to their ambiguity.

5.2.4.2 Subjective healthiness based on public perception

A separate online survey was carried out to measure the subjective perception of healthiness for each advertised food, non-alcoholic drink and nutritional supplement item. Four hundred and sixty-six separate products were extracted. In cases where an advert displayed more than one product, the product was presented separately and the average of the ratings was calculated. The sample consisted of 720 UK participants. The mean age was 35.37 (*SD* = 12.22) and 50% were women. They each saw 50 different products and each product was rated by 75 participants. Products were randomly distributed across participants using Qualtrics' randomisation method. An image of the product in the advertisement was presented to participants with information about the product name and type. They were then asked how healthy they thought the food product was on a scale from 1 ('Very unhealthy') – 6 ('Very healthy').

5.2.5 Categorisation of presence of moral concept

Advertisements were coded as containing a moral concept if the advertisement met the operational definition of moralisation: An advertisement was *moralising* and coded as containing a moral concept if any of the following occurred:

1. Moralisation of food in an advertisement included one or more verbal terms and/or images that implied a judgement of right or wrong.
2. The content aimed to either elicit moral emotions* or prevent/avoid moral emotions from occurring, in either the consumer or others observing the consumer. Moral emotions were considered as: guilt, shame, embarrassment, pride, elevation, awe, gratitude, anger, contempt, disgust, and compassion (Tangney et al., 2007, Haidt, 2001, 2003).
3. The content reflected aspects of morality as defined by Haidt's (2012) moral foundations: Care, Fairness, Loyalty or in-group, Authority, Sanctity or purity and Liberty.

An advertisement was *not moralising* if:

It only included purely aesthetic judgments or purely taste judgements such as "looks good" or "tastes good".

5.2.6 Coding

A pilot coding was initially conducted where 88 of the advertisements were independently coded by myself and a trained, independent coder. Differences between the two coders in terms of the moral concepts present or absent in the advertisements were discussed until agreement was reached. The different moral concepts that were extracted during this pilot coding provided the initial coding structure for the remaining 444 advertisements. All advertisements were then coded for either presence (1) or absence (0) of the established categories. As coding progressed, if no suitable category was available, a new category was created with new advertisements being coded as either having a presence or absence of this category. All advertisements were coded by myself and 20% were coded by a trained, independent second coder. In cases where disagreements occurred, the two coders discussed the differences until a consensus was reached. The final coding scheme contained 36 different moral concepts divided into moral themes (text or imagery) and immoral themes (text or imagery). Moral themes were categorised as those that allude to concepts of moral goodness (e.g. Love/Care, Goodness,

Angel/God/Saint), while immoral themes were those that elude to concepts of moral badness (e.g. Bad, Guilty, Devil). See the appendix 5.1 for an overview of the different concepts.

5.3 Data analysis

All statistical analyses were carried out in R (version 3.3.3). The presence of moral concept in food advertisements over time was analysed using a mixed model controlling for fixed effects of magazine. In cases where a cell had an expected value below 5, Fisher's exact test was used. Models with interactions and/or continuous predictors and categorical outcomes were analysed using logistic regression models.

5.4 Results

5.4.1 Presence of Moral Concepts

Thirty-six different moral concepts were observed (see Appendix 5.2 for an overview and Box 5.1 for examples). Nineteen were verbal descriptions of moral goodness themes (e.g. Divine, Bliss, Care) and six were moral goodness imagery (e.g. Heaven, Halo, In group imageries such as flags). For moral badness themes, ten were verbal descriptions (e.g. Guilty, Devil, Sinful) and one was moral badness imagery (engaging in something illicit). Across the four time points, 29.50 % of advertisements contained a moral concept. Dividing the concepts into moral goodness or badness themes showed that 22.74 % of the advertisements used moral goodness, while only 3.82 % used moral badness. 2.70 % of advertisements had both themes present. See table 5.2 for a breakdown of each year.

Table 5.2

Percentage of advertisements having a presence of moral concept, and moral goodness and badness themes overall and with the advertisements divided by food, non-alcoholic drink and nutritional supplements

	2002 $n = 117$	2007 $n = 110$	2012 $n = 112$	2017 $n = 102$	Total $N = 444$
Presence of moral concept % (*n*)	29.06 (34)	31.82 (35)	32.14 (36)	25.49 (26)	29.50 (131)
Food	30.44 (28)	33.33 (29)	34.18 (27)	25.97 (20)	31.05 (104)
Non-alcoholic Drink	25.00 (5)	30.00 (6)	36.00 (9)	20.00 (4)	28.23 (24)
Nutritional supplement	20.00 (1)	0.00 (0)	0.00 (0)	40.00 (2)	12.50 (3)
Moral goodness % (*n*)	23.08 (27)	27.43 (31)	27.68 (31)	23.76 (24)	25.45 (113)
Food	23.91 (22)	28.74 (25)	29.11 (23)	24.68 (19)	25.57 (89)
Non-alcoholic Drink	20.00 (4)	30.00 (6)	32.00 (8)	20.00 (4)	25.88 (22)
Nutritional supplement	20.00 (1)	0.00 (0)	0.00 (0)	25.00 (1)	8.70 (2)
Moral badness % (*n*)	10.26 (12)	7.08 (8)	7.14 (8)	.99 (1)	6.53 (29)
Food	10.87 (10)	9.20 (8)	8.86 (7)	1.30 (1)	7.76 (26)
Non-alcoholic Drink	5.00 (1)	0.00 (0)	4.00 (1)	0.00 (0)	2.35 (2)
Nutritional supplement	20.00 (1)	0.00 (0)	0.00 (0)	0.00 (0)	4.35 (1)

Box 5.1.

Examples of advertisements containing moral concepts.

A) Advert shows imagery of 'engaging in an illicit activity', b) advert shows both 'angelic', 'heaven' and 'halo' imagery, as well as reference to using the cooking oil as making the user 'saintly', c) advert shows both 'angelic', 'heaven' and 'halo' imagery, as well as references to this yoghurt not being 'sinful' and 'wicked', d) shows text indicating 'superior ingroup' by referring to 'never forget where it comes from', e) shows reference to the chocolate as 'devils'.

Photos removed due to copyright reasons.

| **Copyright holder is Yeo Valley** | **Copyright holder is Fry Light** | **Copyright holder is Fage International** |

a) Marie Claire, June 2017 p 26   b) Weight watchers June 2012, p 12   c) Slimming World, May/June 2002, p 7

Photos removed due to copyright reasons.

| **Copyright holder is Le Gruyere AOP** | **Copyright holder is Mars** |

d) BBC Good Food, April 2007, p 50   e) Sainsbury's magazine, June 2002, p 26

5.4.2 Change over time

To assess whether the use of moral concepts in advertising food products has changed since 2002, a linear mixed model controlling for the fixed effects of magazine was conducted. It revealed that there was no significant difference between years (see Table 5.3 and Figure 5.2). The use of concepts with a moral goodness theme was also not different between years, but the use of concepts with a moral badness theme was (see Figure 5.3). There was a 91.29 % decrease in the use of moral concepts with a moral badness theme when comparing 2002 with 2017, β = -2.44, SE = 1.06, z = -2.30, p = .02, OR = .09, 95% CI for OR [.01, .70].

Table 5.3

Linear mixed model results for change in moral concept use between years, as well as subgroup analyses for the use of concepts with moral goodness and badness themes.

Comparison years	β	SE	z	p	OR	95% CI for OR	% change
2002 & 2007	.10	.30	.33	.74	1.10	.62, 1.97	10.39% increase
Moral goodness	.23	.32	.72	.48	1.25	.67, 2.34	25.43% increase
Moral badness	-.34	.50	-.67	.50	.71	.27, 1.90	28.57% decrease
2002 & 2012	.17	.29	.58	.57	1.18	.66, 2.11	18.47% increase
Moral goodness	.26	.32	.81	.42	1.29	.69, .2.40	29.07% increase
Moral badness	-.23	.50	.46	.64	.79	.30, 2.12	20.61% decrease
2002 & 2017	-.19	.31	-.60	.59	.83	.44, 1.53	17.22% decrease
Moral goodness	.06	.33	.18	.86	1.06	.55, 2.03	5.97% increase
Moral badness	-2.44	1.06	-2.30	.02	.09	.01, .70	91.29% decrease

Note. Moral goodness and moral badness are measured within advertisements containing moral concepts.
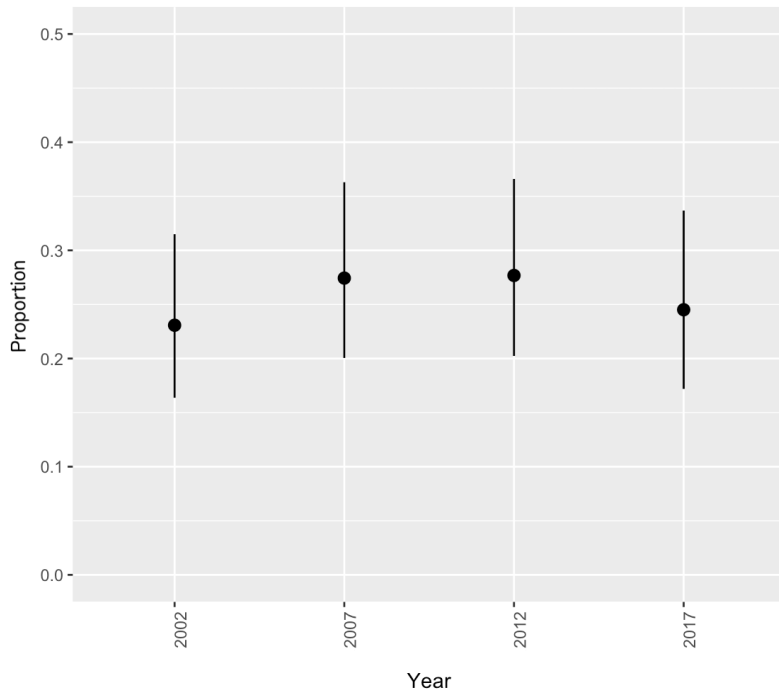
Figure 5.2. Proportion of all advertisements containing a moral concept for each sampled year. Error bars represent 95% CIs (binomial).
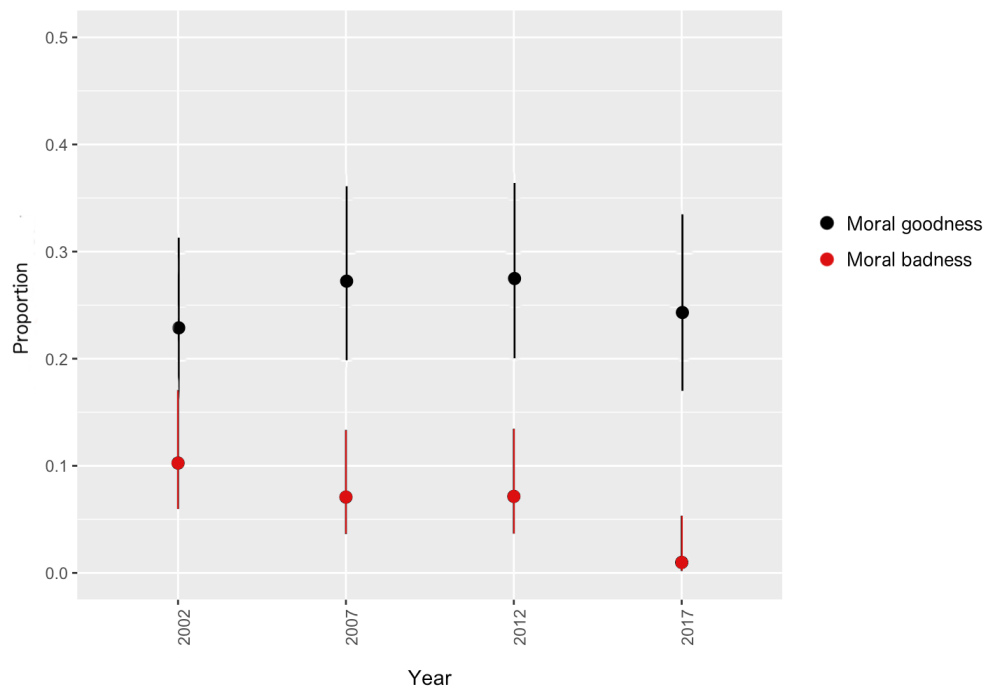
Figure 5.3. Proportion of moral goodness and moral badness themes in advertisements containing a moral concept for each sampled year. Error bars represent 95% CIs (binomial).

5.4.3 Product Type

When combining all time points, a chi square showed that moral concept was not used significantly more often to advertise for food, non-alcoholic drink or nutritional supplements, χ^2 (2) = 3.78, p = .15. Moral goodness and moral badness themes were also not used significantly differently across food, non-alcoholic drink and nutritional supplement advertisements, Fisher's exact test, p = .19.

5.4.4 Healthiness

5.4.4.1 Objective healthiness based on nutritional profile

The majority of food advertisements were for less healthy products (n = 246), while the majority of non-alcoholic drink advertisements were for healthier products (n = 48). See Table 5.4 for an overview of food and non-alcoholic drinks categorised by healthiness. To assess whether moral concepts were differentially used to advertise products depending on healthiness, several analyses were conducted. First, a chi-square with healthiness (less healthy, neutral, healthier) and moral presence showed that there was no difference in the presence of moral concepts across less healthy, neutral and healthier products, χ^2 (2) = .05, p = .98. Second, a logistic regression model was used to analyse whether healthiness affected the use of moral concepts differently depending on whether the advert was for a food or a non-alcoholic drink product. The model showed that the relationship between healthiness and moral presence differed depending on whether the advert was for food or non-alcoholic drink (see Figure 5.4). The interaction was driven by non-alcoholic drink advertisements, where less healthy drinks were more likely to be advertised using a moral concept than healthier drinks, β = -2.64, SD = 1.07, z = -2.47, p = .04. All other comparisons were statistically not significant, p > .10.

Table 5.4

Number of food and non-alcoholic drink advertisements in each healthiness category, with the percentage of advertisements containing a moral concept within each healthiness category.

	Less healthy	Neutral	Healthier
Food n	246	47	42
Non-alcoholic drink n	29	8	48
Moral presence n (%)	76 (38.19%)	18 (48.64%)	34 (60.71%)
Moral goodness n (%)	53 (53.53%)	16 (16.16%)	30 (30.30%)
Moral badness n (%)	14 (82.35%)	0 (0.00%)	3 (17.65%)

Note. Percentage of advertisements containing a moral concept is calculated by rows.
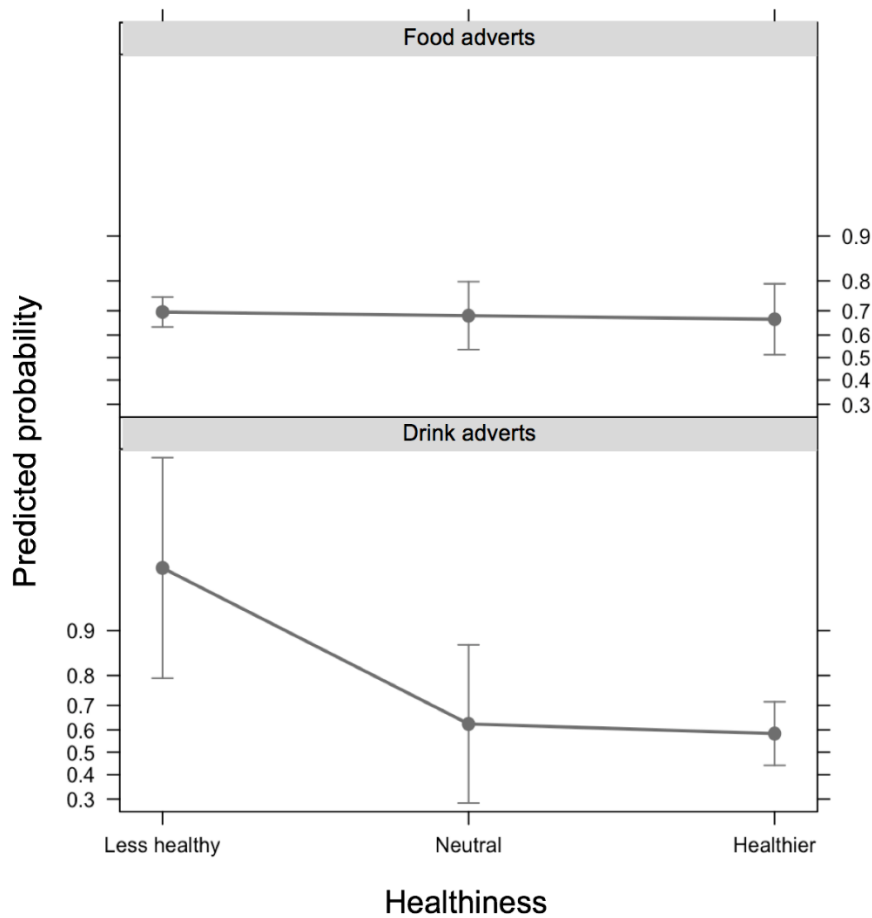
Figure 5.4. Predicted probability of an advert containing a moral concept by item type and healthiness. Error bars represent 95% CIs.

When only examining the advertisements containing moral concepts, Fisher's exact test showed a trend towards healthiness and use of moral goodness and badness themes were dependent on each other, $p = .06$. Although less healthy products were more likely to have both moral goodness and badness themes, moral badness themes were mainly used to advertise less healthy food and non-alcoholic drinks. See Table 5.4 for a breakdown of themes across healthiness categories.

5.4.4.2 Subjective healthiness based on public perception

Most products were rated as neither very healthy nor very unhealthy but somewhere in between (median = 3.41). See Figure 5.5 for the frequency distribution of healthiness ratings for advertised products by product type. Analysing perceived healthiness (e.g. healthiness rated by participants), a logistic regression showed no relationship with the use of moral concept for all advertised products, $\beta = .16$, $SD = .11$, $z = 1.42$, $p = .16$. A logistic regression also showed no

interaction between subjective healthiness and advertised item type (food, non-alcoholic drink, or nutritional supplements), all ps >.1. However, using a logistic regression to analyse the relationship between perceived healthiness and whether the moral concept had a theme of moral goodness or moral badness, showed that less healthy advertisements were more likely to contain a moral badness theme and vice versa, β = -.88, SD = .29, z = -2.93, p = .003. (see Figure 5.6).
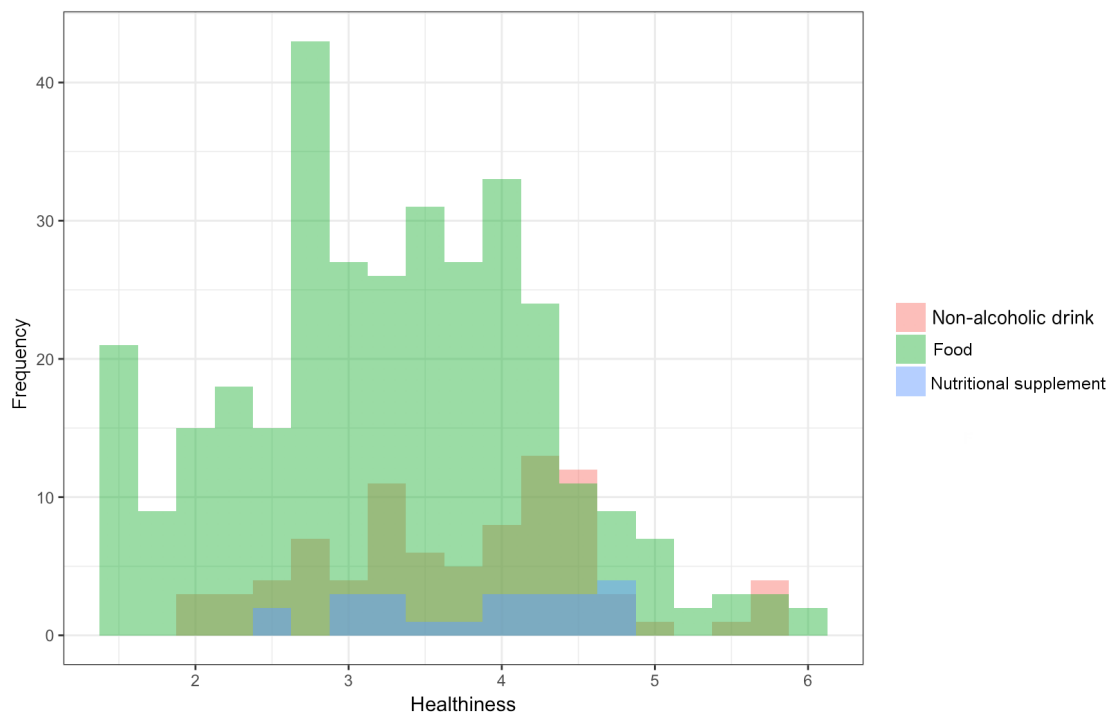
Figure 5.5. Frequency distribution of advertisements across healthiness ratings for non-alcoholic drink, food and nutritional supplement.
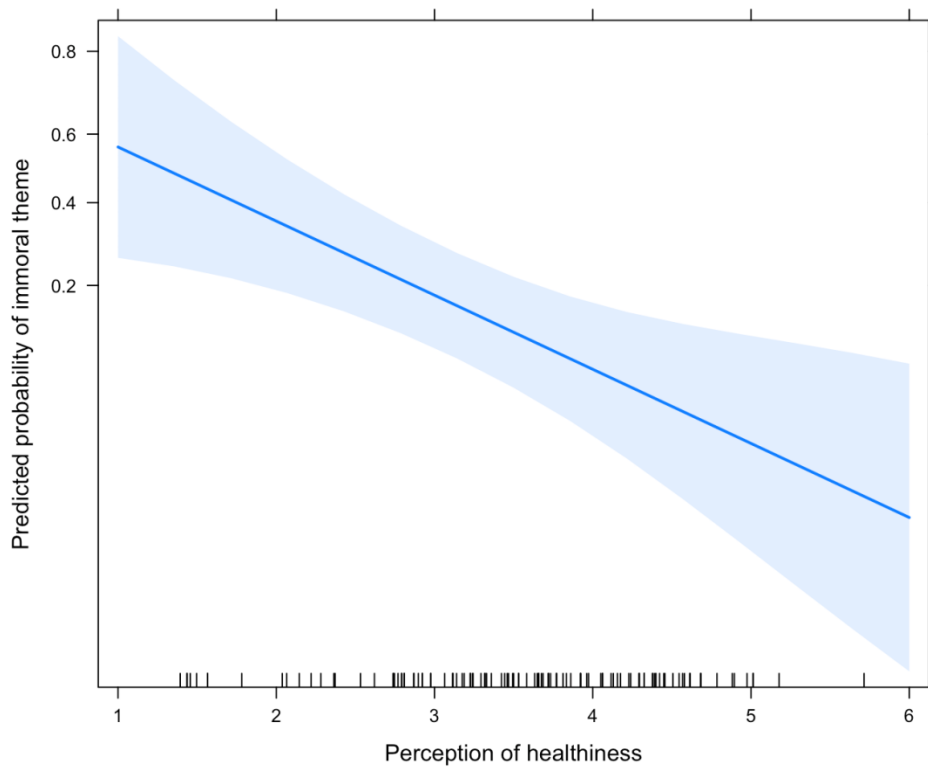
Figure 5.6. Predicted probability of an advertisement containing an immoral theme as a function of healthiness. Bands show 95% CIs.

5.4.5 Magazine Type

To examine the use of moral concept in different magazine types, all advertisements (including duplicates) were analysed. This was to account for the same advert appearing in different magazines. Fisher's exact test showed that the presence of moral concept was not equal across magazine types, $p = 0.009$ (see Figure 5.7). However, when breaking it down using a post-hoc test with Bonferroni-Holm corrections, no single comparison reached significance $p > .05$.
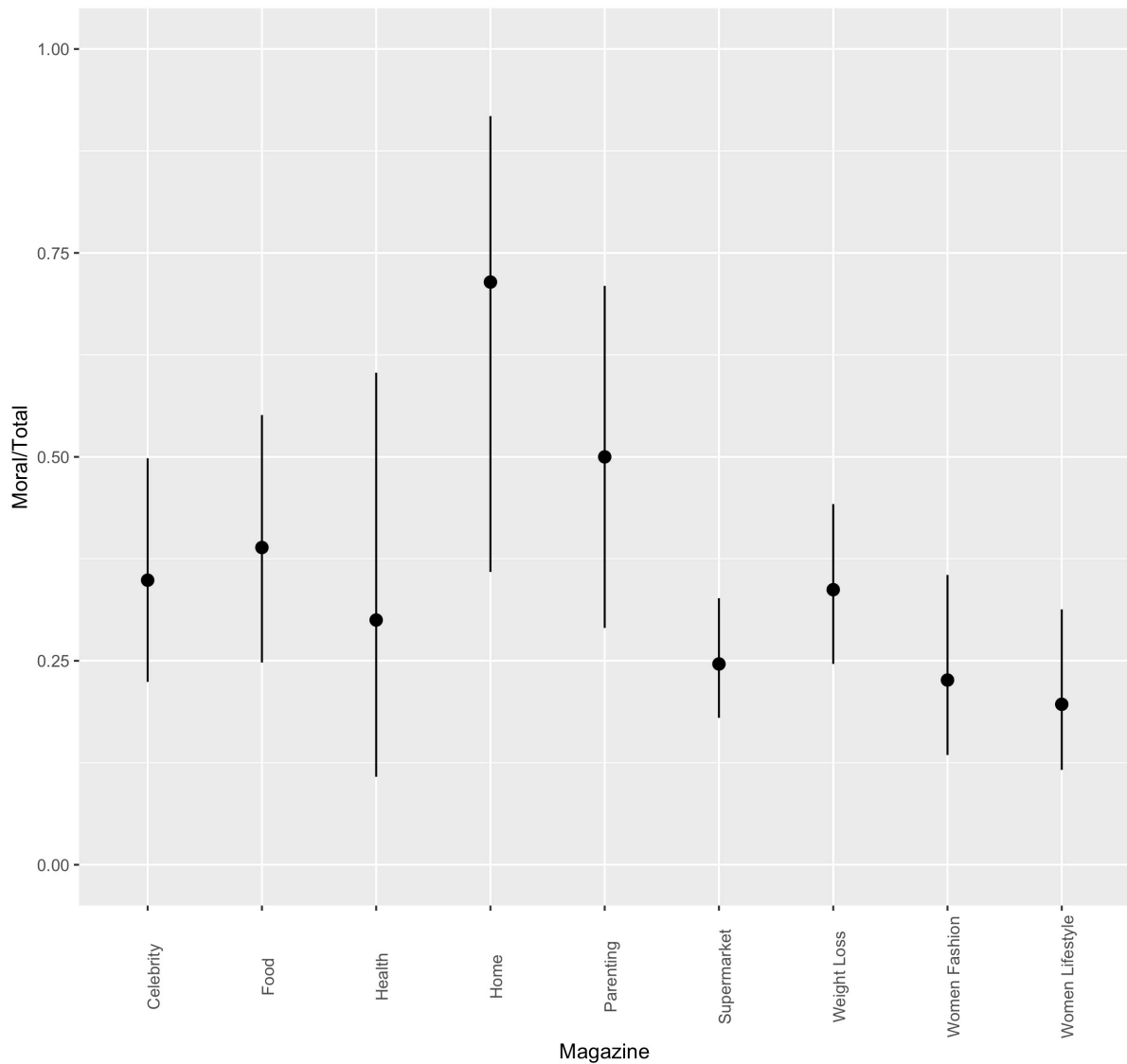
Figure 5.7 Proportion of moral presence across magazine types. Error bars represent 95% CIs (binomial).

5.5 Discussion

5.5.1 Summary of findings

The results of the study showed that moral concepts were used in advertisements for food, non-alcoholic drinks and nutritional supplements in about one third of all sampled magazines for all years combined. Within the advertisements containing a moral concept, the use of text or imagery containing moral goodness themes (e.g. angel, divine, superior in-group) were also used more often than moral badness themes (e.g. devil, illicit activity). The rate of moral concept use was consistent over the 15 years sampled. Within the advertisements containing a moral concept, the change in moral goodness themes stayed the same while there was a decrease in moral badness themes. There were no statistically significant differences between

advertisements for food, non-alcoholic drinks, or nutritional supplements in terms of moral concept usage.

When the advertised products were categorised by healthiness according to their nutritional profile – objective healthiness, most advertisements were for unhealthy food products. Although there was no significant difference in the use of moral concept depending on objective healthiness overall, healthy non-alcoholic drink advertisements were more likely to contain a moral concept. When only advertisements containing moral concepts were analysed, results showed that unhealthy products were more likely to be advertised using themes of moral badness.

A sample of participants also gave their subjective ratings of healthiness for all products. There was no overall significant relationship between subjective healthiness ratings and the use of moral concept, and this relationship did not depend on whether the advertisements was for food, non-alcoholic drink or nutritional supplement. Analysing the use of moral goodness and badness themes within the advertisements containing moral concepts showed that the less healthy the product was perceived to be, the more likely the advertisement was to contain a theme of moral badness. Finally, no difference between any two magazine types was found in the use of moral concepts.

The finding that about one third of advertisements contained a reference to ideas of morality is of significance. Considering 23-41% of the UK population read women's monthly and weekly magazines, the types of messages that are contained therein have the possibility of influencing people's attitudes and beliefs. In the same way that being continuously exposed to the fashion models presented in magazines can cause body image dissatisfaction (e.g. Thomsen et al., 2002; Botta, 2003) and eating disturbances (e.g. Thompson & Stice, 2001) due to the unachievable goal of the 'thin-ideal', a repeated association between food and morality could have other so far unknown consequences. For example, a repeated association between unhealthiness and moral badness might increase the belief that those who eat unhealthily are 'bad' people (Vartanian, Herman & Polivy, 2007).

Although the public has become more interested in healthiness, there was not a significant associated change in the use of moral concepts from 2002 to 2017. The use of moral goodness themes was also not significantly different across time points, but the use of moral badness

themes had decreased. However, due to a small number of advertisements containing moral badness themes these trends should be interpreted with caution. The results indicate that even though there is a longstanding association between morality, food and health (as discussed in Chapter 2), this does not mean a direct increased interest in healthiness results in an increased use of moral concepts to present food products. A larger period could be sampled to establish whether longer-term changes have occurred. For example, as religion lost some importance in Western societies in the last century, this could impact the use of morality in advertisements. Over this longer period, it could either be that moral imagery of the religious kind has lessened, or that the lack of moral guidance through the church has left a vacuum that has to a larger degree been filled by health and body concerns (Cedeström & Spicer, 2015), thereby increasing the use of moral concepts to communicate about food.

In previous research Griffin and Berry (2003) pointed out that Christian imagery such as angels is used to sell a 'healthier' alternatives to a less healthy product. Extending this analysis, the current study found that an advert was more likely to have a theme with moral badness rather than moral goodness the less healthy the product. This is also in line with the idea that moral goodness is associated with good health, self-control and treating the body like a temple, while moral badness is more associated with pleasure, hedonism and indulgence, such as one of the seven sins gluttony. As seen in Chapter 2, people think those who eat unhealthy foods like burgers are 'bad' and those who eat healthy foods like salads are 'good' (Vartanian et al, 2007). By playing on these associations, advertising companies may be increasing liking and thereby sales due to already established bonds (Green, Wind & Jain, 1972). Furthermore, magazines have been found to provide a source of nutritional information (Cash et al., 2014). Because healthiness and moral goodness have a cultural and historical association, products that contain high levels of fat and sugar could be perceived as healthier if they are advertised using a moral goodness theme. Although research has shown that some associations, such as those with organic or fair trade labels, can shift a product to be perceived as healthier (Schuldt, Müller & Schwarz, 2012, Schuldt & Schwarz, 2010), further research needs to establish whether moral concepts such as those presented here have similar effects. Studies 4, 5, 6 and 7 provides a first investigation.

5.5.2 Strengths and limitations

In comparison to previous analyses of Christian notions of morality in food advertisements (Griffin & Berry, 2003; Kilbourne, 1994), the current study examined a large proportion of

advertisements and the degree to which morality was used. By using a definition of morality that included concepts beyond religion, such as ingroup superiority and ideas around morality in psychology today, the mapping was more comprehensive than that previously carried out by Griffin and Berry (2003) and Kilbourne (1994).

Moreover, two forms of healthiness estimates were used: healthiness coded based on a rough estimate of nutritional characteristics, and perceptions of healthiness as rated by a group of participants sampled from the general population. This meant that analyses could be carried out to test for associations with what the public's judgements of subjective healthiness were in comparison to a more objective measure of product healthiness. However, due to the difficulty of estimating 'true' healthiness, this is also one of the limitations of the study. Complete nutritional content is needed to make a more comprehensive evaluation, which was not available for most products. As such, a rough objective estimate and public subjective perception was used in lieu of this. Future work would benefit from more thorough categorisation of healthiness if the nutritional information is available.

Out of convenience, only magazines from June publications were used. Although this method controls for possible seasonal variations, it limits the generalisability of the results to other months. For example, a large proportion of moral goodness themes could be due to marketing companies directing their messages towards summery, lighter themes and are also wary of their customer's potential desire to lose weight and embark on a healthier diet (Madden, 2017). Research has also found that there are seasonal differences in what types of food being advertised (Adams, et al., 2011), which again could contribute to changes in moral concept use depending on the time of year. To further examine this, publications from each season could be tested.

5.6 Summary and the next chapter

The study reported in this chapter found that about one third of advertisements for food, non-alcoholic drinks and nutritional supplements in women's magazines in the UK between 2002 and 2017 contained moral concepts. This rate seems to have remained constant over the last 15 years. Little is known, however, about the effects such messages might have on how people respond to foods that are presented together with a moral concept. The next chapter presents a series of studies that examine the effect of moral labels on the desire, consumption and selection of a less healthy and a healthier food product.

CHAPTER 6

Study 4, 5, 6 and 7

Impact of moral labels on desire, selection and consumption of food: Three experimental studies and a meta-analysis

Summary

Background. Food is sometimes marketed using moral terms. Little is known about the impact of this association between food, eating and morality. Three studies formed the first test of the impact of food labels denoting a moral or an immoral concept on people's desire (Study 4), consumption (Study 5) and selection (Study 6) of healthier and unhealthier food. The results of these three studies are synthesised in Study 7. Whether increased desire, consumption and selection conformed to a pattern of congruency (moral concept-healthy food and immoral concept-unhealthy food) was tested.

Methods: Three studies (Study 4: $n = 725$, Study 5: $n = 210$, Study 6: $n = 276$) tested whether two moral labels ('Angelic' and 'Devilish'), differentially affected (a) desire to consume (Study 4 and 5), (b) consumption (Study 5) and (c) selection (Study 6) of healthier (cereal bar) and unhealthier (chocolate bar) food. For the meta-analysis, Studies 4 and 5 were analysed together to discern any overall effect on desire to consume. To meta-analyse the consumption and selection outcomes in Study 5 and 6, the consumption variable was dichotomised based on whether participants ate more of the cereal bar or the chocolate bar into a combined 'behavioural' measure.

Results: Study 4 showed that, overall, participants desired chocolate bars more than cereal bars. This effect was qualified by a marginally significant interaction whereby chocolate bars with an immoral label were more desired than those with a moral label, $\eta^2_p = .01$, p = .07: a Devilish labelled chocolate bar was more desired than a 'Devilish' labelled cereal bar. There was no difference in desire between for Angelic labelled food. In Study 5 participants desired chocolate bars more and label did not influence desire for any bar, $d = .07$, $p = .62$. For consumption, participants consumed more cereal bars regardless of label, $d = .19$, $p = .18$. When the variable was dichotomised, the results followed the congruency pattern: cereal bars were most consumed when labelled as 'Angelic', while chocolate bars were most consumed when labelled as 'Devilish', OR = 1.58, $p = .04$, In Study 6, selection also followed a congruency pattern: participants were more likely to select a cereal bar with an 'Angelic' label and a chocolate bar with a 'Devilish' label than the other way around, OR = 1.95, $p = .01$. Synthesising the results of these three experiments (Study 7), showed no effect of label type on desire, $d = .08$, 95% CI [-.06, .22], but a statistically significant effect of label type on the

combined behavioural measure (consumption and selection), log OR = .55, 95% CI [.21, .88]. Specifically, a Devilish label increased participants' behaviour towards a chocolate bar and an Angelic label increased participants' behaviour towards a cereal bar.

Conclusions: Results across three studies and their synthesis in a meta-analysis suggest that food labelled with congruent labels affect behaviour (selection and consumption), but do not affect participants' self-reported desire to consume the food. A chocolate bar with an immoral label and a cereal bar with a moral label (congruent) were preferred over a chocolate bar with a moral label and a cereal bar with an immoral label (incongruent).

Background

When estimating the objective healthiness or calorie content of food products, people are often inaccurate (Stanton & Tips, 1990). The calorie content of food perceived as 'healthy' is underestimated but overestimated for perceived 'unhealthy' foods (Carels, Harper & Konrad, 2006; Carels, Konrad & Harper, 2007). Such errors are not uncommon. When making quick, everyday decisions people rely to a large degree on automatic processes and heuristics (Gigerenzer & Gaissmaier, 2011; Tversky & Kahmeman, 1974). These processes often fall prey to impulses and desires (Hofmann, Baumeister, Förster, & Vohs, 2012; Rook, 1987) and can easily be influenced by so-called 'nudges' – cues in the environment that prompt perceptions or behaviours in a certain direction. When an entity is unknown, complex or ambiguous, signals extrinsic to the object are especially influential in the formation of perceptions of intrinsic properties. In the case of food perceptions, a range of external cues influence estimates (Provencher & Jacob, 2016). For example, research has shown that people are biased by cues such as nutritional labels (e.g. Kozup, Creyer & Burton, 2003), red/green colour labels (e.g. Schuldt 2013; Temple, Johnson, Archer, LaCarte & Epstein, 2011), stereotypes about brand names (e.g. Cavanagh & Forestell, 2013; Oakes, 2005) the perceived healthiness of the restaurant (Chandon & Wansink, 2007) or the presence of a healthy side dish (Forwood, Ahern, Hollands, Fletcher & Marteau, 2013).

Labels are powerful communicators and are used by marketing companies to conjure up ideas and emotions in the consumer (Wansink, van Ittersum & Painter, 2004). Value-based claims such as 'organic' and 'fair-trade' have received attention due to their effect on perceived healthfulness (e.g. Lee, Shimizu, Kniffini & Wansink, 2013; Sörqvist et al., 2015; Schuldt & Hannahan, 2013; Schuldt et al., 2012; Schuldt & Schwarz, 2010). Schuldt and colleagues (2012) found that the 'fair trade' label, which indicated that workers have been paid and treated fairly, lowers the estimates of calorie content of chocolate. Moreover, the products from a company that displays corporate social responsibility are perceived as lower in calorie than from a control company (Peloza, Ye & Montford, 2015). Similarly, although organic production methods have limited impact on nutritional content (Smith-Spangler et al., 2012), participants rated cookies labelled as having been 'produced with organic flour and sugar' as lower in calories than conventionally labelled cookies (Schuldt & Schwarz, 2010). This has been dubbed the 'health halo'. In halo effects, one good aspect of the item influences the evaluation of the item as a whole (e.g. Andrews, Burton & Netemeyer, 2000; Asch, 1946, Thorndike,

1920). For example, attractive individuals are thought to have more favourable personality traits and become more successful in life (Eagly, Ashmore, Makhijani & Longo, 1991). In the case of fair trade or organic food labels, the knowledge that a food item has been produced ethically biases people to judge the item as healthier than it is.

Both fair trade and organic labels are ethical labels that reflect an aspect of the product. However, as seen in Chapter 5, many marketing companies also utilise moral descriptions that are otherwise unrelated to aspects of the ingredients or production method of the product (Griffin & Berry, 2003; Kilbourne, 1994). For example, there is 'Virtue Ice Tea', 'Innocent Smoothies', 'Divine Chocolate' and ice cream marketed as 'Seven Deadly Sins'. Tapping into the halo effect, the moral theme is likely used to sell an idea and to communicate properties or attributes outside of the products themselves.

When a product receives a halo, people could justify eating larger portions of a product they would otherwise consume less of, while at the same time maintaining the belief that they have been healthy. A consistent positive self-image, such as personal moral status, is an important aspect of many people's identity (Aquino & Reed, 2002). This need for consistency, the degree to which a person believes they are good or bad, motivates effortful behaviour to both confirm personal goodness or fight potential threats to it, prospectively or subsequently (Reynolds & Ceranic, 2007). As seen in Chapters 2, 3 and 4, people change their behaviour in line with a moral balance theory (Merritt et al., 2010; Monin & Miller, 2001), where bad behaviour motivates people to compensate with good behaviour and good behaviour licenses bad behaviour. In relation to food, carrying out an effortful word task has been found to increase hedonistic behaviour such as eating snacks (de Witt Huberts et al., 2012), and when purchasing a green product people have been found to later cheat and steal more than when purchasing a conventional product (Mazar & Zhong, 2010). Exposure to healthy organic food products has also been found to decrease the amount of time people volunteer to help someone else (Eskine, 2013).

This type of self-licensing has not only been found to occur sequentially, but the hedonistic act can also be licensed by the presence of the halo effect. A recent review of food, alcohol and tobacco labelling (Shemilt, Hendry & Marteau, 2017) found some evidence that labels such as 'Low fat', 'Reduced calories' and similar can shift people's opinion of these products. For example, low-fat labelled snacks were perceived as having fewer calories, tasted better and had

better health attributes than the regular labelled snacks (Ebneter, Latner & Nigg, 2013). A study in which participants were given either foods labelled with 'Lower fat' or 'Normal fat' or 'Higher fat', participants said they were more likely to buy the Lower fat' in comparison to both the 'Normal fat' or 'Higher fat' labelled foods (Westcombe & Wardle, 1997). Looking at selection of food, margarine labelled as 'Reduced fat (40% fat)' or 'Full fat (80% fat)' was selected more than the 'Reduced fat' margarine (Aaron, Mela & Evans, 1994). Energy intake has also been found to increase by 3% of food labelled as 'low energy/fat' in comparison to baseline and 'high energy/fat' labels (McCann et al., 2013). However, there was not enough high-quality evidence for a conclusion about whether this leads to licensing behaviour in terms of selection or consumption overall. A more recent study by Vasiljevic and colleagues suggested that lower strength alcohol labels may carry similar effects to the labelling of food and tobacco by increasing alcohol consumption (see Vasiljevic, Couturier, Frings, Moss, Albery, & Marteau, 2018). In sum, prior research indicates that labels that signal healthiness such as 'low fat' etc. can alter perceptions of food products and this has the potential to induce self-licensing to justify higher consumption of food that could be unhealthy overall.

It is possible that moral labels also have a halo effect and can impact perception and consumption of the labelled food product. However, limited prior research has looked at whether positively-valued and negatively-valued labels affect healthy and unhealthy foods independently. The Gestalt concept of unity-in-variety suggests that people expect certain properties to go together and like products with a high goodness-of-fit (Green et al., 1972). From research on actual versus expected food experience (Yeomans, Chambers, Blumenthal & Blake, 2008), results seem to suggest that the actual consumption experience is compared with the expected consumption experience. If there is a discrepancy between the two entities people use either assimilation or contrast effects to account for the difference. In assimilation effects, the actual experience of the product is changed to more closely match the expected experience. In contrast effects, the discrepancy is exaggerated. Okamoto and colleagues (2009) found that participants rated food samples as tastier when they had labels matching the taste (such as 'lemon' for a sour taste) than when it was not matching the taste (such as 'lemon' for an umami taste).

As seen above, extrinsic properties such as the label can influence perceptions of the intrinsic properties such as healthiness or calorie content. Comparably, the label can also influence the formation of the consumers' expected experience. A moral label is likely to create different

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expectations than an immoral label. As seen in prior research on ethical production labels, a fair-trade label is likely to create expectations of healthiness (Schuldt et al., 2011). Conversely, it is possible that an immoral label could create expectations of unhealthiness. In the studies presented here, both a moral and an immoral label were used together with either an unhealthy or healthy product, giving four combinations: morally labelled healthy food, morally labelled unhealthy food, immorally labelled healthy food and immorally labelled unhealthy food. A chocolate bar was chosen as the unhealthy product and a cereal bar was chosen as a healthy product. Although both foods are comparable in terms of nutritional content, people perceive cereal bars as healthier than chocolate bars (Urala & Lähteenmäki, 2006, Vasiljevic, Pechey & Marteau, 2015).

From the literature on the 'need for consistency' (e.g. Festinger, 1957; Reynolds & Ceranic, 2007) discussed above, there is evidence suggesting that when there is a congruency between the value of the label and personal value, the positive perception of the food increases and people are more likely to choose the product (Sirgy, 1982; Litvin & Kar, 2004). For example, a study by Allen, Gupta and Monnier (2008) showed that participants who valued an exciting life (a self-concept stereotyped by 'Coca Cola' advertisements), rated a soft drink as tastier when labelled as 'Coca Cola' then as 'Woolworth cola'. Similarly, in the study by Schuldt and colleagues (2011), in comparison to those who did not value ethical production methods, participants who valued ethical production methods thought the fair trade labelled food products were lower in calories than the conventional labelled products. Thus, the current studies also assessed the potential moderating influence of moral identity (Aquino & Reed, 2002) and whether moral labels would affect a self-identifying moral person differently. There is also some evidence that those who restrain their food intake are differentially influenced by brand associations. Cavanagh and Forestell (2013) found that restrained eaters ate more cookies that had a 'healthy-sounding' brand rather than an 'unhealthy-sounding' brand. As such, a measure of restrained eating was included as an additional moderator.

Overview of studies

Although moral food labelling is widespread, no research has been carried out on the influence of such labels. Three experiments were conducted to determine the impact of moral labels on the self-reported desire for (Study 4 and 5), and the observed behaviour towards (Study 5 and 6) chocolate bars and cereal bars. In addition, individual differences in moral identity (the degree to which someone thinks being moral is a core part of their identity), and restrained

eating (the degree to which someone restrains their food intake to lose or maintain weight), were assessed as moderators in Study 4 and 5. In Study 5, impulsivity was also assessed as a moderator. Study 7 is an internal meta-analysis of self-reported desire to consume and observed behaviour (selection and consumption combined) towards the food as a function of the moral labelling.

6.1 Study 4

The primary aim of Study 4 was to test the impact of moral labels on desire to consume unhealthy and healthier food.

Four hypotheses were tested:
1. Participants will report a higher desire to consume chocolate than cereal bars.
2. Participants will report a higher desire for the morally labelled food than the food without a moral label.
3. There will be an interaction between food type and moral label on desire to consume.
4. The interaction between moral label type and food type on the desire to consume will be moderated by a) restrained eating and b) moral identity.

6.1.1 Method
6.1.1.1 Study design
A 2 (food type: chocolate bar vs. cereal bar) x 3 (label type: moral vs. immoral vs. no moral connotation) between-subjects design. Out of the six possible combinations of food and label type, one combination was randomly presented to participants.

6.1.1.2 Participants
A sample of 725 adults was recruited by a research agency and was nationally representative across age, gender, socioeconomic status and geographical region in the UK. Only participants who successfully passed the attention checks embedded in the online survey were included in analyses. The required sample size was based on an effect size taken from a study with a similar design that reported a small to medium sized interaction effect of food and label type ($\eta^2 = .02$) on self-reported tastiness of food (Vasiljevic et al., 2015). Because the study reported a very small effect on desire to consume ($\eta^2 = .005$) the related outcome of tastiness was chosen as a more feasible effect size. This sample size provided 90% power at 5% level of significance to detect a small to medium sized interaction between food type and label type. It also allowed

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me to detect a significant difference in the simple main effects when decomposing the interaction with 80% power at 5% level of significance.

6.1.1.3 Intervention

Participants either saw a chocolate bar (unhealthy) or cereal bar (healthier option). The food label was altered to reflect either a moral ('Angelic Chocolate/Cereal Bar'), immoral ('Devilish Chocolate/Cereal Bar') or no moral connotation [control condition] ('Chocolate Bar/Cereal Bar'). The food was displayed without packaging, with the label presented above the product (Figure 6.1). A pilot study was conducted to decide the moral words to pair with the food. Twenty-two moral words were paired separately with a chocolate and a cereal bar and displayed to a sample of 86 participants (55 female, mean age = 20.12, SD = 12.98) in exchange for the possibility of winning a £20 Amazon voucher. The participants rated each labelled food on how likely they were to buy and eat the food, how likely was that such a product existed and how appealing it was ('attractive', 'eye-catching', 'cool', 'fun' and 'worth looking at'). The labels Angelic and Devilish emerged as the word pair with the highest credibility and appeal ratings (see Appendix 6.1 for more detail).

Figure 6.1. Sample labels on a cereal and chocolate bar.

6.1.1.4 Procedure

The study was carried out online, using the testing platform Qualtrics. The study was approved by the Department of Psychology Ethics Committee of the University of Cambridge (ref: 2015/16-18). After giving informed consent, participants completed questions pertaining to their demographics. In the central part of the study participants were shown a labelled food item and asked to complete a series of questions concerning the food and their perceptions of it, as well as their predictions regarding their future eating behaviours. Participants were randomly assigned to see one of the food and label combinations through the Qualtrics randomization function. Participants were also administered an attention check, in which they were asked "When was the last time you have flown to Mars?" Any participant choosing an

answer other than "Never" was not included in the final sample. Finally, the Dutch Eating Behaviour Questionnaire (van Strien et al., 1986) and Moral Identity Scale (Aquino & Reed, 2002) were administered before participants were debriefed.

6.1.1.5 Measures

6.1.1.5.1 Primary outcome: Self-reported desire to consume

This item was adapted from Vasiljevic et al. (2015): 'How much would you like to eat this chocolate (cereal) bar now?', with answers recorded on a visual analogue scale from 0 ('Not at all') to 100 ('Very much so'). The cursor was placed in the middle of the scale as a starting position.

6.1.1.5.2 Secondary outcomes

Tastiness. Perceived tastiness was measured by the following question: 'Compared to other bars like this, how tasty is this chocolate (cereal) bar?', with answers recorded on a VAS ranging from 0 ('Less tasty') to 100 ('More tasty').

Healthiness. The healthiness of the product was measured by: 'Compared to other bars like this, how healthy is this chocolate (cereal) bar?', with responses ranging from 1 ('Less healthy') to 100 ('More healthy').

Calories. Estimated calorie value was measured by the question: 'Compared to other bars like this, how many calories do you think this chocolate (cereal) bar contains?', with answers recorded on a VAS ranging from 0 ('Less calories') to 100 ('More calories').

6.1.1.5.3 Other measures

Self-Licensing. How much participants might compensate by changing their consumption after being exposed to a 'Devilish' or 'Angelic' labelled food item was measured by two questions answered on a scale from 1 ('Strongly disagree') to 7 ('Strongly agree'): 'If I were to have this chocolate (cereal) bar now, I would feel like I deserved something sweeter for my next snack' and 'If I were to have this chocolate (cereal) bar now, I would feel like I could have more than my usual number of snacks'. The internal reliability for this scale was $r = .70$, p < .001.

Motivation to reduce consumption. Three further questions were asked about participants' behaviour in the next six months: 'I intend to eat fewer snacks', 'I want to eat fewer snacks' and 'I will try to eat fewer snacks'. The internal reliability for this scale was good, $\alpha = .82$.

Restrained Eating. The eating restraint subscale of the Dutch Eating Behaviour Questionnaire (van Strien et al., 1986) was administered to measure participants' tendency to restrain their food intake [e.g., 'Do you take into account your weight with what you eat?' and 'Do you eat less at meal times then you would like to eat?']. Participants provided answers to 11 items on scales ranging from 1 ('Never') to 5 ('Very Often'). The scale had excellent internal reliability in the current study, $\alpha = .93$. Two items were added to the scale: participants were also asked whether they have had or currently have an eating disorder (Anorexia Nervosa, Bulimia Nervosa and Binge-eating Disorder) and if it was diagnosed by a clinician.

Moral Identity. The Moral Identity Scale (Aquino & Reed, 2002) was used to capture how central morality is to participants' self-concept, by asking to what degree they relate to a series of moral traits (e.g. 'caring', 'compassionate', 'honest'): 'It would make me feel good to be a person who has these characteristics' and 'Having these characteristics is an important part of my sense of self' on a 1 ('Strongly disagree') to 5 ('Strongly disagree') Likert-type scale ($\alpha = .83$). The scale is comprised of 13 items.

6.1.1.5.4 Control variables

Hunger was measured on a scale from 1('Very hungry') to 7 ('Full') with the question: 'How hungry do you feel right now?'. Participants also provided their age, gender, ethnicity, height and weight, political affiliation and indices of socio-economic status (profession of highest earner, yearly salary).

6.1.2 Data Analysis

All analyses were carried out in R (version 3.3.3). The primary and secondary outcomes were analysed using factorial ANOVAs with food type, label type and the interaction between the two as predictors. Separate models were conducted for the three-way interactions with restrained eating and moral identity. To breakdown any significant interactions, Bonferroni-Holm was used.

6.1.2.1 Assumptions

All models were checked for assumptions. The distribution of desire to consume was bimodal, resulting in non-normally distributed model residuals (see Appendix 6.2 for further details). To account for the distribution several different models were explored. However, neither provided

a useful improvement in comparison to a factorial analysis of variance (ANOVA). To improve the final model the continuous variables hunger, age and BMI were included in addition to the main predictors of interest: Food type (cereal bar or chocolate bar) interacting with Label type (Angelic, Devilish or Control). All other assumptions were met for the remaining models.

6.1.2.2 Randomisation checks

To ensure successful randomisation, the groups were compared on relevant measures and demographics. The groups were not significantly different in terms of age, $F(5, 719) = .77$, $p = .58$, gender, $\chi^2(5) = 1.56$, $p = .91$, ethnicity, $\chi^2(5) = 23.08$, $p = .81$, BMI, $F(5, 703) = .49$, $p = .79$ and SES, $\chi^2(55) = 44.90$, $p = .83$. Participants hunger reports were also not significantly different by group, $F(5, 719) = 2.65$, $p = .02$. Including hunger in the models did not change the conclusions of the analyses (see Appendix 6.3).

6.1.3 Results

6.1.3.1 Participants.

Participants ($n = 725$) had a mean age of 46.62 years ($SD = 16.96$) and 50.48% were women. The sample was majority White (92.97%), with a mean BMI of 25.4 ($SD = 24.77$). See Table 6.1 for an overview of participant characteristics.

6.1.3.2 Primary Outcome: Self-reported desire to consume

See Table 6.2 for an overview of test statistics and Table 3 for means and standard deviations.

Hypothesis 1: Participants will report a higher desire to consume chocolate than cereal bars. The model showed that the chocolate bars ($M = 53.71$, $SD = 33.61$) were more desired than the cereal bars ($M = 44.09$, $SD = 32.27$), $F(1, 700) = 18.08$, $p < .001$, $\eta^2 = .02$.

Hypothesis 2: Participants will report a higher desire for the morally labelled food than the food without a moral label.
The results showed that there was no significant difference between the labels on desire to consume (Angelic $M = 47.95$, $SD = 34.28$, Devilish $M = 50.18$, $SD = 32.66$, Control $M = 48.21$, $SD = 32.91$), $F(2, 700) = .34$, $p = .71$, $\eta^2_p = .001$.

Hypothesis 3: There will be an interaction between food type and moral label on desire to consume.

There was a marginally significant interaction between food type and label, $F(2, 700) = 2.63$, $p = .07$, $\eta^2_p = .01$. Planned comparisons indicated that participants did *not* desire the cereal bar more when it was labelled as Angelic ($M = 46.64$, $SD = 34.49$) than when labelled as Devilish ($M = 43.28$, $SD = 31.22$), $F(1, 238) = .36$, $p = .62$, $\eta^2_p = .002$. However, the Devilish chocolate bar ($M = 57.31$, $SD = 32.72$) was more desired than the Devilish cereal bar ($M = 43.28$, $SD = 31.22$), $F(1, 238) = 11.46$, $p = .007$, $\eta^2_p = .05$, and the control chocolate bar ($M = 54.47$, $SD = 33.75$) was more desired than the control cereal bar ($M = 42.39$, $SD = 31.13$), $F(1, 232) = 8.48$, $p = .02$, $\eta^2_p = .03$ (see Figure 6.2. and Table 6.4)

Hypothesis 4: The interaction between moral label type and food type on the desire to consume will be moderated by a) restrained eating and b) moral identity.
Neither the three-way interaction between food type, label, and restrained eating (continuous), $F(2, 707) = .16$, $p = .85$, $\eta^2_p = .003$, nor with moral identity (continuous), $F(2, 707) = .48$, $p = .62$, $\eta^2_p < .001$, on desire to consume was found to be significant.

Table 6.1

Participant Characteristics

Group	Angelic Cereal (*n* = 123)	Angelic Chocolate (*n* = 117)	Devilish Cereal (*n* = 122)	Devilish Chocolate (*n* =118)	Control Cereal (*n* = 127)	Control Chocolate (*n* = 118)	Total (*n* = 725)
Age *M* (SD)	46.89 (16.33)	47.44 (17.16)	44.30 (17.37)	45.91 (16.23)	47.09 (17.69)	48.14 (16.97)	46.62 (16.96)
Gender [Female] % (*n*)	51.22 (63)	52.99 (62)	46.72 (57)	50.00 (59)	48.82 (62)	53.39 (63)	50.48 (366)
Ethnicity [White]% (*n*)	95.12 (117)	94.87 (111)	95.08 (116)	92.37 (109)	88.19 (112)	92.37 (109)	92.97 (674)
Education [University degree] % (*n*)	34.96 (43)	35.90 (42)	41.80 (51)	33.05 (39)	37.80 (48)	37.29 (44)	36.83% (267)
BMI *M* (SD)	25.39 (5.20)	25.04 (5.10)	24.97 (4.42)	25.51 (5.84)	25.77 (5.91)	25.74 (5.23)	25.40 (5.30)
Hunger	3.57 (1.28)	3.58 (1.34)	3.61 (1.29)	3.80 (1.29)	3.98 (1.28)	3.45 (1.29)	3.67 (1.30)

Table 6.2

Results of ANOVAs for the primary outcome (Desire to Consume) and secondary outcomes (Tastiness, Healthiness and Calories) by food type, label type, RE and MI.

Predictor	F	df	p	η^2_p
Desire to Consume				
Food	18.08	1, 700	<.001	.02
Label	.34	2, 700	.71	.001
Food *Label	2.63	2, 700	.07	.01
Food *Label*RE	.16	2, 707	.85	.003
Food *Label*MI	.48	2, 707	.62	<.001
Tastiness				
Food	.27	1, 719	.60	.0004
Label	1.22	2, 719	.30	.003
Food *Label	5.86	2, 719	.003	.02
Food *Label*RE	.65	2, 713	.53	.002
Food *Label*MI	1.45	2, 713	.24	.004
Healthiness				
Food	64.29	1, 719	<.001	.08
Label	1.49	2, 719	.23	.004
Food *Label	4.48	2, 719	.01	.01
Food *Label*RE	.87	2, 713	.42	.002
Food *Label*MI	1.95	2, 713	.14	.005
Calories				
Food	5.68	1, 719	.02	.008
Label	.46	1, 719	.63	.001
Food *Label	.69	2, 719	.50	.002
Food *Label*RE	.34	2, 713	.71	.001
Food *Label*MI	.13	2, 713	.87	.0004

Note. RE = Restrained Eating, MI = Moral Identity.
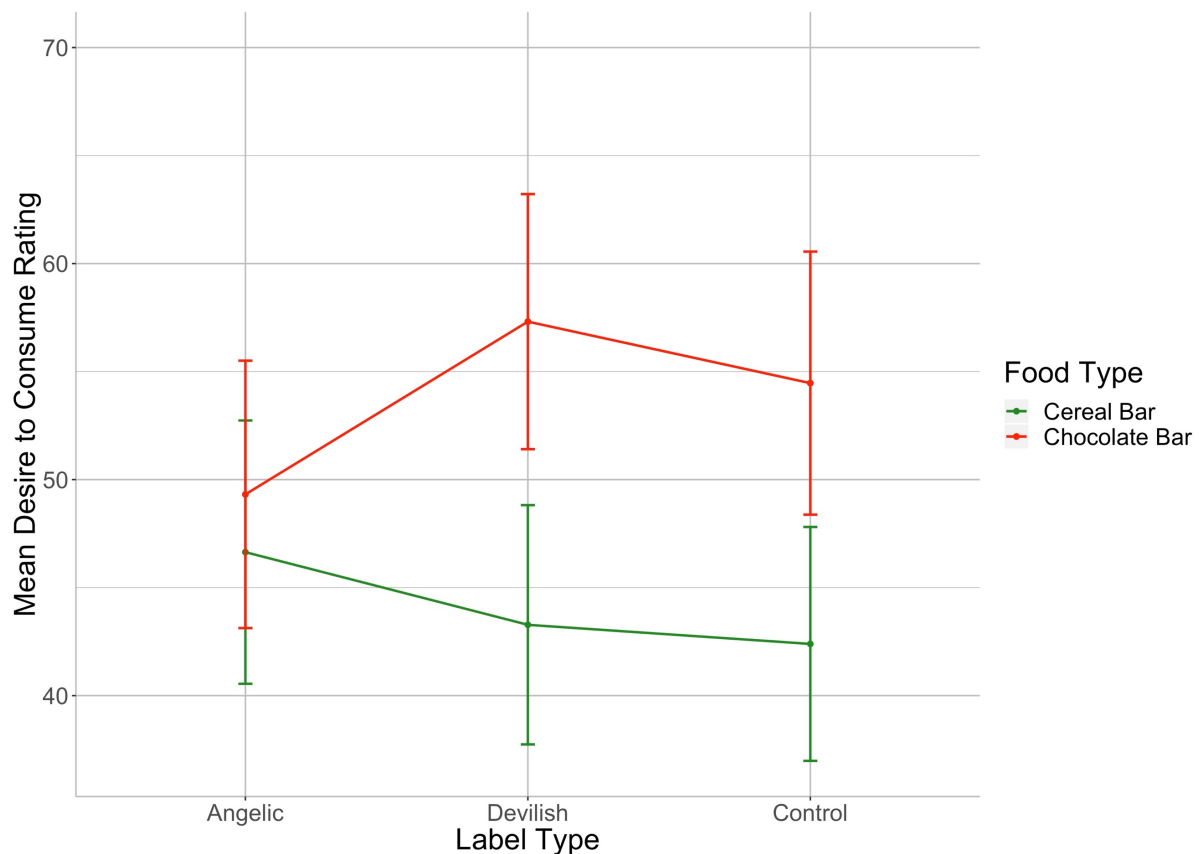
Figure 6.2. Interaction between food and label type on desire to consume food type. Error bars are 95% CIs.

6.1.3.3 Secondary Outcomes.

See Table 6.2 for the test statistics and Table 6.3 for breakdowns of means and standard deviations of Table 6.4 for simple main effects of significant interactions.

Tastiness.

A 2 (Food type: cereal bar or chocolate bar) x 3 (Label type: Angelic, Devilish or Control) ANOVA revealed that chocolate bars ($M = 56.87$, $SD = 20.55$) were not perceived as tastier than cereal bars ($M = 56.05$, $SD = 21.85$), $F(1, 719) = .27$, $p = .60$, $\eta^2_p = .0004$, and there was no difference in tastiness between the Angelic ($M = 57.06$, $SD = 20.35$), Devilish ($M = 57.57$, $SD = 20.93$) and Control bars ($M = 54.76$, $SD = 22.27$), $F(2, 719) = 1.22$, $p = .30$, $\eta^2_p = .003$. Although no main effects were significant the two predictors interacted (Figure 6.3). Simple effects with Bonferroni-Holm corrections showed that a cereal bar was rated as tastier when labelled as Angelic ($M = 60.38$, $SD = 21.79$) than when labelled with no moral descriptors ($M = 52.45$, $SD = 22.53$), $F(1, 248) = 8.00$, $p = .04$, $\eta^2_p = .03$, while a chocolate bar was rated as tastier when labelled as Devilish ($M = 59.77$, $SD = 21.17$) rather than Angelic ($M = 53.56$, $SD = 18.16$), $F(1, 233) = 5.82$, $p = .05$, $\eta^2_p = .02$. Furthermore, Angelic labels made participants

rate cereal bars ($M = 60.38$, $SD = 21.79$) as marginally tastier than chocolate bars ($M = 53.56$, $SD = 18.16$), $F(1, 238) = 6.90$, $p = .04$, $\eta^2_p = .03$. No other effects were significant.

Table 6.3

Means and standard deviations for Desire to Consume, Tastiness, Healthiness and Calories by both food type and label type separately and in total.

	Food type		
Label	Total M (SD)	Cereal bar M (SD)	Chocolate bar M (SD)
Desire to Consume			
Angelic	47.95 (34.28)	46.64(34.49)	49.32 (34.16)
Devilish	50.18 (32.66)	43.28 (31.22)	57.31 (32.72)
Control	48.21 (32.91)	42.39 (31.13)	54.47 (33.75)
Total	48.77 (33.26)	44.09 (32.27)	53.71 (33.61)
Tastiness			
Angelic	57.06 (20.35)	60.38 (21.79)	53.56 (18.16)
Devilish	57.57 (20.93)	55.43 (20.56)	59.77 (21.17)
Control	54.76 (22.27)	52.45 (22.53)	57.24 (21.81)
Total	56.45 (21.21)	56.05 (21.85)	56.87 (20.55)
Healthiness			
Angelic	55.09 (19.02)	63.38 (17.54)	46.37 (16.51)
Devilish	52.65 (19.41)	56.72 (19.80)	48.43 (18.14)
Control	52.50 (20.15)	56.40 (20.51)	48.30 (18.96)
Total	53.40 (19.55)	58.81 (19.55)	47.70 (17.88)
Calories			
Angelic	52.83 (51.31)	52.25 (15.92)	15.92 (14.69)
Devilish	53.05 (15.42)	51.79 (15.71)	54.36 (15.06)
Control	51.76 (16.16)	49.60 (16.13)	54.08 (15.93)
Total	52.54 (15.62)	51.19 (15.92)	53.95 (15.20)

Figure 6.3. Interaction between food and label type on perceived tastiness of food. Error bars are 95% CIs.

Healthiness.

A 2 (food type: cereal bar or chocolate bar) x 3 (label type: Angelic, Devilish or Control) factorial ANOVA showed that the cereal bars (*M* = 58.81, *SD* = 15.92) were thought to be healthier than the chocolate bars (*M* = 47.70, *SD* = 17.88), $F(1, 719) = 64.29$, p <.001, $\eta^2_p = 08$, but there was no difference between the three labels on perceived healthiness (Angelic *M* = 55.09, *SD* = 19.02, Devilish *M* = 52.65, *SD* = 19.41, Control *M* = 52.50, SD = 20.15), $F(2, 719) = 1.49$, *p* = .23, $\eta^2_p = .004$. The main effect of food bar was qualified by a statistically significant interaction between label and food type, $F(2, 719) = 4.48$, *p* = .01, $\eta^2_p = .01$. Post hoc analyses using simple main effects with Bonferroni-Holm corrections showed that cereal bars labelled as Angelic (*M* = 63.38, *SD* = 17.54) were perceived as healthier than those labelled as Devilish (*M* = 46.37, *SD* = 16.51), $F(1, 243) = 7.77$, *p* = .01, $\eta^2_p = .03$ (see Figure 6.4).
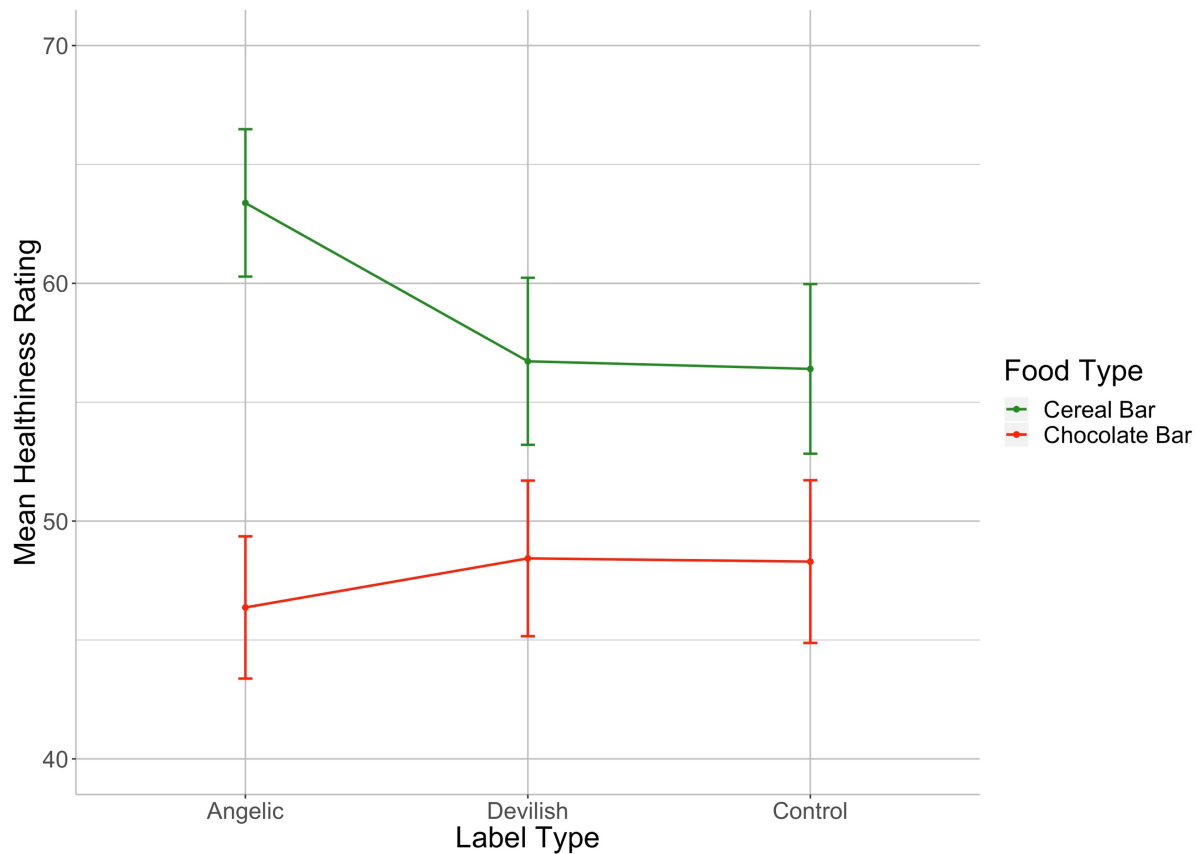
Figure 6.4. Interaction between food and label type on the perceived healthiness of the food. Error bars are 95% CIs.

Calories.

A 2 (food type: cereal bar or chocolate bar) x 3 (label type: Angelic, Devilish or Control) factorial ANOVA indicated that participants thought the chocolate bars ($M = 53.95$, $SD = 15.20$) contained more calories than the cereal bars ($M = 51.19$, $SD = 15.92$), $F(1,719) = 5.68$, $p = .02$, $\eta^2_p = .008$, but there was no effect of label $F(2, 719) = .46$, $p = .63$, $\eta^2_p = .001$, and no interaction between food type and label type, $F(2, 719) = .69$, $p = .50$, $\eta^2_p = .002$ (see Figure 6.5).
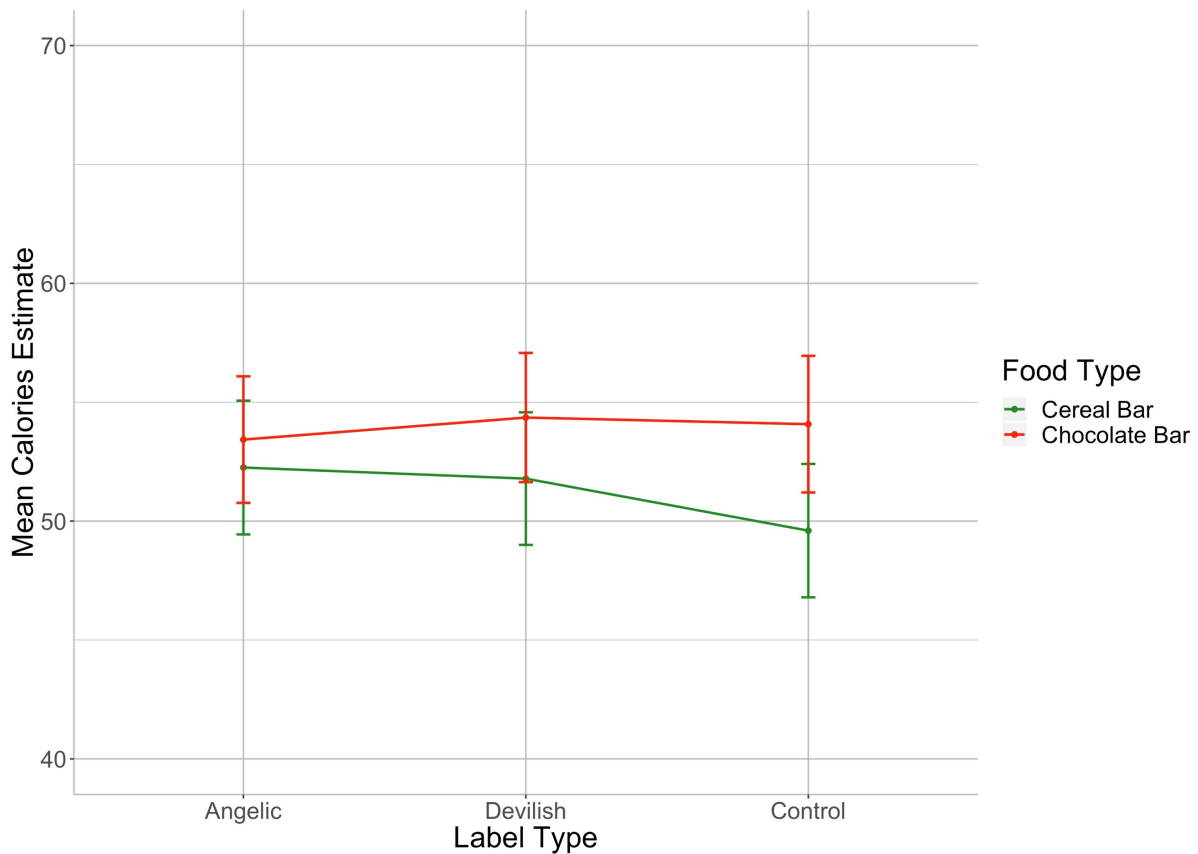
Figure 6.5. Interaction between food and label type on the estimated number of calories of the food. Error bars are 95% CIs.

Moderation by restrained eating and moral identity.

For perceived tastiness, there were no significant 3-way interactions between food type, label and restrained eating $F(2, 713) = .65$, $p = .53$, $\eta^2_p = .002$, or between food type, label and moral identity, $F(2, 713) = 1.45$, $p = .24$, $\eta^2_p = .004$. For perceived healthiness, there were also no 3-way interactions between label, food type and restrained eating, $F(2, 713) = 4.48$, $p = .42$, $\eta^2_p = .002$, or moral identity, $F(2, 713) = 1.94$ $p = .14$, $\eta^2_p = .005$. Finally, there were also no 3-way interactions between label, food type and restrained eating, $F(2, 713) = .34$, $p = .71$, $\eta^2_p = .001$, or between label, food type and moral identity on perceived calories, $F(2, 713) = .13$, $p = .87$, $\eta^2_p = .0004$.

Table 6.4

Simple main effects with Bonferroni-Holm corrections for the significant interactions between food type and label type for Desire to Consume, Tastiness and Healthiness

Predictor	F	df	p	η^2
Desire to Consume				
Angelic Cereal − Angelic Chocolate	.36	1, 238	.62	.002
Devilish Cereal − Devilish Chocolate	11.56	1, 238	.007	.05
Regular Cereal − Regular Chocolate	8.48	1, 232	.02	.03
Angelic Cereal − Devilish Cereal	.64	1, 243	.62	.003
Angelic Cereal − Regular Cereal	1.05	1, 248	.55	.004
Devilish Cereal − Regular Cereal	.05	1, 247	.82	<.001
Angelic Chocolate − Devilish Chocolate	3.56	1, 233	.20	.01
Angelic Chocolate − Regular Chocolate	1.35	1, 233	.55	.006
Devilish Chocolate − Regular Chocolate	.43	1, 234	.61	.002
Tastiness				
Angelic Cereal − Angelic Chocolate	6.90	1, 238	.04	.03
Devilish Cereal − Devilish Chocolate	2.59	1, 238	.16	.01
Regular Cereal − Regular Chocolate	2.85	1, 243	.16	.01
Angelic Cereal − Devilish Cereal	3.34	1, 243	.15	.01
Angelic Cereal − Regular Cereal	8.00	1, 248	.04	.03
Devilish Cereal − Regular Cereal	1.19	1, 247	.31	.005
Angelic Chocolate − Devilish Chocolate	5.82	1, 233	.05	.02
Angelic Chocolate − Regular Chocolate	1.97	1, 233	.21	.01
Devilish Chocolate − Regular Chocolate	.82	1, 234	.37	.003
Healthiness				
Angelic Cereal − Angelic Chocolate	59.75	1, 238	<.001	.20
Devilish Cereal − Devilish Chocolate	11.42	1, 238	.004	.05
Regular Cereal − Regular Chocolate	10.27	1, 243	.005	.04
Angelic Cereal − Devilish Cereal	7.77	1, 243	.01	.03
Angelic Cereal − Regular Cereal	8.34	1, 248	.009	.03
Devilish Cereal − Regular Cereal	.02	1, 247	.96	<.001
Angelic Chocolate − Devilish Chocolate	.83	1, 233	.52	.004
Angelic Chocolate − Regular Chocolate	.69	1, 233	.52	.003
Devilish Chocolate − Regular Chocolate	.003	1, 234	.95	<.001

6.2 Study 5

Study 4 showed that overall participants desired chocolate bars more than cereal bars. This effect was qualified by a marginally significant interaction whereby chocolate bars were more desired with an immoral label than a moral label. No significant effect of label was found for cereal bars. For health and taste, participants thought a cereal bar was healthier but less tasty than a chocolate bar. This was qualified by significant interactions, such that a cereal bar was perceived as tastier and healthier with a moral label, and a chocolate bar was perceived as tastier with an immoral label. Even though participants perceived chocolate bars to contain more calories than cereal bars, there was no effect of label and no interaction between label and food type. The effects were not moderated by any of the individual difference variables measured.

Study 4 assessed self-reported desire and perceptions about food characteristics. To investigate whether moral labels impact food consumption, in Study 5 participants were offered small pieces of cereal and chocolate bars in two separate bowls, which either had a moral or immoral label. Although participants seemed to prefer healthy food with a moral label and unhealthy food with an immoral label, it is unclear whether participants explicitly associate healthiness with morality. Therefore, participants' moral judgements of cereal and chocolate bars were also assessed. Participants were also asked to judge the moral goodness and badness of themselves and others when eating cereal or chocolate bars, to address the lack of direct measures of moral judgments of food and eating in Study 2. In addition to the individual characteristics assessed in Study 4, measures of impulsivity and sustainable shopping habits were included. Trait impulsivity has been shown to moderate the impact of environmental features, such as food variety or increased taxes, on consumption (Giesen, Havermans, Nederkoorn & Jansen, 2012; Guerrieri, Nederkoorn & Jansen, 2008). For example, past research has found that people who regularly engage with food labels and buy organic and fair trade products are less susceptible to the halo-effect of these labels (Lee et al., 2013).

It was predicted that participants would consume more of the chocolate than the cereal bar and no difference in consumption between the labels. Rather, an interaction between food type and moral label was expected whereby participants would consume more chocolate bars with an immoral label than a moral label, and no effect of label on the consumption of cereal bars.

6.2.1 Method

6.2.1.1 Pilot, sample size calculation and participants

A pilot was conducted to obtain an estimate of the predicted effect size for the study. Participants completed the experiment as detailed below, but did not fill out the individual difference measures. Thirty participants took part in the pilot (Lancaster, Dodd & Williamson, 2004). One participant guessed the purpose of the study, leaving a sample of 29. The results of the pilot indicated that participants ate more food when it was labelled as 'Devilish' than when it was 'Angelic', $p < .05$, which was not in line with the expected pattern. However, when controlling for age, gender, BMI, last time of eating, hunger and SES, the finding that participants consumed more of a 'Devilish' food was explained by an unlucky randomisation process (see Appendix 6.4). Thus, the effect size calculation was performed by a Monte Carlo simulation. The results of the simulation showed that a sample size of 210 would allow us to detect a significant medium effect of labels ($d = 0.5$) on the intake of healthy and unhealthy food with a probability of 0.8 by means of a Wilcoxon test. The results also showed that a mixed model, controlling for fixed effects, was superior in comparison to t-tests in terms of power. Mixed models were therefore the preferred method of analysis.

Two-hundred and twelve participants were recruited through volunteer mailing lists, online and local advertising. Three participants were removed due to not spending the set time on the taste task, an error with the display of labels and a missing weight recording, leaving a final sample of 209 (Angelic $n = 105$, Devilish $n = 104$). All participants were screened for relevant food allergies and intolerances. They were reimbursed £10 for their time.

6.2.1.2 Study design

The design was a 2 (within-subjects food type: chocolate bar vs. cereal bar) x 2 (between-subjects label type: moral vs. immoral) repeated measures design. Participants were randomly allocated to one of two label groups: 'Angelic' or 'Devilish'. Within each group, they were all simultaneously presented with one bowl of cereal bar pieces and one bowl of chocolate bar pieces, with counterbalanced order presentation of the bowls.

6.2.1.3 Study setting

Participants attended an individual study session in a testing room in the Department of Psychology, University of Cambridge. The testing room consisted of a table where the food bowls were placed and a chair positioned in front of the table. The proximity of the food bowls

was kept constant at 35cm from the table edge. Each testing session lasted approximately 45 minutes.

6.2.1.4 Intervention

The moral status of the food label was manipulated: 1) moral = 'Angelic', 2) immoral = 'Devilish'. Two types of food were used: 1) Cereal bar, 2) Chocolate bar. The food was cut up into varying sizes to maximise variability. The pieces were piled on top of each other, as previous research has found that larger portions of food increase food consumption (see Hollands et al., 2015 for a review). The baseline weight of the bowl and food totalled circa 200g. The bowl was weighed before and after the study session.

6.2.1.5 Procedure

The study protocol was approved by the University of Cambridge Department of Psychology Ethics Committee (ref: 2015-16/32). To standardise levels of satiety, the experimental sessions were run between 11am-7pm. The participants were required not to eat any food two hours before the experiment (see Evers, de Ridder & Adriaanse, 2009; Sproesser et al., 2014). Upon agreeing to take part in the study, each participant was presented with pieces of cereal bars and chocolate bars in two separate bowls, with the label being given just above the bowl. Participants were told to evaluate each product on taste, healthiness, calories, structure and perception of the foods, as well as willingness-to-pay (WTP). Before tasting, they were asked to indicate their desire for the item, before moving on to sampling and filling out the rest of the survey. They were told that they could eat as much of each food as they would like and they were given 30 minutes alone in the room to complete the survey. Unbeknownst to the participants, each bowl was weighed in advance of the taste test and after the participant had left, so that the amount consumed per participant could be ascertained. At the end of the study, participants were also asked for their demographics, before being debriefed and thanked for their participation.

6.2.1.6 Measures

6.2.1.6.1 Primary observed behavioural outcome: Consumption of the food (g)

The primary outcome measure was the consumed amount of each type of bar in grams (g). This took the form of a difference score between the bowl weight before and after the taste test. To facilitate the later synthesising with Study 6's binary measure of selection into an observed

behaviour variable, the consumption variable was dichotomised. Dichotomisation was based on whether the participant consumed more cereal (coded as 1) than chocolate (coded as 0).

6.2.1.6.2 Secondary outcomes

Self-reported measures of desire to consume, tastiness, healthiness, and calorie estimation were the same as in Study 4. Participants were asked to report their desire before the taste test, and the tastiness and healthiness during tasting.

Willingness-to-pay. At the end of the taste task, participants were asked to indicate the highest amount of money (in £, p) they would be willing to pay for the food item (e.g., Schulze & Wansink, 2012)

Filler items and taste ratings. To fill up the time participants spent on the taste test and encourage consumption, several taste-related items were asked (see Appendix 6.5).

6.2.1.6.3 Individual difference measures

Sustainable shopping habits. To measure participants' use of nutrition labels and ethically sourced foods they were asked the questions: 'I usually read nutrition labels on foods', 'I usually buy organic food' and 'I usually buy fair trade foods', with answers recorded on a VAS ranging from 0 ('Strongly disagree') – 100 ('Strongly agree').

Impulsivity. To measure individual differences in impulsivity the Barratt Impulsiveness Scale (BIS-11; Patton, Stanford & Barratt, 1995) was used. The BIS is a 30-item self-report questionnaire assessing 6 assets of impulsivity (Attention [e.g. 'I don't pay attention'], Motor [e.g. 'I do things without thinking'], Self-Control [e.g. 'I plan tasks carefully], Cognitive Complexity [e.g. 'I like to think about complex problems'], Perseverance [e.g. 'I change jobs'] and Cognitive Instability [e.g. 'I have racing thoughts']. The items were answered on a 1 ('Rarely/Never') – 4 ('Almost Always') Likert scale. The BIS-11 had acceptable internal reliability, $\alpha = .74$.

Restrained Eating. The restrained eating measure, Dutch Eating Behaviour Questionnaire (van Strien et al., 1986), was the same as in Study 4. The internal reliability in the current study was good, $\alpha = .90$.

Moral Identity. The Moral Identity Scale (Aquino & Reed, 2002) was the same as in Study 4 (α = .88).

6.2.1.4 Control variables and demographics

Participants were also asked to rate how hungry they are ('How hungry do you feel right now?' answered on a 7-point rating scale anchored at -3 = Very hungry, 0 = Neither hungry nor full, +3 = Very full), as well as their weight and height to calculate BMI. In addition, participants were asked to indicate their age, gender, ethnicity, political views and socio-economic status. Socio-economic group was identified by the NRS Social Grade classification tool developed by the British National Readership Survey and is derived by the profession of highest earner (NRS, 2018).

6.2.2 Data analysis

All analyses were carried out in R (version 3.3.3). The primary outcome, number of grams of food consumed, was analysed using a linear mixed model (LMM) controlling for fixed effects and with a random term for participants. The dichotomised consumption variable was also analysed using a chi-square to examine the effect of label on behaviour. All secondary outcome variables and moderation analyses were also analysed using LMMs. 'lmer' from the 'lme4' package was used to carry out the analyses. In cases where test-assumptions were not met, the outcome variable was transformed instead (see section 6.2.2.1).

6.2.2.1 Assumptions

All model residuals were assessed by both visual inspections (histograms, QQ plots) and statistical assessments (Shapiro-Wilk test). The LMM analysing the effect of food and label type on the primary outcome, total grams of food consumed was found to violate assumptions of normality ($W = .91$, $p < .001$). Using the cube-root of the outcome variable was found to correct for non-normality. For the secondary outcomes, all models were found to violate assumptions of normality (desire to consume: $W = .96$, $p < .001$, tastiness: $W = .95$, $p < .001$, healthiness: $W = .97$, $p < .001$ and calories: $W = .97$, $p < .001$, WTP: $W = .56$, $p < .001$.). Desire to consume and calories were positively skewed. Tastiness and healthiness were negatively skewed and were reflected before transformations were applied, and back-reflected thereafter. All four variables were square-rooted before being entered into the LMMs, which amended the non-normality. The WTP variable was negatively skewed with

several univariate outliers. The variable was first Winsorized and then square-root transformed before being entered into the LMM.

For the models assessing moral judgement, moral badness of the food, moral goodness and badness of the participant themselves consuming the food and others consuming the food were all non-normally distributed (all ps <. 001.). The log was taken of each variable before being entered into the final models.

6.2.2.2 Randomisation checks

To check that randomisation had been successful, relevant measures and demographic characteristics of the two randomised groups were compared. Using a Mann-Whitney U test to account for the positive skew of age and negative skew of hunger, it was found that participants in the two groups did not differ in terms of age, $W = 19026$, $p = .75$ or hunger, $W = 22024$, $p = .62$. A t-test showed that participants were also matched on BMI, $t(399.37) = -.95$, $p = .34$. Chi-square tests also showed that the two groups were not statistically different in terms of gender, $\chi^2(2) = .06$, $p = .97$, but they were statistically different on ethnicity, $\chi^2(7) = 26.77$, $p <. 001$. This difference is likely due to the larger spread of ethnicities in the Angelic condition than in the Devilish condition. However, the largest ethnic group (Caucasian) was not statistically different across groups, $\chi^2(1) = .14$, $p = .71$. As a sensitivity check, including ethnicity in the models did not change the conclusions of the analyses (these sensitivity analyses are reported in Appendix 6.6).

6.2.3 Results

6.2.3.1 Participants

The mean age was 22.42 ($SD = 3.48$), with women making up 67.46 % of the sample. The sample was mostly White (63.64%), and had a BMI of 22.09 ($SD = 2.89$). See Table 6.5 for a full overview of participant characteristics.

6.2.3.2 Primary observed behavioural outcome: Consumption of the food (g)

See Table 6.7 for an overview of test statistics.

Hypothesis 1: Participants will eat more grams of chocolate than cereal

The model showed that participants ate significantly more grams of cereal (M = 52.42, SD = 39.38) than chocolate bar pieces (M = 38.27, SD = 28.84), β = -.44, SE = .09, t (207) = -4.79, p < .001, d = .66, 95% CI [-.62, -.26].

Table 6.5

Participant characteristics

	Angelic (n = 105)	Devilish (n = 104)	Total (n = 209)
Age M (SD)	22.51 (3.76)	22.32 (3.17)	22.42 (3.48)
Gender [female] % (*n*)	67.62 (71)	67.31 (70)	67.46 (141)
Ethnicity [White] % (*n*)	61.90 (65)	65.38 (68)	63.64 (133)
BMI M (*SD*)	21.95 (2.88)	22.23 (2.91)	22.09 (2.89)
Hunger M (*SD)*	5.81 (2.21)	5.66 (2.38)	5.73 (2.29)

Hypothesis 2: There will be an interaction between food type and moral label on consumption

When testing for an interaction between label type and food type on the number of grams of food consumed, the model did not reveal a statistically significant effect (see Figure 6.5), β = .18, SE = .13, t (207) = 1.36, p = .19, d = .19, 95% CI [-.08, .43].

Examining the dichotomised consumption variable, a chi-square showed that whether participants ate more chocolate than cereal, or cereal than chocolate, was dependent on label, χ^2 (1) = 4.38, p = .04, OR = 1.58. Although participants overall ate more cereal, when shown the 'Angelic' label there was a shift towards participants eating more cereal (n =78) than chocolate (n = 25) and when shown the 'Devilish' label the shift was towards the chocolate (n = 34) rather than the cereal (n = 67) (see Table 6.6 for an overview).

Table 6.6

Contingency table showing how many participants ate more cereal than chocolate or more chocolate than cereal depending on the label.

	More cereal n (%)	More chocolate n (%)	Total
Angelic	78 (75.73)	25 (24.27)	103
Devilish	67 (66.34)	34 (33.66)	101
Total	145	59	204

Exploratory analysis of individual differences

Several moderation analyses were conducted to explore whether certain individual characteristics (restrained eating, moral identity, impulsivity, sustainable shopping habits) influenced any effect of label on food type for consumption. See Table 6.8 for an overview of test statistics. Including restrained eating in the model showed that it did not moderate the effect of food type and label type on amount of food consumed, β = .03, *SE* = .24, *t* (187) = .12, *p* = .91, *d* = .02, 95% CI [-.44, .50].

When moral identity was included as a moderator of the interaction effect, a significant effect was found (Figure 6.7), β = -.43, *SE* = .20, *t* (196) = -2.10, *p* = .04, *d* = .29, 95% CI [-.82, -.03]. Pairwise comparisons with a Tukey adjustment showed that participants with higher moral identity displayed decreased consumption of Devilish chocolate bar, β = -.28, *SE* = .13, *p* <.05, df = 340.1, 95% CI [-.53, -.02]. No other groups were affected by moral identity.

Impulsivity was not found to interact with food and label type on consumption of food, β = -.15, *SE* = .43, *t* (185) = -.36, *p* = .72, *d* = .05, 95% CI [-.1.01, -.70]. No impact was found of shopping habits (regularly reading nutrition labels, buying organic and fair trade food) on the effect of labels and food type on consumption.
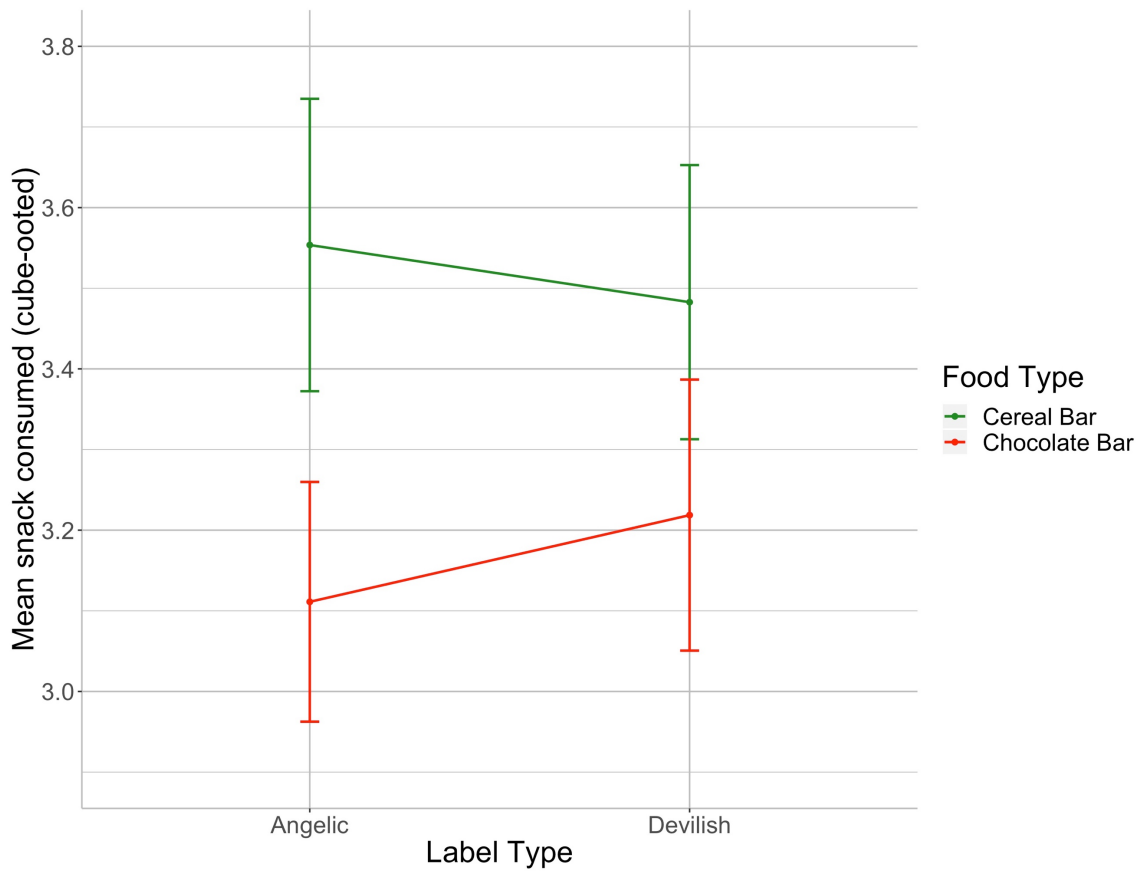
Figure 6.6. Interaction between food type and label type on amount of food consumed (cube-rooted). Error bars are 95% CIs.
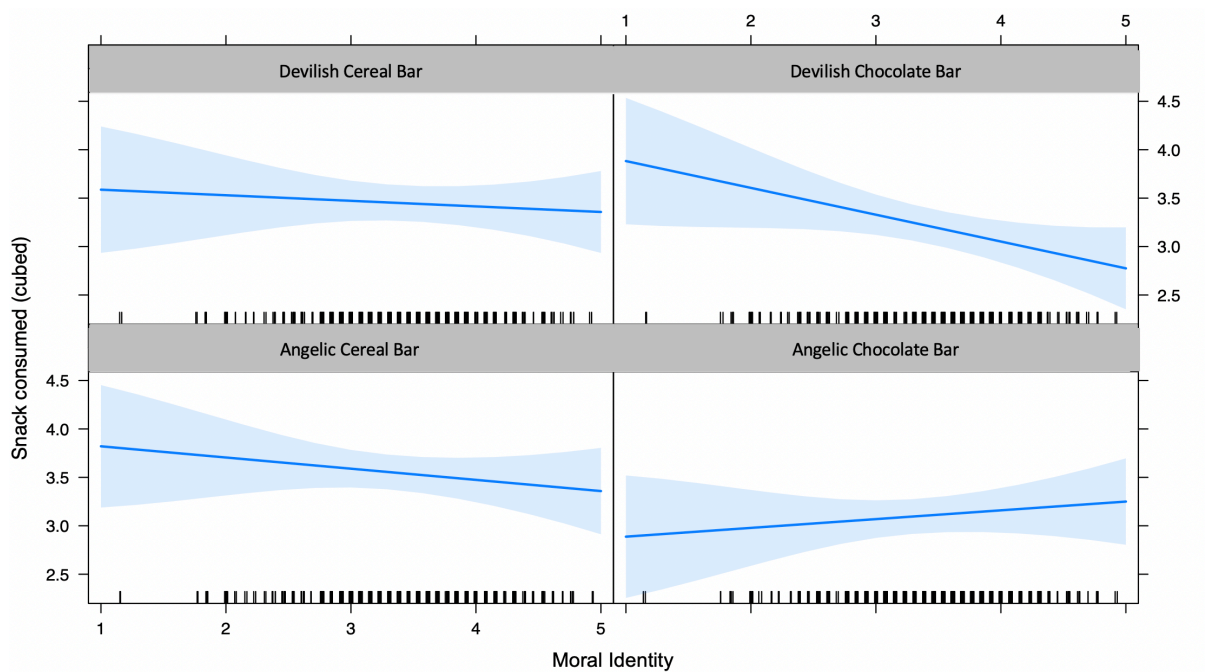
Figure 6.7. Three-way interaction between food type, label type and moral identity. Error bars are 95% CI bands.

Table 6.7

Results of LMMs for the primary outcome (consumption) and secondary outcomes (Desire to Consume, Tastiness, Healthiness, Calories and Willingness-to-Pay [WTP]).

Predictor	*β*	*SE*	*df*	*t*	*p*	*d*	*95% CIs*
Consumption							
Food	-.44	.09	207	- 4.79	<.001	.66	-.62, -.26
Label	-.07	.12	354.10	-.59	.56	.08	-.21, .17
Food *Label	.18	.13	207	1.36	.18	.19	-.08, .43
Desire to Consume							
Food	.35	.08	206.40	4.52	<.001	.63	.20, .49
Label	.02	.09	374.30	.18	.86	.02	-.16, .20
Food *Label	-.05	.11	206	-.50	.62	.07	-.27, .16
Tastiness							
Food	.03	.08	205.50	.36	.72	.05	-.13, .18
Label	-.09	.06	404.60	-1.03	.31	.14	-.25, .07
Food *Label	.12	.11	206	1.06	.29	.15	-.10, .34
Healthiness							
Food	-.98	.07	206	-13.20	<.001	1.83	-1.12, -.83
Label	.13	.09	385.80	1.53	.13	.21	-.03, .30
Food *Label	-.06	.11	206	-.56	.58	.08	-.26, .15
Calories							
Food	.76	.19	206	4.05	<.001	.56	.39, 1.12
Label	-.52	.32	290.40	-1.64	.10	.26	-1.32, .02
Food *Label	-.03	.27	206	-.12	.90	.02	-.55, .48
WTP							
Food	-.01	.02	207	-.68	.50	.09	-.05, .02
Label	-.01	.03	284.44	-.38	.71	.05	-.07, .05
Food *Label	.01	.02	207	.43	.67	.06	-.04, .06

Note. The following variables were transformed before being entered into the model: Consumption (cube-rooted), Desire to Consume (square-rooted), Tastiness (square-rooted), Healthiness (square-rooted) and Calories (square-rooted). The reference categories are as follows: Food (Cereal Bar) and Label (Angelic).

Table 6.8

Results of LMMs for the moderators for the primary outcome (Consumption) and secondary outcomes (Desire to Consume, Tastiness, Healthiness, Calories and Willingness-to-Pay [WTP]) of Study 5.

Predictor	β	SE	df	t	p	d	95% CIs
Consumption							
Food *Label*Restrained Eating	.03	.24	187	.12	.91	.02	-.44, .50
Food *Label*Moral Identity	-.43	.20	196	-2.10	.04	.29	-.82, -.03
Food *Label*Impulsivity	-.15	.43	185	-.36	.72	.05	-1.01, .70
Food *Label*Read Nutrition Labels	.07	.04	202	1.63	.11	.23	-.01, ,15
Food *Label*Buy Organic	.04	.05	203	.87	.39	.11	-.05, .13
Food *Label*Buy Fair Trade	-.03	.05	202	-.65	.52	.09	-.12, .06
Desire to Consume							
Food *Label*Restrained Eating	-.13	.21	186.90	-.65	.52	.09	-.53, .27
Food *Label*Moral Identity	.16	.17	196.60	.93	.35	.13	-.17, .48
Food *Label*Impulsivity	-.13	.34	184.70	-.38	.71	.05	-.81, .55
Food *Label*Read Nutrition Labels	.05	.04	201.50	1.34	.18	.19	-.02, .12
Food *Label*Buy Organic	.09	.04	202	2.23	.03	.31	.01, .16
Food *Label*Buy Fair Trade	.03	.04	201.70	.84	.40	.12	-.04, .11
Tastiness							
Food *Label*Restrained Eating	-.11	.21	186.80	-.51	.61	.07	-.52, .30
Food *Label*Moral Identity	-.23	.17	195.80	-1.33	.18	.18	-.56, .11
Food *Label*Impulsivity	-.50	.37	184.5	-1.34	.18	.19	-1.22, .22
Food *Label*Read Nutrition Labels	.001	.04	203	.02	.99	.002	-.07, .07
Food *Label*Buy Organic	-.01	.04	202.30	-.16	.87	.02	-.09, .07
Food *Label*Buy Fair Trade	.003	.04	202.70	.08	.93	.01	-.08, .08
Healthiness							
Food *Label*Restrained Eating	.30	.20	187	1.53	.13	.21	-.08, .69
Food *Label*Moral Identity	-.08	.16	196	-.53	.59	.07	-.39, .23
Food *Label*Impulsivity	.23	.35	185	.65	.52	.09	-.46, .92
Food *Label*Read Nutrition Labels	-.01	.03	202	-.21	.84	.03	-.07, .06
Food *Label*Buy Organic	-.03	.03	202	-.79	.43	.11	-.11, .04
Food *Label*Buy Fair Trade	<.001	.04	202	.01	.99	.002	-.07, .07
Calories							
Food *Label*Restrained Eating	-.78	.52	187	-1.50	.14	.21	-1.79, .23
Food *Label*Moral Identity	.17	.42	196	.45	.66	.06	-.63, 1.00
Food *Label*Impulsivity	-2.11	.89	185	-2.37	.02	.33	-3.84, -.38
Food *Label*Read Nutrition Labels	.01	.09	202	.11	.91	.02	-.16, .18
Food *Label*Buy Organic	-.06	.10	202	-.62	.54	.09	-.25, .13
Food *Label*Buy Fair Trade	-.08	.06	202	-.86	.39	.12	-.27, .10
WTP							
Food *Label*Restrained Eating	.01	.05	187	.12	.91	.02	-.09, .10
Food *Label*Moral Identity	-.03	.04	196	.87	.39	.12	-.11, .04
Food *Label*Impulsivity	-.13	.08	185	-1.65	.10	.23	-.29, .02
Food *Label*Read Nutrition Labels	-.004	.01	202	-.51	.61	.07	-.02, .01
Food *Label*Buy Organic	.01	.01	202	1.34	.18	.19	-.01, .03
Food *Label*Buy Fair Trade	-.01	.01	202	.74	.46	.10	-.02, .01

Note. The models were run separately for each moderator. The following variables were transformed before being entered into the model: Consumption (cube-rooted), Desire to Consume (square-rooted), Tastiness (square-rooted), Healthiness (square-rooted) and Calories (square-rooted). The reference categories are as follows: Food (Cereal Bar) and Label (Angelic). The moderators are all continuous.

Table 6.9

Means and Standard Deviations for Consumption, Desire to Consume, Tastiness, Healthiness and Calories by both Food and Label Type separately and in total.

| | Food | | | | | |
| | Transformed values | | | Original values | | |
Label	Total M (SD)	Cereal M (SD)	Chocolate M (SD)	Total M (SD)	Cereal M (SD)	Chocolate M (SD)
Consumption						
Angelic	3.33 (.89)	3.55 (.95)	3.11 (.78)	45.14 (36.51)	54.49 (42.75)	35.79 (25.96)
Devilish	3.35 (.89)	3.48 (.88)	3.22 (.87)	45.55 (33.91)	50.32 (35.75)	40.78 (31.41)
Total	3.34 (.89)	3.52 (.92)	3.16 (.83)	45.34 (35.20)	52.42 (39.38)	38.27 (28.84)
Desire to Consume						
Angelic	1.35 (.68)	1.18 (.65)	1.53 (.70)	6.27 (2.45)	5.68 (2.52)	6.84 (2.26)
Devilish	1.34 (.68)	1.20 (.60)	1.49 (.60)	6.22 (2.41)	5.78 (2.28)	6.67 (2.47)
Total	1.35 (.68)	1.19 (.61)	1.51 (.71)	6.25 (2.34)	5.73 (2.40)	6.76 (2.36)
Tastiness						
Angelic	1.49 (.59)	1.48 (.53)	1.51 (.65)	6.86 (1.99)	6.89 (1.78)	6.84 (2.18)
Devilish	1.47 (.64)	1.39 (.58)	1.54 (.68)	6.72 (2.10)	6.54 (2.02)	6.91 (2.17)
Total	1.48 (.61)	1.44 (.56)	1.52 (.67)	6.80 (2.04)	6.72 (1.91)	6.87 (2.17)
Healthiness						
Angelic	1.35 (.79)	1.83 (.62)	.86 (.63)	2.44 (2.22)	3.75 (2.14)	1.13 (1.36)
Devilish	1.45 (.81)	1.97 (.55)	.93 (.69)	2.75 (2.32)	4.17 (2.08)	1.33 (1.56)
Total	1.40 (.80)	1.90 (.59)	.89 (.66)	2.59 (2.27)	3.95 (2.12)	1.23 (1.46)
Calories						
Angelic	14.68 (2.10)	14.30 (2.15)	15.05 (1.99)	219.80 (57.33)	209.04 (57.55)	230.55 (55.30)
Devilish	14.14 (2.49)	13.78 (2.20)	14.51 (2.68)	204.24 (68.05)	193.03 (57.39)	215.44 (75.88)
Total	14.34 (2.51)	14.04 (2.20)	14.78 (2.37)	212.05 (63.29)	201.07 (57.89)	223.03 (66.62)
WTP						
Angelic	.82 (.34)	.81 (.33)	.82 (.36)	.94 (.72)	1.01 (.92)	.88 (.42)
Devilish	.79 (.33)	.78 (.30)	.80 (.36)	.93 (.71)	.92 (.55)	.95 (.94
Total	.8 (.34)	.80 (.31)	.81 (.36)	.94 (.71)	.96 (.76)	.91 (.66)

Note. The following variables were transformed: Consumption (cube-rooted), Desire to Consume (square-rooted), Tastiness (square-rooted), Healthiness (square-rooted) and Calories (square-rooted).

6.2.3.3 Secondary outcomes

Unless otherwise stated, LMMs controlling for fixed effects of label were also used to analyse the secondary outcome variables. If the variable was transformed to correct for non-normality, both original and transformed means and standard deviations are reported. Test statistics for all secondary outcomes are reported in Table 6.7, moderator results in Table 6.8 and means and standard deviations in Table 6.9.

Desire to consume

Using a square root transformation of the desire to consume variable to correct for non-normality (transformed values are reported), the LMM showed that participants desired chocolate (M = 1.51, SD = .71) more than cereal bar (M = 1.19, SD = .61), β = .35, SE = .08, t (206.40) = 4.52, p < .001, d = .63, 95% CI [.20, .49], but there was no difference between label types (Angelic M = 1.35, SD = .68, Devilish M = 1.34, SD = .68), β = .02, SE = .09, t (374.30) = .18, p = .86, d = .02, 95% CI [-.16, .20]. The model also revealed no interaction between the two, β = -.06 SE = .11, t (206) = -.50, p = .62, d = .07, 95% CI [-.27, -.16].

Taste

A LMM with food and label type predicting the square root of the taste variable was conducted. Transformed values are reported. The model showed that participants did not perceive cereal (M = 1.44, SD = .56) to taste better than the chocolate (M = 1.51, SD = .71), β = .03 SE = .08, t (205.50) = .36, p = .72, d = .05, 95% CI [-.13, .18], there was no difference between label types (Angelic M = 1.49, SD = .59, Devilish M = 1.47, SD = .64), β = -.09 SE = .06, t (404.60) = .-1.03, p = .31, d = .14, 95% CI [-.25, .07], and no interaction between the two was found, β = .12 SE = .11, t (206) = 1.06 p = .29, d = .15, 95% CI [-.10, .34].

Healthiness

A LMM was conducted on the square-rooted health variable, with food and label type as predictors. Transformed values are reported. Results showed that participants judged the chocolate bar (M = .89, SD = .66) as less healthy than the cereal bar (M = 1.90, SD = .59), β = -.98 SE = .07, t (206) = -13.20 p < .001, d = 1.83, 95% CI [-1.12, -.83], but there was no effect of label (Angelic M = 1.35, SD = .79, Devilish M = 1.45, SD = .81), β = .13 SE = .09, t (385.80) = 1.53 p = .13, d = .21, 95% CI [-.03, .30], or any interaction between food type and label on perceived healthiness, β = -.06 SE = .11, t (206) = -.56 p = .58, d = .08, 95% CI [-.26, .15].

Calories

A LMM with food type and label type as predictors of estimated calorie content were computed. Two participants had estimated the calorie content to be zero and were therefore removed from analysis. Due to a positive skew, the variable was square-rooted, but original values are reported here for ease of interpretation. The results showed that participants thought a chocolate bar (M = 223.03, SD = 66.62) contained more calories than a cereal bar (M = 201.07, SD = 57.89), β = .76 SE = .19, t (206) = 4.05 p <.001, d = .56, 95% CI [.39, 1.12], there was no statistically significant difference between Angelic (M = 219.80, SD = 57.33) and Devilish labels (M = 204.24, SD = 68.05), β = -.52 SE = .32, t (290.40) = -1.64, p = .10, d = .26, 95% CI [-1.32, .02], and no interaction between label and food type on calorie estimation, β = -.03 SE = .02, t (206) = -.12 p = .90, d = .02, 95% CI [-.55, .48].

Willingness-to-pay

The results showed that participants did not want to pay more for either food type, nor for any label type. There was also no interaction between food type and label type on WTP.

Moderation by individual differences

To analyse whether the impact of moral labels on the self-reported secondary outcomes for food types were moderated by the individual differences restrained eating, moral identity, impulsivity and shopping habits, a series of LMMs were run. Due to the number of analyses, only significant models are reported here. See Table 6.8 for a full overview of all model results.

Self-reported desire to consume. For desire to consume, food and label type did not interact with restrained eating, moral identity, impulsivity, reading nutrition labels, or buying fair trade food, all ps > .10. However, there was a significant interaction between tendency to buy organic food, food and label type on desire, β = .09 SE = .04, t (202) = 2.23, p = .03, d = .31, 95% CI [.01, .16], but no individual slope showed a significant change across groups, >.30.

Taste. No three-way interaction between and label type, and restrained eating, moral identity, impulsivity, reading food labels, buying organic food or buying fair trade food were found, all ps > .10.

Healthiness. No effects were found of the individual differences measures of restrained eating, moral identity, impulsivity or reading food labels, buying organic food or buying fair trade food, all ps >.10.

Calories. There was no three-way interaction between food and label type and restrained eating, moral identity, reading food labels, buying organic food or buying fair trade food, all ps > .10. The only significant three-way interaction was between food, label type and impulsivity (see Figure 6.8). Simple slopes analysis with Tukey method for comparing a family of four estimates showed that for a devilish chocolate bar there was a negative relationship between impulsivity and calorie estimation, M = -1.99, SE = .71, df = 265.04, 95% CI [-3.38, -.59]. That is, the more impulsive the participants reported to be, the fewer calories they believed the devilish chocolate bar contained. Impulsivity did not moderate the effects of any other labelled food type.
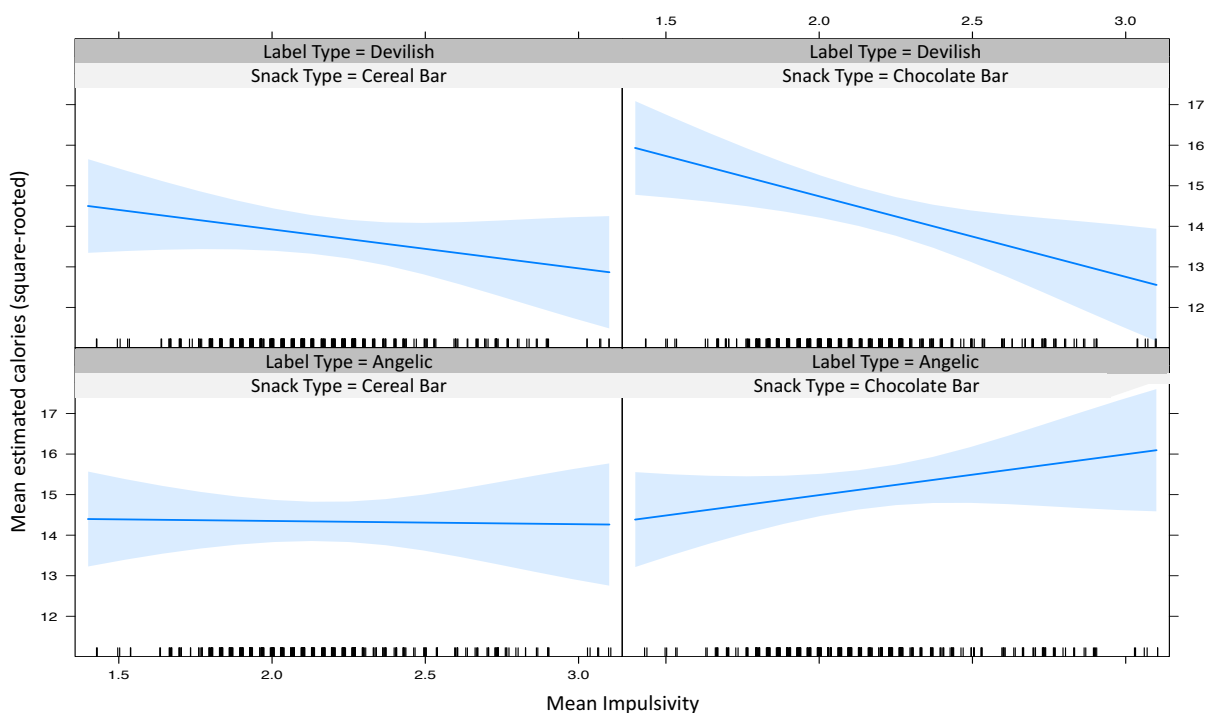
Figure 6.8. Interaction between food type, label type and impulsivity on estimated calories of the food, with 95% CI bands.

Individual differences. Separate LMMs were run with each individual difference measure moderating the food and label interaction on willingness-to-pay for the food. No three-way interaction was found to be significant, all ps >.10.

6.2.3.4 Moral judgements

See Table 6.10 for a breakdown of means and standard deviation and Table 6.11 for all test statistics.

Moral judgement of food

The model showed that participants thought cereal bars (M = 1.97, SD = 2.62) to be more morally good than chocolate bars (M = 1.04, SD = 1.97), β = -.81, SE = .19, t (207) = -4.15 p < .001, d = .57, 95% CI [-1.20, -.43], but no effect of label, β = .27, SE = .32, t (297.81) = .84 p = .40, d = .12, 95% CI [-.36, .90], or an interaction between label and food type, β = -.24, SE = .28, t (207) = -.86, p = .39, d = .12, 95% CI [-.78, .31]. In terms of morally bad judgements, participants thought the chocolate bar (M = 1.57, SD = 2.1) was more morally bad than the cereal bar (M = .77, SD = 1.53), β = .35, SE = .07, t (207) = 4.75 p < .001, d = .67, 95% CI [.20 .49], but there was no statistically significant effect of label type, β = .16, SE = .11, t (315.67) = 1.41 p = .16, d = .19, 95% CI [-.06, .37] and no interaction, β = -.01 SE = .10, t (207) = -.05, p = .96, d = .01, 95% CI [-.21, .20] All reported means and standard deviations are non-transformed values due to the moral goodness of the food variable not being transformed.

Moral judgement of the self

For the judgements of moral goodness of the self, there was a significant main effect of food type such that participants thought they were more morally good after eating a cereal bar (M = .68, SD = .79) than after a chocolate bar (M = .48, SD = .69), β = -.19, SE = .05, t (207) = -3.84 p < .001, d = .53, 95% CI [-.29, -.09]. However, there was no main effect of label, β = .09, SE = .10, t (261.41) = -.91 p = .36, d = .13, 95% CI [-.11 .29], and no interaction between label and food type, β = -.02, SE = .07, t (207) = -.34 p = .73, d = .05, 95% CI [-.15, .11]. For the judgement of moral badness, the model showed a significant main effect of food such that participants thought they were more morally bad after eating a chocolate bar (M = .78, SD = .73) than after eating a cereal bar (M = .45, SD = .58), β = .33, SE = .05, t (207) = 6.31 p < .001, d = .87, 95% CI [.23, .43], but there was no main effect of label, β = .02, SE = .09, t (286.06) = .21 p = .84, d = .03, 95% CI [-.16, .26] and no interaction between the two, β = .004, SE = .07, t (207) = .06 p = .96, d = .01, 95% CI [-.14, .15]. Reported means and standard deviations are transformed values.

Moral judgement of others

There was a main effect of food type on the judgement of moral goodness of others, such that those who ate a cereal bar (*M* = .74, *SD* = .79) was judged as higher than those who ate a chocolate bar (*M* = .46, *SD* = .66), *ß* = -26, *SE* = .06, *t* (207) = -4.64, *p* <. 001, *d* = .64, 95% CI [-.37, -.15], but there was no main effect of label, *ß* = .07, *SE* = .10, *t* (280.76) = .66, *p* = .51, *d* = .09, 95% CI [-.13 .26], and no interaction between the two, *ß* = -.03, *SE* = .08, *t* (207) = -.37, *p* = .71, *d* = .05, 95% CI [-.18, .13.] For judgment of moral badness, there was a main effect of food type in that participants judged those who ate chocolate bars (*M* = .55, *SD* = .64) to be more morally bad than those who ate cereal bars (*M* = .33, *SD* = .49), *ß* = .24 *SE* = .05, *t* (207) = 5.12 *p* < .001, *d* = .71, 95% CI [.15, .33], but there was no main effect of label, *ß* = .07, *SE* = .08, *t* (289.77) = .86, *p* = .39, *d* = .12, 95% CI [-.09, .22], and no interaction between food and label type, *ß* = -.03, *SE* = .07, *t* (207) = -.47, *p* = .64, *d* = .07, 95% CI [-.16, .10].

Table 6.10

Means and Standard Deviations for moral judgements of goodness and badness for the food, the self and others who eat the food across food and label type.

Label	Food type					
	Transformed values			Original values		
	Total M (SD)	Cereal M (SD)	Chocolate M (SD)	Total M (SD)	Cereal M (SD)	Chocolate M (SD)
Food						
Goodness						
Angelic	-	-	-	1.43 (2.31)	1.84 (2.47)	1.02 (2.06)
Devilish	-	-	-	1.58 (2.42)	2.11 (2.76)	1.05 (1.88)
Total	-	-	-	1.50 (2.36)	1.97 (2.62)	1.04 (1.97)
Badness						
Angelic	.64 (.80)	.47 (.65)	.81 (.90)	1.05 (1.84)	.63 (1.36)	1.47 (2.15)
Devilish	.79 (.82)	.62 (.73)	.96 (.87)	1.30 (1.91)	.91 (1.68)	1.68 (2.06)
Total	.72 (.81)	.55 (.69)	.89 (.89)	1.17 (1.88)	.77 (1.53)	1.57 (2.1)
Self						
Goodness						
Angelic	.54 (.76)	.64 (.81)	.45 (.70)	1.50 (2.93)	1.83 (3.43)	1.16 (2.31)
Devilish	.62 (.73)	.73 (.77)	.52 (.68)	1.55 (2.41)	1.88 (2.60)	1.23 (2.17)
Total	.58 (.75)	.68 (.79)	.48 (.69)	1.52 (2.68)	1.85 (3.04)	1.20 (2.24)
Badness						
Angelic	.60 (.67)	.44 (.60)	.77 (.71)	1.38 (2.07)	.95 (1.81)	1.81 (2.23)
Devilish	.62 (.68)	.46 (.57)	.79 (.75)	1.44 (2.07)	.93 (1.54)	1.95 (2.39)
Total	.61 (.68)	.45 (.58)	.78 (.73)	1.41 (2.07)	.94 (1.68)	1.88 (2.31)
Others						
Goodness						
Angelic	.57 (.73)	.70 (.76)	.44 (.68)	1.44 (2.35)	1.78 (2.5)	1.10 (2.15)
Devilish	.63 (.74)	.77 (.81)	.48 (.64)	1.58 (2.44)	2.05 (2.74)	1.10 (2.01)
Total	.60 (.74)	.74 (.79)	.46 (.66)	1.51 (2.39)	1.92 (2.62)	1.10 (2.07)
Badness						
Angelic	.41 (.57)	.29 (.48)	.53 (.63)	.87 (1.63)	.60 (1.44)	1.14 (1.77)
Devilish	.47 (.59)	.36 (.49)	.57 (.66)	.97 (1.63)	.68 (1.29)	1.26 (1.88)
Total	.44 (.58)	.33 (.49)	.55 (.64)	.92 (1.63)	.64 (1.36)	1.20 (1.82)

Note. The following variables were transformed: Moral badness of food (log) moral goodness and badness of self (log) and moral goodness and badness of others (log).

Table 6.11

Results of LMMs for the judgement of moral goodness and moral badness for the food type (Cereal, Chocolate), the self eating the food type and others eating the food type

Predictor	β	SE	df	t	p	d	95% CIs
Food							
Goodness							
Food	-.81	.19	207	-4.15	<.001	.57	-.1.20 -.43
Label	.27	.32	297.81	.84	.40	.12	-.36, .90
Food *Label	-.24	.28	207	-.86	.39	.12	-.78, .31
Badness							
Food	.35	.07	207	4.75	<.001	.67	.20, .49
Label	.16	.11	315.67	1.41	.16	.19	-.06, .37
Food *Label	-.01	.10	207	-.05	.96	.01	-.21, 20
Self							
Goodness							
Food	-.19	.05	207	-3.84	<.001	.53	-.29, .09
Label	.09	.10	261.41	.91	.36	.13	-.11, .29
Food *Label	-.02	.07	207	-.34	.73	.05	-.16, .11
Badness							
Food	.33	.05	207	6.31	<.001	.87	.23, .43
Label	.02	.09	286.06	.21	.84	.03	-.16, .20
Food *Label	.004	.07	207	.06	.96	.01	-.14, .15
Others							
Goodness							
Food	-.26	.06	207	-4.64	<.001	.64	-.37, -.15
Label	.07	.10	280.76	.66	.51	.09	-.13, .26
Food *Label	-.03	.08	207	-.37	.71	.05	-.18 .13
Badness							
Food	.24	.05	207	5.12	<.001	.71	.15, .33
Label	.07	.08	289.77	.86	.39	.12	-.09, .22
Food *Label	-.03	.07	207	-.47	.64	.07	-.16, .10

Note. The following variables were transformed before being entered into the model: Moral badness of food (square-rooted), moral goodness and badness of self (log) and moral goodness and badness of others (log).

6.3 Study 6

In Study 5 participants ate more cereal bar pieces than chocolate bar pieces, even though they reported to desire the chocolate bar pieces more. They also thought the cereal bar pieces to be healthier but contain more calories. An interaction between food and label type only emerged when the consumption was dichotomised by whether participants ate more cereal than chocolate or chocolate than cereal. The significant interaction effect revealed that 'Angelic' labelled foods were consumed equally, but when the foods had a 'Devilish' label there was a shift towards participants eating the chocolate rather than the cereal. Two three-way interactions were also found: participants high on moral identity were found to eat less 'Devilish' chocolate bar pieces, and the more impulsive participants reported they thought the 'Devilish' chocolate bar pieces contain fewer calories. Overall participants also reported that chocolate and those who consume it were morally bad, while cereal bars and its consumers were judged as morally good.

Although participants overall ate more of the cereal bars when shown the 'Angelic' label there was a shift towards participants eating more cereal ($n = 78$) than chocolate ($n = 25$) and when shown the 'Devilish' label the shift was towards the chocolate ($n = 34$) rather than the cereal ($n = 67$) (see Table 6.6 for an overview).

Study 4 differs from Study 5 in an important way. While in Study 4 the participants were representative of the general UK population on gender, age (above 18), socioeconomic status and geographical location, Study 5 consisted mainly of university students. Thus, to further investigate the effect of moral labelling on eating behaviour an experiment was conducted in which participants selected between two bars: a chocolate bar or a cereal bar. Depending on the condition, the bars were either labelled as Angelic or Devilish. Based on the results of the two previous studies it was predicted that participants would be more likely to choose a chocolate bar than a cereal bar, and participants' selection would be influenced by the label displayed. Specifically, it was hypothesised that participants would be more likely to choose a chocolate bar labelled as Devilish rather than Angelic, and more likely to choose a cereal bar labelled as Angelic rather than Devilish.

6.3.1 Method

6.3.1.1 Participants

Participants were 276 attendees (124 female) at the Cambridge Science Festival with an average age of 24.36 years (SD = 17.25). The sample consisted of both children under the age of 16 (n =116) and adults and adolescents above the age of 16 (n = 139). The sample was self-selecting in that participants chose to attend the science festival and approached the Behaviour and Health Research Unit stand.

6.3.1.2 Study design

The study was 2 (within-subjects food type: chocolate bar vs cereal bar) x 2 (between-subjects label type: moral vs immoral) repeated measures design. Participants saw both food types, but only one label type.

6.3.1.3 Intervention

Participants were shown two baskets side by side, one filled with cereal bars and one filled with chocolate bars. Depending on the condition, baskets were either labelled as 'Angelic Chocolate Bar" and "Angelic Cereal Bar", or "Devilish Chocolate Bar" and "Devilish Cereal Bar". The food was individually wrapped in cellophane to remove the original wrapping but keep the food presentable and hygienic (see Figure 6.9).
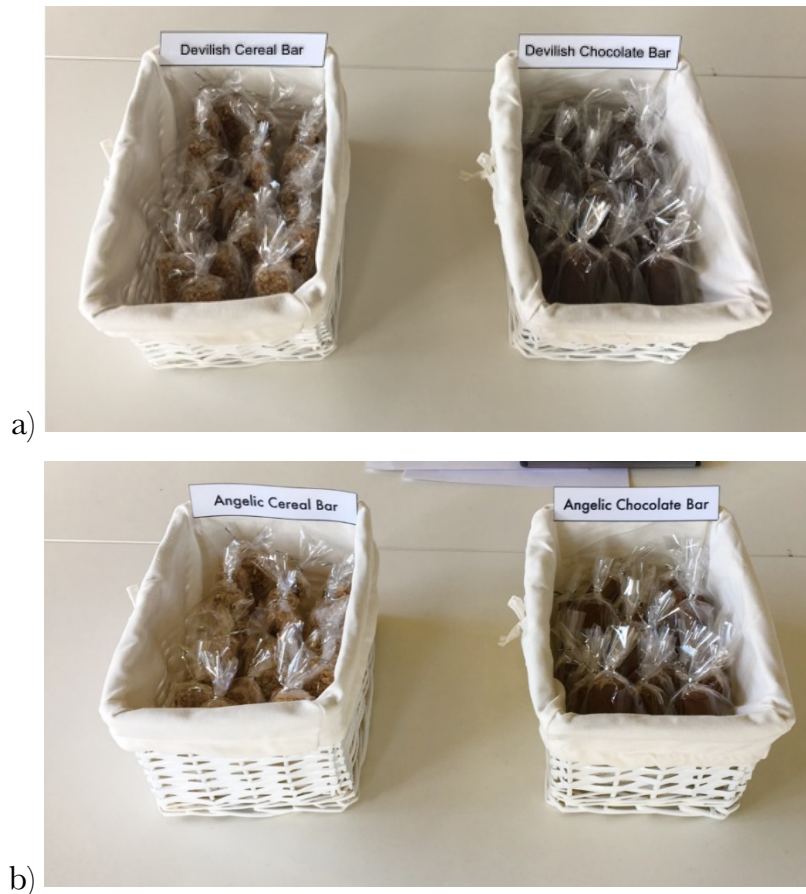
Figure 6.9. Presentation of food in the A) Devilish condition, and B) Angelic condition. Order presentation was counterbalanced.

6.3.1.4 Procedure

The study was part of a stall run by the Behaviour and Health Research Unit at the University of Cambridge Science Festival. The festival took place at the University Technical College in Cambridge on the 26th of March 2017. As participants entered the room in which the stall was placed, they were asked for their demographics and were then given a sticker with a participant number. They then proceeded to work their way through the different tasks and experiments set out by the research group, of which the current study was one. At the current study stall participants were given a chance to choose one of two food products, bearing one of two label types, as a treat to take home. The labels were rotated approximately every 30 minutes throughout the day and order of food presentation was counterbalanced.

6.3.1.5 Measures

Primary observed behavioural outcome: Selection of food type

The primary outcome was which food the participant selected: chocolate bar or cereal bar.

Demographics

Participants' age and gender were recorded, as well as their current hunger and thirst levels.

6.3.2 Results

6.3.2.1 Demographic characteristics

Due to the non-random allocation of attendees to group, analyses were carried out to assess whether gender, age, hunger and thirst were equally distributed across groups. A Chi-squared test gave no evidence that gender distribution was different across groups, χ^2 (1) = .02, p > .25, and an independent t-test showed that participants were of a similar age in both groups, t (228.96) = -1.26, p = .21. Furthermore, participants were equally hungry, t (254.19) = -.40, p > .25, and thirsty, t (253.06) = -1.61, p = .11, across both groups. Randomisation to groups was therefore deemed successful.

6.3.2.2 Primary outcome: Selection of food type

Hypothesis 1: Participants will be more likely to choose a chocolate than a cereal bar

A chi-squared test of equal proportions showed that attendees were more likely to choose a chocolate bar (184) than a cereal bar (92) overall, χ^2 (1) = 322.68, OR = 2, p <.001.

Hypothesis 2: The selection of food will be dependent on the label. Participants will be more likely to choose a cereal bar when labelled as Angelic than when labelled as Devilish and more likely to choose a chocolate bar when labelled as Devilish than when labelled as Angelic.

A Pearson's Chi-Square with Yates' continuity correction revealed that selection of food was influenced by label, χ^2 (1) = 5.91, OR = 1.95, p = .01, such that the choice of snack bar shifted towards cereal bars in the Angelic label condition and towards chocolate bars in the Devilish condition (see Table 6.12).

Table 6.12

Contingency table showing the number of participants in each group choosing either a cereal bar or a chocolate bar.

	Selection of Food		
Label	Cereal count (%)	Chocolate count (%)	Total
Angelic	59 (40.14%)	88 (59.86%)	147
Devilish	33 (25.58%)	96 (74.42%)	129
Total	92	184	276

6.4 Study 7

Internal Meta-Analysis

When conducting multiple studies each individual study might not reach conventional levels of significance. It is increasingly recommended for researchers to combine the effect sizes of multiple studies in an internal meta-analysis to overcome potential problems with statistical power in each individual study (Braver, Thoemmes & Rosenthal, 2014; Cumming, 2014; Goh, Hall & Rosenthal, 2016; Schimmack, 2012). As such, the effects of interactions and pairwise comparisons of the reported desire to consume and perceptions of taste and health from Study 4 and Study 5 were combined in an internal meta-analysis to assess the overall effect. The consumption and selection results of Study 5 and Study 6 were also synthesised into a 'observed behavioural' outcome (see section 6.4.1.1). The 'rma' function from the R package 'metafor' was used to conduct all meta-analyses apart from the odds ratio for the observed behavioural variable which was analysed using the 'metabin' function from the R package 'meta'. A fixed effect model was used due to the interventions across studies being very similar and the small number of studies included (Borenstein, Hedges, Higgins & Rothstein, 2009).

6.4.1 Results

6.4.1.1 Observed behaviour (selection and consumption)

To combine the consumption and selection results from Study 5 (continuous) and 6 (binary), the consumption variable from Study 5 was dichotomised. Participants who ate more cereal than chocolate were coded as preferring cereal, while participants who ate more chocolate than cereal were coded as preferring chocolate. For the meta-analysis of the overall odds ratio for each study, the log odds ratio was calculated before being combined in the fixed-effects meta-analysis. To analyse the odds from each cell, Study 5 and 6 were combined using the odds ratio and then analysed using the Mantel-Haenszel method of meta-analysis. The results showed that overall observed behaviour towards the food was dependent on the label. Participants ate or selected an Angelic labelled cereal bar over a Devilish labelled cereal bar. Conversely, participants ate or selected a chocolate bar with a Devilish label in comparison to those labelled with an Angelic label. Furthermore, within each label condition, participants preferred cereal over chocolate when the label was Angelic, and chocolate over cereal when the label was Devilish. Figure 6.10 for the forest plots.

a) Interaction between food and label type for the observed behavioural outcome

Interaction between snack type and label type — **Effect Size (log OR) [95% CI]**

	Effect Size (log OR) [95% CI]
Study 5	0.67 [0.15, 1.18]
Study 6	0.46 [0.03, 0.89]
FE Model	0.55 [0.21, 0.88]

Log Odds Ratio

b) Difference between Angelic cereal and Devilish cereal bars

Study	Angelic Events	Total	Devilish Events	Total	Odds Ratio	OR	95%-CI	Weight
Study 5	156	206	134	202		1.58	[1.03; 2.44]	60.9%
Study 5	59	147	33	129		1.95	[1.17; 3.26]	39.1%
Fixed effect model		353		331		1.73	[1.24; 2.40]	100.0%

Heterogeneity: $I^2 = 0\%$, $\tau^2 = 0$, $p = 0.54$

c) Difference between Angelic chocolate and Devilish chocolate bars

Study	Angelic Events	Total	Devilish Events	Total	Odds Ratio	OR	95%-CI	Weight
Study 5	50	206	68	202		0.63	[0.41; 0.97]	55.9%
Study 6	88	147	96	129		0.51	[0.31; 0.86]	44.1%
Fixed effect model		353		331		0.58	[0.42; 0.81]	100.0%

Heterogeneity: $I^2 = 0\%$, $\tau^2 = 0$, $p = 0.54$

d) Difference between cereal and chocolate bars for the Angelic label

Study	Cereal Events	Total	Chocolate Events	Total	Odds Ratio	OR	95%-CI	Weight
Study 5	78	103	24	103		10.27	[5.41; 19.51]	10.0%
Study 6	59	147	88	147		0.45	[0.28; 0.72]	90.0%
Fixed effect model		250		250		1.43	[1.02; 1.99]	100.0%

Heterogeneity: $I^2 = 98\%$, $\tau^2 = 4.8249$, $p < 0.01$

e) Difference between cereal and chocolate bar for the Devilish label

Study	Cereal Events	Total	Chocolate Events	Total	Odds Ratio	OR	95%-CI	Weight
Study 5	67	101	34	101		3.88	[2.17; 6.96]	13.8%
Study 6	33	129	96	129		0.12	[0.07; 0.21]	86.2%
Fixed effect model		**230**		**230**		**0.64**	**[0.45; 0.90]**	**100.0%**

Heterogeneity: $I^2 = 99\%$, $\tau^2 = 6.0136$, $p < 0.01$

0.1 0.5 1 2 10
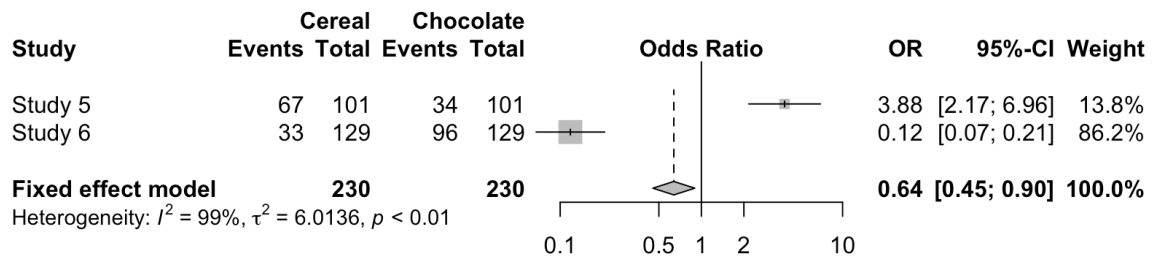
Figure 6.10. Forest plot of the interaction between food and label type on the observed behavioural outcome for food (a) and for Angelic vs Devilish within cereal bars (b) and chocolate bars (c), and cereal and chocolate bars for the Angelic (d) and Devilish (e) labels.

6.4.1.2 Self-reported desire

There was not an overall interaction between food and label type on the self-reported desire to consume the food. There was no significant difference between conditions, and within the label conditions participants desired chocolate bars more than cereal bars across both labels. See Figure 6.11 for forest plots.

a) Interaction between snack type and label type on desire to consume

Interaction between snack type and label type	Effect Size (d) [95% CI]
Study 5	0.21 [0.01, 0.41]
Study 6	-0.05 [-0.25, 0.15]
FE Model	0.08 [-0.06, 0.22]

-0.4 -0.2 0 0.2 0.4 0.6

Effect Size
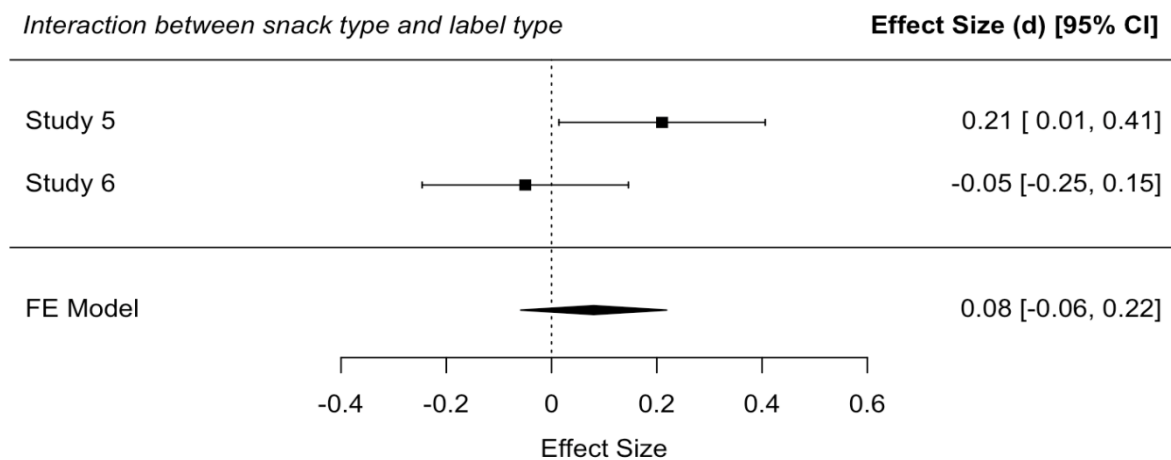
b) Difference between Angelic cereal bar and Devilish cereal bar desire

Study	Total	Angelic Mean	SD	Total	Devilish Mean	SD	Standardised Mean Difference	SMD	95%-CI	Weight
Study 4	123	46.64	34.4900	122	43.28	31.2200		0.10	[-0.15; 0.35]	47.5%
Study 5	104	5.68	2.5200	193	5.78	2.2800		-0.04	[-0.28; 0.20]	52.5%
Fixed effect model	**227**			**315**				**0.03**	**[-0.15; 0.20]**	**100.0%**

Heterogeneity: $I^2 = 0\%$, $\tau^2 = 0$, $p = 0.41$

-0.3 -0.2 -0.1 0 0.1 0.2 0.3
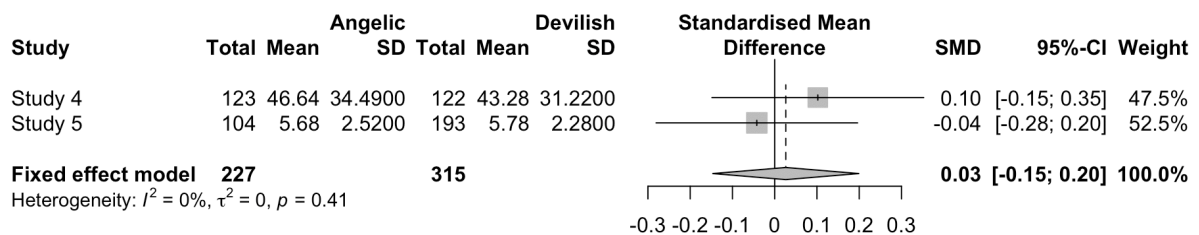
c) Difference between Angelic chocolate and Devilish chocolate desire

Study	Total	Angelic Mean	SD	Total	Devilish Mean	SD	Standardised Mean Difference	SMD	95%-CI	Weight
Study 4	117	49.32	34.1600	118	57.31	32.7200		-0.24	[-0.50; 0.02]	52.9%
Study 5	105	6.84	2.2600	103	6.67	2.4700		0.07	[-0.20; 0.34]	47.1%
Fixed effect model	222			221				-0.09	[-0.28; 0.09]	100.0%

Heterogeneity: $I^2 = 62\%$, $\tau^2 = 0.0301$, $p = 0.10$

-0.4 -0.2 0 0.2 0.4
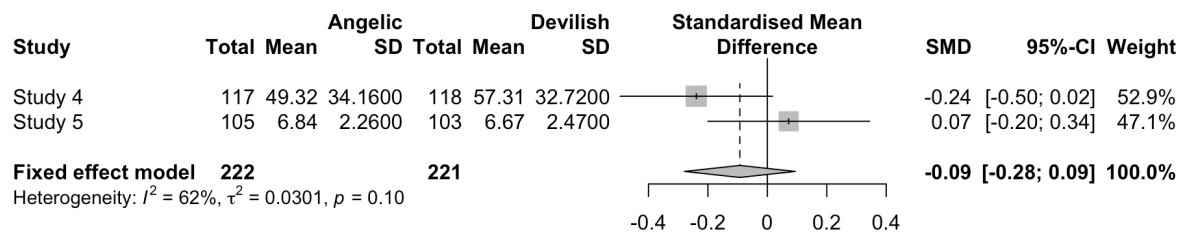
d) Difference between cereal and chocolate bar desire for Angelic label

Study	Total	Cereal Mean	SD	Total	Chocolate Mean	SD	Standardised Mean Difference	SMD	95%-CI	Weight
Study 4	123	4.66	3.4500	117	4.93	3.4200		-0.08	[-0.33; 0.17]	54.1%
Study 5	104	5.68	2.5200	105	6.84	2.2600		-0.48	[-0.76; -0.21]	45.9%
Fixed effect model	227			222				-0.26	[-0.45; -0.08]	100.0%

Heterogeneity: $I^2 = 78\%$, $\tau^2 = 0.0643$, $p = 0.03$

-0.6 -0.4 -0.2 0 0.2 0.4 0.6

e) Difference between cereal and chocolate bar desire for Devilish label

Study	Total	Cereal Mean	SD	Total	Chocolate Mean	SD	Standardised Mean Difference	SMD	95%-CI	Weight
Study 4	122	4.33	3.1200	118	5.73	3.2700		-0.44	[-0.69; -0.18]	53.6%
Study 5	103	5.78	2.2800	103	6.67	2.4700		-0.37	[-0.65; -0.10]	46.4%
Fixed effect model	225			221				-0.41	[-0.60; -0.22]	100.0%

Heterogeneity: $I^2 = 0\%$, $\tau^2 = 0$, $p = 0.74$

-0.6 -0.4 -0.2 0 0.2 0.4 0.6
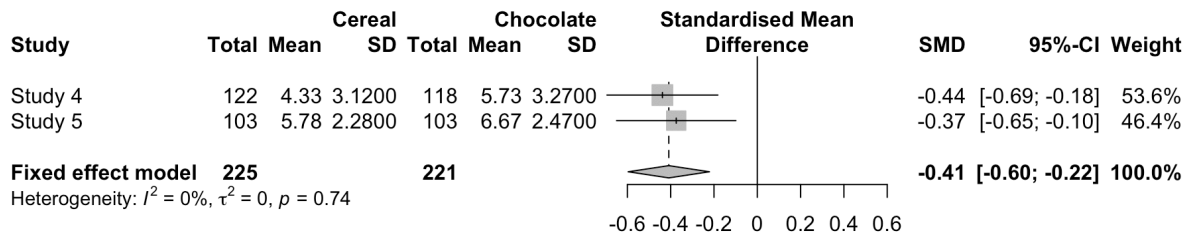
Figure 6.11. Forest plots showing the fixed effect models of the self-reported desire to consume variable across Study 4 and Study 5.

6.4.1.3 Taste

For perception of taste, there was an overall significant interaction between food and label type, such that participants judged a cereal bar to taste better when labelled as Angelic than when labelled as Devilish. A chocolate bar on the other hand was perceived as tastier when labelled as Devilish than when labelled as Angelic. Within each label condition, participants perceived the taste of cereal bars to be better than chocolate bars in the Angelic condition, and chocolate bars to taste better in the Devilish condition. See Figure 6.12 for forest plots.

a) Interaction between snack type and label type on perceived tastiness

Interaction between snack type and label type		Effect Size (d) [95% CI]
Study 5		0.22 [0.02, 0.42]
Study 6		0.10 [-0.10, 0.30]
FE Model		0.16 [0.02, 0.30]

-0.1   0   0.1   0.2   0.3   0.4   0.5

Effect Size
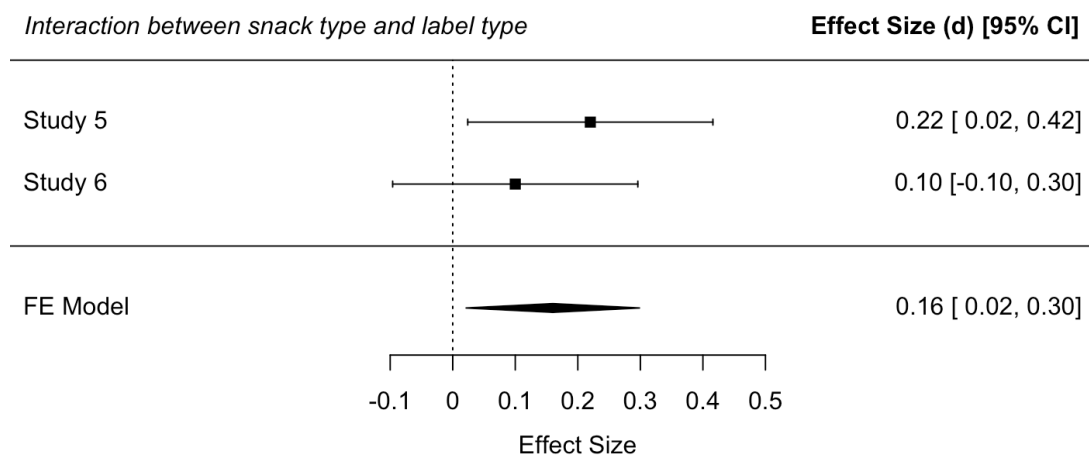
b) Difference between Angelic cereal and Devilish cereal bar in perceived tastiness

Study	Total	Angelic Mean	SD	Total	Devilish Mean	SD	Standardised Mean Difference	SMD	95%-CI	Weight
Study 4	123	60.38	21.7900	122	55.43	20.5600		0.23	[-0.02; 0.48]	54.1%
Study 5	105	6.89	1.7800	102	6.54	2.0200		0.18	[-0.09; 0.46]	45.9%
Fixed effect model	228			224				0.21	[0.03; 0.40]	100.0%

Heterogeneity: $I^2 = 0\%$, $\tau^2 = 0$, $p = 0.79$

-0.4   -0.2   0   0.2   0.4

c) Difference between Angelic chocolate and Devilish chocolate bar in perceived tastiness

Study	Total	Angelic Mean	SD	Total	Devilish Mean	SD	Standardised Mean Difference	SMD	95%-CI	Weight
Study 4	117	53.56	18.1600	118	59.77	21.1700		-0.31	[-0.57; -0.06]	52.7%
Study 5	105	6.84	2.1800	103	6.91	2.1700		-0.03	[-0.30; 0.24]	47.3%
Fixed effect model	222			221				-0.18	[-0.37; 0.01]	100.0%

Heterogeneity: $I^2 = 54\%$, $\tau^2 = 0.0217$, $p = 0.14$

-0.4   -0.2   0   0.2   0.4

d) Difference between cereal and chocolate bar in perceived tastiness for the Angelic label

Study	Total	Cereal Mean	SD	Total	Chocolate Mean	SD	Standardised Mean Difference	SMD	95%-CI	Weight
Study 4	123	6.04	2.1800	117	5.36	1.8200		0.34	[0.08; 0.59]	53.0%
Study 5	105	6.89	178.0000	105	6.84	2.1800		0.00	[-0.27; 0.27]	47.0%
Fixed effect model	228			222				0.18	[-0.01; 0.36]	100.0%

Heterogeneity: $I^2 = 68\%$, $\tau^2 = 0.0390$, $p = 0.08$

-0.4   -0.2   0   0.2   0.4

e) Difference between cereal and chocolate bar in perceived tastiness for the Devilish label

Study	Total	Cereal Mean	SD	Total	Chocolate Mean	SD	Standardised Mean Difference	SMD	95%-CI	Weight
Study 4	122	5.54	2.0600	118	5.98	2.1200		-0.21	[-0.46; 0.04]	53.9%
Study 5	102	6.54	2.0200	103	6.91	2.1700		-0.18	[-0.45; 0.10]	46.1%
Fixed effect model	224			221				-0.19	[-0.38; -0.01]	100.0%

Heterogeneity: $I^2 = 0\%$, $\tau^2 = 0$, $p = 0.86$

-0.4   -0.2   0   0.2   0.4

Figure 6.12. Forest plots showing the fixed effect models of the taste variable across Study 4 and Study 5.

6.4.1.4 Healthiness.

There was not an overall significant interaction between food and label type for perceptions of healthiness. However, participants thought Angelic cereal bars were healthier than Devilish cereal bars. Within the Angelic label condition, participants thought the cereal bar was healthier than the chocolate bar, while in the Devilish label condition, no significant difference was found. See Figure 6.13 for forest plots.

a) Interaction between snack type and label type for perceived healthiness
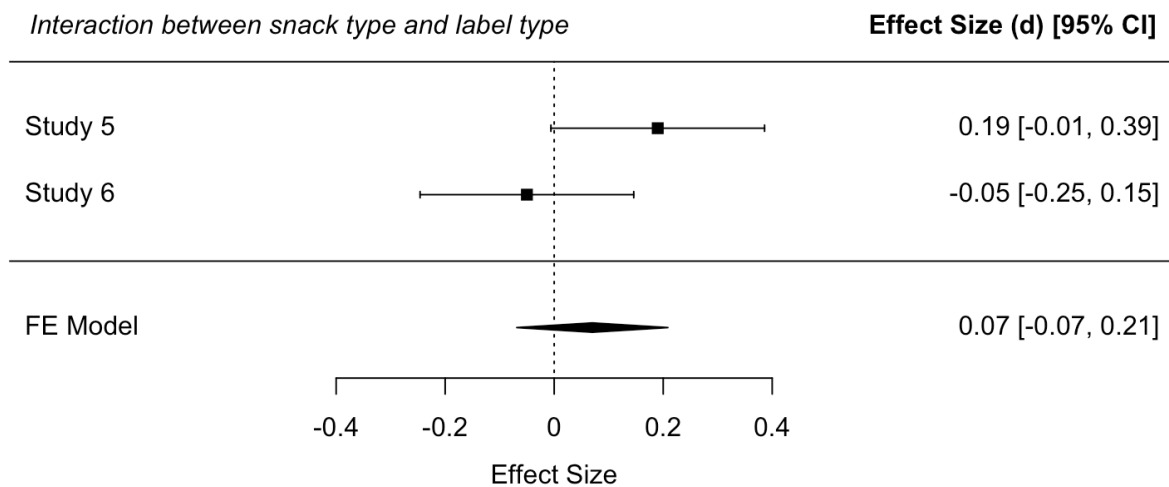
b) Difference between Angelic cereal and Devilish Cereal in perceived healthiness
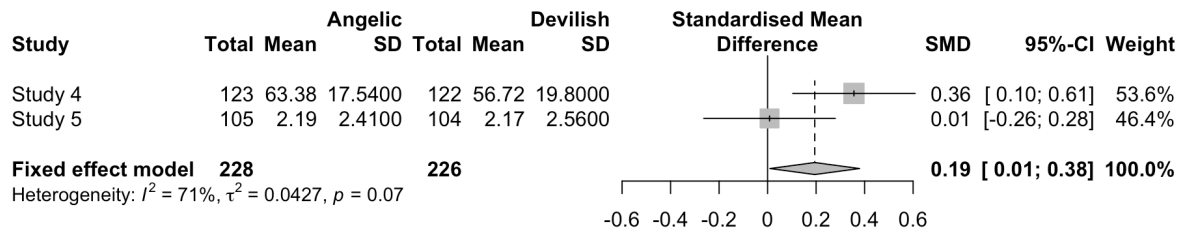
c) Difference between Angelic chocolate and Devilish chocolate for perceived healthiness

d) Difference between cereal and chocolate bar in perceived healthiness for the Angelic label

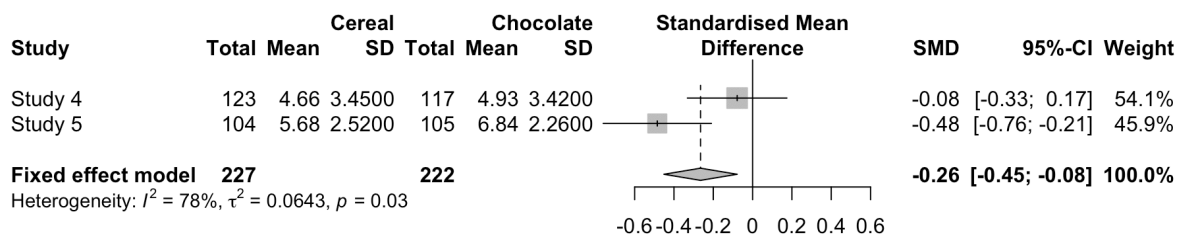| Study	Total	Cereal Mean	SD	Total	Chocolate Mean	SD	Standardised Mean Difference	SMD	95%-CI	Weight
Study 4	123	6.34	1.7500	117	4.64	1.6500		1.00	[0.73; 1.27]	50.4%
Study 5	105	2.19	2.4100	105	2.37	2.2500		-0.08	[-0.35; 0.19]	49.6%
Fixed effect model	228			222				0.47	[0.27; 0.66]	100.0%

Heterogeneity: $I^2 = 97\%$, $\tau^2 = 0.5600$, $p < 0.01$

-1   -0.5   0   0.5   1

d) Difference between cereal and chocolate bar in perceived healthiness for the Devilish label

Study	Total	Cereal Mean	SD	Total	Chocolate Mean	SD	Standardised Mean Difference	SMD	95%-CI	Weight
Study 4	122	5.67	1.9800	118	4.84	1.8100		0.44	[0.18; 0.69]	53.1%
Study 5	105	2.17	2.5600	104	2.90	2.5100		-0.29	[-0.56; -0.02]	46.9%
Fixed effect model	227			222				0.10	[-0.09; 0.28]	100.0%

Heterogeneity: $I^2 = 93\%$, $\tau^2 = 0.2447$, $p < 0.01$

-0.6 -0.4 -0.2 0 0.2 0.4 0.6

Figure 6.13. Forest plots showing the fixed effect models of the health variable across Study 4 and Study 5.

6.5 Discussion

6.5.1 Summary of findings
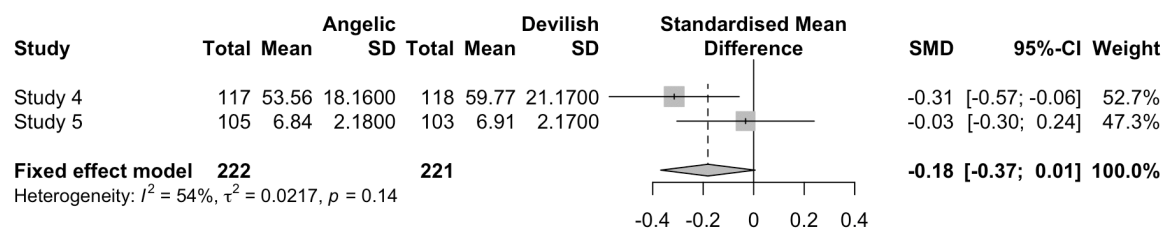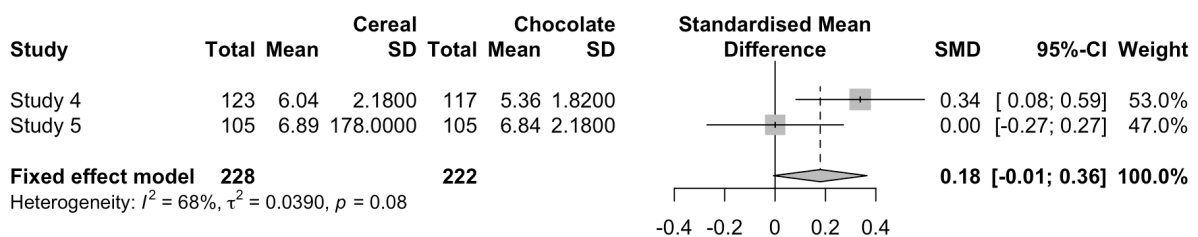
Although Study 3 showed that approximately one third of food advertisements in UK women's magazines contain a moral concept, no previous research has examined the impact of associating morality with food products on desire, consumption and selection of food. As the first study to carry out this investigation, the aims of the current studies were to assess the impact of labels with moral (Angelic) and immoral (Devilish) words on self-reported desire and observed behaviour for an unhealthy (chocolate bar) and less unhealthy (cereal bar) food type, as well as how these labels might influence perceptions of taste, healthiness and other characteristics. An internal meta-analysis of the studies found that observed behaviour towards food type was influenced by moral label such that participants ate or selected a morally labelled cereal bar over an immorally labelled cereal bar. Conversely, participants ate or selected a chocolate bar with an immoral label in comparison to those labelled with a moral label. Within each label condition, participants ate or selected a cereal bar over a chocolate bar when the label was Angelic and ate or selected a chocolate bar over a cereal bar when the label was Devilish. Self-reported desire, on the other hand, was not influenced by such an interaction. However, an interaction between food and label type for taste emerged such that participants perceived a cereal bar to be tastier if it had a moral label and a chocolate bar to be tastier if it

had an immoral label. Within each label condition, participants perceived a cereal bar to be tastier than a chocolate bar when the label was Angelic and thought a chocolate bar was tastier than a cereal bar when the label was Devilish. Although, no overall interaction between label and food type was found for judgements of healthiness of the food bar, the results of the meta-analysis indicated that participants thought Angelic cereal bars were healthier than Devilish cereal bars. Within the Angelic label condition, participants thought the cereal bar was healthier than the chocolate bar, while in the Devilish label condition, no significant difference was found.

In comparison to the moral balance effect seen in Study 2, there was no support for such an effect in Studies 4, 5 and 6. Participants did not behave in line with a moral compensation effect, with a decrease in desi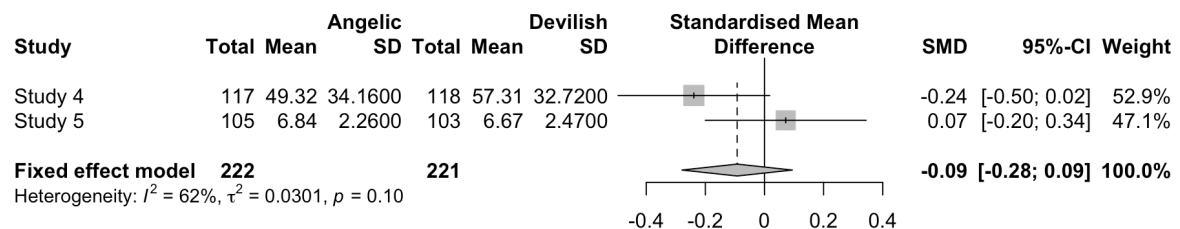re, choice and consumption of the immorally labelled foods. There was also no support for a moral licensing effect, where participants would preferentially desire, choose or consume food with a moral label, or believe it to be tastier, healthier or lower in calories than an immorally labelled food. Furthermore, there was no support for a moral credits theory, where a food item with a moral label would 'cost fewer credits' than one labelled with an immoral label, and therefore this 'cheaper' product could be chosen more often or eaten more of. The alternative theory of moral credentials, in which people want to re-establish their moral image in the eye of an audience, was not supporter either. Although participants consumed the foods while being alone in the room, the experimenter would have observed how much they had eaten while picking up the food bowls after the taste test. For the moral credentials theory to be supported, participants should have consumed less in the immorally labelled condition.

Instead, the results reflect a pattern of congruently labelled items resulting in increased selection and consumption, and increased judgements of taste. Healthier food with a moral label was increasingly selected and consumed, and perceived as tastier, while the same was found for unhealthy food with an immoral label. It is possible that congruently labelled items are appealing to participants because they confirm an already present belief, while incongruently labelled items could elicit a state of cognitive dissonance where participants would have to change an already established association between morality and health (e.g. Mycroft, 2008; Spoel et al., 2012). This interpretation is supported by studies showing that people are more likely to like items that are presented with extrinsic information which matches their intrinsic properties (Okamoto et al., 2009).

A possible explanation for the different effects from Study 2 and Studies 4,5 and 6 could be that Study 2 presented the participants with moral behaviours, either remembered or enacted, in a serial fashion – participants first recalled a memory of a time they ate a large amount of food, then they were given the opportunity to help the experimenter. In Studies 4, 5 and 6 however, participants were presented with the moral information and the food choice simultaneously. It has been theorised that the moral balancing effect to some extent relies on feelings of guilt to motivate moral compensation (Ding et al., 2016). However, in the current studies, participants are unlikely to feel any specific moral emotions because they have not yet behaved in either a morally good or bad manner. Instead, it is possible that in a situation in which the moral information is displayed simultaneously as the choice is made, anticipated moral emotions play a role.

From previous research on emotional consequences of unhealthy food consumption, it has been shown that eating chocolate often results in feelings of guilt (e.g. Steenhuis, 2009). Guilt can also influence decisions ahead of time through anticipated guilt. Anticipated guilt is the judgement an individual might make about how guilty they will feel depending on a choice they make (Erlandsson, Jungstrand & Västfjäll, 2016; Steenhaut & Kenhove, 2006). In these studies, when participants were primed with high-responsibility messages they rated their anticipated guilt as being significantly higher if they decide on the immoral action. In the current study, it could be that when participants are shown a moral label (Angelic) they are more likely to anticipate the guilt that might come as a consequence of unhealthy food consumption and thus eat less of the unhealthy chocolate bar in comparison to the immoral (Devilish) chocolate bar. This could be because being primed with 'Angelic' sets a standard of behaviour that is more moral than that of 'Devilish'. In contrast, the 'Angelic' label may instil a larger sense of anticipated pride in participants for choosing the cereal bar over the chocolate bar.

Although there was no support for a moral balance effect, the results could be explained by a self-licensing effect. For a self-licensing effect to occur, the individual would use any kind of self-justification to engage in a certain kind of behaviour (de Witt Huberts et al., 2011). In the current study, the finding that participants engaged more with a healthier food with a moral label and an unhealthy food with an immoral label could be attributed to participants' justification that they are being 'good' by eating the healthier food, and 'being a bit bad' –

maybe a guilty pleasure – by eating the unhealthy food. However, using this logic it is unclear why an unhealthy food with a moral label would not also increase consumption and selection, but instead decrease it. If a moral label affects consumers perceptions of how 'good' they are being, the same should apply to an unhealthy food product. To understand further whether participants were using such self-justifications in their selection and consumption of the food, further research needs to be conducted.

Interestingly, the results showed no effect of labelling on self-reported desire but did influence actual behaviour. These findings are in line with the intention-behaviour gap (Webb & Sheeran, 2006) reported throughout the literature. More often than not, people's intentions do not predict their actual behaviour. For example, intentions of eating healthy food rarely result in a healthy diet (Kumanyika et al., 2000). Self-report measures are often subject to response bias. For example, self-reported desire in Study 5 was the opposite to actual behaviour (consumption). Participants reported that they desired chocolate more than cereal bars but ate more cereal bars than chocolate. However, even though the results on self-reported desire to consume did not reach significance, the patterns were in the same direction as the results on observed behaviour: congruently labelled food products were reported as more desirable. A reason for this discrepancy could be that the effect of moral labels on food occurs outside awareness. By asking participants to judge their desire to consume a labelled food product, this requires some insight into their own desires, an evaluation that should occur by definition within awareness. Moreover, the failure to find that label affected self-reported desire for unhealthy and healthier food could be attributed to Study 4 being powered on a different measure, perceived taste. In the study that was used to calculate sample size (Vasiljevic et al., 2015), no effect on desire to consume was shown.

The results of moral label on perceived taste of the food products mirror the results on selection and consumption. It is possible that the change in taste perception drives the behavioural effects. If participants perceive the congruently labelled food as tastier than the incongruently labelled food, this could increase consumption of the congruently labelled foods. In comparison to desire to consume, which was measured before participants tasted any of the foods, taste reflects actual changes in participants taste perception. If the effects of moral label on food occurs outside of awareness it is possible that measure which do not reflect a conscious judgement of the food are affected. Taste perception requires an evaluation of a product, rather than insight into own desires. To test whether changes in taste perception is driving the

behavioural effects a sufficiently powered moderated mediational experiment could be conducted.

The findings have also expanded the research on health halo effects, showing that in comparison to labels such as 'organic' and 'fair trade' (Schuldt et al., 2012; Schuldt & Schwarz, 2010), moral labels do not influence how healthy food products are thought to be. However, in opposition to results showing that organic labels reduce perceived taste (Schuldt & Hannahan, 2013), the current studies showed that a moral label such as 'Angelic' increased perceived tastiness. Thus, even though organic products are sometimes advertised using moral concepts (such as Divine Organic Chocolate), they are not interchangeable. An organic, or fair-trade label can be argued to signal ethical properties inherent in the production of the food item. However, from the results reported here it would seem that labelling a food item as 'Organic' has different effects than labelling it as 'Angelic'.

Results from Study 5 extended the results of Study 2 and replicated previous findings on consumption stereotypes (Vartanian et al., 2007; Stein & Nemeroff 1995) by showing that not only do people judge others as having less moral value when eating unhealthy foods (and vice versa with healthy foods), but that this judgement also extends to the food product itself and the judges themselves. As such, extending the potential moralisation of eating found indirectly in Study 2, in Study 5 the link between food and morality was found to be explicit in the minds of participants. There was no difference in moral judgments between those seeing the moral label and those seeing the immoral label. However, because participants were given the moral judgement questions in the absence of the labelled food and asked about food in general, it is possible that the answers did not refer to food with moral labels. Thus, even though participants viewed chocolate bars as more morally bad and less morally good, they were more likely to pick a chocolate bar and to perceive it as tasty. Furthermore, if it had an immoral label on, it's perceived tastiness and behaviour with it increased further. It is possible that the framing of a 'Devilish' chocolate bar further plays to its characterisation as a 'naughty but nice' food product due to its pleasurable taste but unhealthy nutritional profile (Stirling & Yeomans, 2003)

In terms of the influence of individual differences, Study 5 showed that participants who thought morality to be integral to their sense of self consumed less of the 'Devilish' chocolate bar than those who did not think morality was important. A 'Devilish' chocolate bar, a particularly immoral food, could have been off-putting to someone with a highly moral identity.

Furthermore, participants who scored high in impulsivity were more likely to also judge the 'Devilish' chocolate bar as containing fewer calories. However, the current studies were not specifically powered to test for three-way interactions with these individual difference measures. As such, any results showing significant three-way interactions should be interpreted with caution and require further testing using appropriately-powered studies.

6.5.2 Strengths and limitations

A strength of the current studies is the range of measures used, from self-report to selection and consumption of food, rather than relying on self-report only. Furthermore, the studies sampled participants from different populations.

However, there are several limitations to the present research. The results are based on two types of food only, cereal and chocolate bars. Although cereal bars are believed to be healthier than chocolate bars, they are both high in sugar content. Further research with different types of products is required to establish the effect of moral labels on a wider variety of healthy and unhealthy foods. Similarly, the two moral labels used, 'Angelic' and 'Devilish', only reflect moral religious concepts. As seen in Chapter 5, a range of moral concepts are used to marked food. Therefore, other moral concepts need to be assessed in future research. In Study 5 participants were mostly drawn from a student population, limiting the generalisability of the results to the wider population. It is possible that this population is more health conscious and therefore consumed on average more cereal bars than chocolate bars, in comparison to the non-student population in Study 6 that were more likely to choose a chocolate bar than a cereal bar. However, the non-student population in Study 6 consisted of both children and adults, with previous research finding that children are more likely to say they wanted to choose a chocolate based over a cereal based food (Bower & Sandall, 2002).

In Studies 5 and 6, participants saw only one label (Angelic or Devilish) but could choose from two types of food (cereal bar or chocolate bar), while in Study 4, participants only saw one labelled food type. This might have implications for the interpretation of the results. For Studies 5 and 6, the moral labels provided a context in which participants made a choice about a food type, limiting the interpretation of cross label comparison of the same food type. However, the results of the meta-analyses are consistent in terms of participants preferring the food that is congruent with the moral label. As such, the overall presentation of results remains unchanged. Interestingly, no research has to date been published on the impact of a moral context on a

'nonmoral' decision. The current results could indicate that a moral context would influence a healthier choice and an immoral context an unhealthy choice. If the general proposal presented here, that unhealthy food consumption is construed as immoral, is accurate, then it follows that a moral context will influence 'moral' behaviour, and an immoral context will influence 'immoral' behaviour. These suggestions require further examination outside the realm of food.

6.6 Conclusions and the next chapter

The four studies presented in this chapter provide some evidence that moral labels influence both the selection and consumption of healthier food and make them appear tastier, with a similar effect evident for immoral labels in relation to unhealthier food. Given this is the first set of studies to assess the impact of moral food labels on perception, selection and consumption of food products, further research is warranted to replicate the findings reported here and to establish the extent to which they generalise across food and label type. The next chapter discusses the results of all seven studies in this thesis, in light of the existing literature, the strengths and limitations of the studies and future directions for research.

CHAPTER 7

General Discussion

Despite the abundance of historical and anecdotal evidence linking food, eating and morality, very little research has been carried out on this relationship. The overarching aim of this thesis was to address this gap by exploring what the consequences of such an association might be. As presented in Chapter 2 and reproduced here, Box 2.3 demonstrates how each research question relates to the association between morality and eating.

Box 2.3 *Graphical representation of how the association between morality and eating has shaped each research question*

Morality ⟵———— **Eating**

The first research question concerns the association between and the impact of eating behaviour on morality. This is addressed in Study 1 and 2.

Morality ⟵————⟶ **Food/eating**

The second research question concerns the prevalence of the association between morality and food/eating. This is addressed in Study 3.

Morality ————⟶ **Food/eating**

The third research question concerns the impact of morality on desire for and consumption of food. This is addressed in Study 4, 5, 6 and 7.

Specifically, the consequences examined in the work presented here have focused on whether moral judgement and behaviour is associated with and impacted by unhealthy eating, and whether eating is impacted by morally labelled food products. In addition, the thesis presented an investigation into the prevalence of moral concepts in advertising food products. This chapter contains a general discussion of the findings presented in this thesis, alongside their implications. It starts by summarising the main findings from each empirical chapter, before discussing how the findings address the research questions set out in Chapter 1. Then, it goes on to discuss strengths and limitations of the thesis as a whole before exploring future directions. The chapter closes by presenting the conclusions that can be drawn from the results of the thesis.

7.1 Overview of findings

The aim of this thesis was to examine the consequences of a moralisation of eating. Seven studies addressed this aim through three research questions:

1. Do people compensate morally for unhealthy eating behaviours?

2. How prevalent is the tendency to associate morality with eating and food?

3. What is the impact on self-reported desire and behaviour of associating moral terms with food?

The first research question concerned how eating behaviour might be associated with or impacts on moral judgement and behaviour. Study 1 presented in Chapter 3 tested whether there was an association between chocolate consumption and moral judgement. The results revealed that the more chocolate participants ate during their study session, the more lenient their judgements of other people's moral transgressions were, and vice versa. Alternatively, the more lenient participants were, the more chocolate they ate. Participants' tendency to restrain their food intake was not a moderating factor. This result indicates that eating behaviours and moral judgements are either directly related or are both related to a common third variable.

To further explore the association between morality and eating, Study 2, presented in Chapter 4, used an experimental approach. Participants were given a chance to help the experimenter after recalling either an overeating episode or a control memory. Participants who recalled an episode in which they ate a lot of food helped the experimenter for significantly longer than those who recalled a control memory. The increased prosociality after recalling an overeating memory mirrors a similar pattern of behaviour after moral transgressions, namely moral compensation. This could suggest that participants might be perceiving their past eating behaviour as a transgression that requires subsequent repenting.

The second research question was explored in Study 3, presented in Chapter 5. Here, food, non-alcoholic drink and nutritional supplement advertisements (here forth food advertisements unless otherwise stated) were extracted from UK women's magazines for June 2002, 2007, 2012 and 2017, and examined for presence of a moral concept. Across the fifteen-year period, approximately one third of food advertisements contained a moral concept. There was no

significant change between the years, between food, non-alcoholic drink and nutritional supplement advertisements or between magazine types. Both the healthiness of the advertised product rated by a group of participants (subjective) and as categorised based on nutritional profile (objective) were unrelated to the use of moral concept overall. However, when only advertisement containing a moral concept were analysed, it was found that less healthy products (as identified both subjectively and objectively) were more likely to contain an immoral theme.

The third research question was explored across Studies 4, 5, 6 and 7, presented in Chapter 6. Here an unhealthy (chocolate bar) or healthier (cereal bar) food item was labelled with either a label denoting moral goodness ('Angelic') or moral badness ('Devilish'). Participants were asked to report their desire for the food online (Study 4), both report their desire and consume the food in the laboratory (Study 5), or select the food in a field setting (Study 6). An internal meta-analysis (Study 7) showed that the type of label had no effect on participants' self-reported desire for either food type. However, the combined observed behaviour (selection and consumption) towards the food items was impacted by moral label type: when a food had a moral label congruent with its healthiness (e.g. 'Angelic' cereal bar and 'Devilish' chocolate bar), people were more likely to select and consume it.

7.2 Discussion of the research questions

7.2.1 Do people compensate morally for unhealthy eating behaviours?

The first question asked whether people compensate morally for their unhealthy eating behaviour. Moral compensation occurs when people carry out an act perceived as 'good' following an act perceived as 'bad'. Research on moral self-regulation has found that when participants have engaged in unethical acts, such as harming a person, they tend to behave more ethically thereafter to compensate for their transgressions (e.g. Carlsmith & Gross, 1968; Ding et al, 2016; Jordan et al., 2016). Feeling morally superior through physical cleansing can also influence how wrong other people's transgressions are perceived to be (Zhong et al., 2010). If people construe unhealthy eating practices as immoral, then engaging in them should also lead to a similar pattern of moral judgement and behaviour. Consistent with this position, the results from Study 1 and 2 show that participants' unhealthy eating behaviour is indeed related to their moral judgement and subsequent moral behaviour. In Study 1, the more chocolate participants ate, the less harshly they judged other people's wrong doings. In Study 2, participants remembering a time they overate subsequently spent longer time helping the

experimenter. Thus, unhealthy or remembered unhealthy food consumption has consequences in line with immoral acts. However, several questions remain unanswered.

First, it is unclear what the driving forces behind this moral compensation are. Results from Study 5 show that participants think that chocolate bars are more morally bad and less morally good than cereal bars. But whether they make this assessment during the time of consumption is unknown. An alternative explanation could be that eating unhealthily can for some people trigger feelings of guilt. Unhealthy eating behaviours have been shown to trigger feelings of guilt in women in particular (Dewberry & Ussher, 1994; Nowak & Speare, 1996; Rozin, Fischler, Imada, Sarubin, & Wrzesniewski, 1999), and guilt is involved in people's motivation to do good after having done bad (Tangney et al., 2007). Previous research using an unhealthy eating recall manipulation (Schei et al, submitted; Sheikh et al., 2013) have also shown increased feelings of guilt after being asked to consider their last overconsumption episode. As such, guilt could be involved in the moral compensation seen in Study 2, but this remains to be examined directly. To do so a measurement of guilt could be administered between the recall task and the helping measure in a similar design to Schei and colleagues (submitted) and Sheikh and colleagues (2013). However, to improve upon the previous designs, an implicit measure of guilt could be used in order to circumvent the issues relating to drawing attention to emotional states (Schwarz & Clore, 1983).

For the relationship between chocolate consumption and moral judgement in Study 1, both guilt and potentially pride might be involved. Zhong and colleagues (2010) found that participants who had been physically or visually cleansed - as a proxy for moral purity - were harsher in their judgement of others moral transgressions. They also had an inflated moral self, akin to pride. Thus, it is possible that both guilt and pride are in part driving the observed relationship, on separate ends of the chocolate consumption spectrum. This could be tested by conducting an experiment in which participants either recalled a time they ate a large amount of food (similar to Study 2), or the amount consumed was directly manipulated. This could be done either through successful implementation of the portion size effect (Hollands et al. 2015) or by instructing participants to eat a certain amount. However, it is possible that if participants are told how much to eat by the experimenter, rather than choosing how much to eat themselves, their personal intention might be diminished and thus less guilt or pride could be experienced.

Second, previous research has also found that after recalling an overeating event, women participants spend more time causing themselves pain, than those recalling a neutral event (Schei et al., submitted). Study 2 extended this research by showing that recalling an overeating event also led to increased prosociality. Taken together, recalled overeating affects later compensation through both self-punishment and prosociality, two strategies found elsewhere in the moral compensation literature (e.g. Bastian et al., 2011; Carlsmith & Gross, 1968; Ding et al, 2016; Jordan et al., 2016). However, it is unclear under what circumstances someone might choose to self-punish or to become prosocial. In comparison to most other moral transgressions, unhealthy eating behaviour does not directly harm anyone else. As such, the self is both the perpetrator and the victim. It is possible that if given the choice, this might drive the individual to seek repentance in a certain manner that involves the self rather than others. However, no previous research has explored this distinction and what might drive prosociality over self-punishment as a compensation strategy.

Third, it is possible that gender is a significant contributor to moral compensation after unhealthy eating practices. Study 2 and the previous study showing increased self-punishment after recalled overeating (Schei et al., submitted) both tested women students only. Previous research has found that women on average feel guiltier about food than men do (e.g. Dewberry & Ussher, 2001; Nowak & Speare, 1996; Rozin et al., 1999), are more likely to be on a diet (e.g. Dewberry & Ussher, 2001; Markey & Markey, 2005), and those who are on a diet are even more likely to feel guilty about food (Dewberry & Ussher, 2001). Research has also found that there are some gender differences in helping (see Espinosa & Kovářík, 2015 for a review). Furthermore, Sheikh et al., (2013) found that only women showed an increased accessibility of cleaning-related words, such as 'soap', 'wash' and 'shower' after a similar overeating recall. Taken together, this could mean that women are more likely to morally compensate for unhealthy eating behaviours than men, but this needs to be explored further by extended future research to include male participants. In sum, the results of Studies 1 and 2 provide evidence for a tendency to morally compensate for unhealthy eating behaviours.

Fourth, the results of Study 2 can be used to differentiate between the two separate theories of moral balance: moral credits theory and moral credentials theory. In Study 2, participants completed their memory recall while alone in the room, and their written recall was anonymised. As such, it is unlikely that they felt they had lost moral credentials in the eyes of the experimenter and needed to regain them by helping for longer. Instead, the results are more

in line with the moral credits theory, which represents an internal moral balance in the form of moral bank credits that can be depleted by a moral transgression and filled up again by being virtuous.

7.2.2 How prevalent is the tendency to associate morality with eating and food?

The second research question asked what is the prevalence of associating morality with eating and food. A common method to survey cultural trends is through the inspection and analysis of advertisements (Dyer, 2015). Griffin and Berry (2003) and Kilbourne (1994) carried out qualitative analyses of how morality was used in a select few food advertisements, and found that unhealthy food was often presented as immoral with Christian imagery of 'sin', while the advertised diet version of the unhealthy product was sold as the 'salvation'. Despite advertising agencies using morality to sell products, no other research has been conducted on the use and prevalence of this practice. Study 3 addressed this lack by examining a series of UK women's magazines over a 15-year period. The results showed that moral concepts were present in approximately one third of food, non-alcoholic drink and nutritional supplement advertisements (here forth referred to as 'food advertisements' unless otherwise specified). The majority of ads used concepts of moral goodness over moral badness. Furthermore, no difference in use of moral concepts was found over years sampled. However, there are several outstanding areas of investigation.

First, Study 3 only examined women's magazine advertisements in the UK. It is therefore unclear whether the findings can be extended to advertisements in magazines outside of the UK. Considering cultural variations in moral concerns (e.g. Haidt & Jospeh, 2004), it is possible that the frequency of use and moral themes might differ from place to place. Women's magazines in the UK might also differ from women's magazines in other countries. For example, results of comparative content analyses (Frith, Cheng & Shaw, 2014; Maynard & Taylor, 1999) have shown that in relation to US women's magazines, Singaporian, Taiwaneese and Japanese women's magazines often portray the local women as demurer and more innocent in comparison to western women who are often portrayed as sensual. These differences in values could impact the use of moral advertising when relying on portrayals of unhealthy food consumption as engaging in an illicit or 'naughty' activity.

Furthermore, what makes up the cultural landscape extends far beyond magazine advertisements. As discussed in Chapter 5, qualitative research has found that moral language

is used in some weight management support groups (Mycroft, 2008). This could be further explored by examining how widespread this tendency is and whether it hinders weight management success. Moreover, other avenues could be explored in terms of how they differ from advertising in their use of moral concepts related to food. For example, how do outlets that do not have a specific commercial aim to sell products present food? Are they taking advantage of what they already know is an established link? Do journalists and blogs discuss food in a different way to advertising companies? What about usage in spoken rather than written language? There is some indication that moral language is evoked when journalists discuss certain aspects of food such as diet and health fads (e.g. Holland, 2018, Wilson 2017, Wiseman, 2018) but little is known about the degree to which this occurs. As such, future investigations could examine the presence of moral concepts in the way journalists and bloggers discuss and present food.

Second, Study 3 only examined use of moral concepts associated with food in women's magazine advertisements during a 15-year period. During this time, no change was observed. However, it is possible that there has been changes over a longer time-period or in different mediums. Alternatively, the longstanding association between morality, the body and food as seen in early writings such as the Ancient Greeks might mean that the frequency at which food is associated with morality is less susceptible to change.

Third, although Study 4, 5, 6 investigated the impact of moral labels on food, it is still unclear how an advertisement that includes both pictures and text, rather than a stripped-down label, may affect consumers. It is possible that the richness of the advert, which can carry further meaning beyond a single label, is more or less persuasive. As such, a future study could be carried out using actual food advertisements on a variety of outcomes, such as desire and actual consumption.

In sum, the results of Study 3 suggested that the tendency to associate moral concepts with food products is common in food advertisements found in women's magazines in the UK.

7.2.3 What is the impact on self-reported desire and observed behaviour of associating moral terms with food?

The third research question asked how associating moral terms with food can affect people's desire for food and how it affects their selection and consumption of it. Research on labels such

as 'organic' and 'fair-trade' have shown that these ethical claims make the products appear healthier or lower in calories than they are (Schuldt et al., 2013; Schuldt & Schwarz, 2010). As an extension of this work, Study 4, 5 and 6 found that using labels indicating both 'moral' (Angelic) and 'immoral' (Devilish) concepts had similar but more complex influences on the labelled food. These studies utilised both a label hypothesised to have a health halo effect – Angelic – as well as an immoral label – Devilish – the effects of which no previous research could predict. In addition, this research also extended the previous work by manipulating healthiness of the two types of food: an unhealthy chocolate bar and a healthier cereal bar. By the inclusion of two levels of healthiness, the design could test for an interaction between 'moral' and 'immoral', and 'unhealthy' and 'healthier'.

In comparison to the available evidence of health halo labels, the findings show that when a moral label is paired with a healthier food, and an immoral label is paired with an unhealthy food, people are more likely to consume or choose it. This is in line with the idea that health is seen as something moral, while unhealthy is seen as immoral (see Chapter 2 for an overview), and that congruent pairings increase liking and selection (Litvin & Kar, 2004; Sirgy, 1982). What these findings also indicate is that people might indeed equal health with morality and unhealthy with immorality, and that this association can have both positive and negative consequences for healthy eating behaviour. It is possible that using concepts of morality such as 'Angelic' can persuade people to make a healthier food selection, either by increasing selection of a healthier food or decreasing selection of an unhealthy food. It is unclear at this stage, however, whether other moral terms might have similar effects and with other types of foods. Furthermore, it would also be necessary to test the effect of food labels under more naturalistic conditions than the lab or a selection presented as part of a science festival. It is possible that pairing moral labels with food only shows an effect if the choice is only between two (unhealthy and healthier) options.

From the results of the internal meta-analysis reported in Study 7, there was a distinction between effects of moral label on self-reported measures and observed behavioural measures. Participants did not indicate that they desired to eat the food any differently depending on label, but when they were faced with an opportunity to engage with the food item (by consuming or selecting it), moral label significantly affected whether they engaged with the healthy or unhealthy food. This would indicate that either participants are not reporting their true desires, or the effects of moral label occurs outside of the participants' awareness in line

with predictions from a dual-process theory (e.g. Strack & Deutch, 2004). It is possible that if these effects occur outside of awareness they require fewer cognitive resources. This might mean that people who have weaker regulatory systems or who are experiencing high cognitive load might be especially prone to the influence of moral labelling. In a study examining the role of cognitive resources on an environmental 'nudge' on eating behaviours – the proximity of the food – found no effect of available resources (Hunter, Hollands, Couturier & Marteau, 2018). However, it is possible that labelling might be affected differently, but there is limited evidence regarding the effect of state cognitive resources on the impact of food labelling. Further research could be carried out on whether the influence of moral labels on food behaviour occurs in an automatic fashion outside of awareness, and thus potentially explained by a dual-process theory. This could be done by manipulating cognitive load while participants are exposed to morally labelled food. In sum, the results of Studies 4, 5, 6 and 7 showed that people are not more likely to desire, but are more likely to engage with – *i.e.* consume or select - food types that have congruent moral labels.

7.3 Strengths and limitations of the thesis

Specific strengths and limitations of each study have been presented and discussed in each empirical chapter (Chapters 3 to 6). However, there are some strengths and limitations of the thesis as a whole, which will be presented here. A strength of the thesis is the broad set of questions investigated. Several aspects of the link between morality and eating has been explored, which demonstrated that the link might have far reaching consequences, from judgemental, to perceptual and behavioural. However, this strength is also a limitation. Due to several aspects being examined, in-depth research was limited. The aim of the thesis was to explore consequences of the link, and thereby attention was not given to the specific processes that might be involved, such as the role of moral emotions discussed previously.

The studies in this thesis were all carried out with different populations, and often in different settings (from online, to lab- and field-based). Study 1 used a student sample, Study 2 a women-only student sample, Study 4 was a nationally representative sample, Study 5 used a student and local community sample while Study 6 used a convenience sample consisting of both local community adults and children. Different samples will also likely have different levels of experience. The sample in Study 4 was recruited by a research agency, which indicates that the participants regularly take part in online studies. As such, it is unclear whether any one of the findings were dependent on the sample and whether they would extend to other

populations. For Study 4, 5 and 6, the experiments were sufficiently similar to qualify for a meta-analysis, thereby giving an overall effect across the populations. However, this effect could be different than if only one population was used. As such, for the first two studies, replications need to be conducted to establish the reliability of the effects in the same population and their generalisability more broadly.

7.4 Future directions

As presented in Chapter 2, moral concerns differ from group to group (Shweder et al., 1984; 1993; 1997). The current set of studies were all conducted in the UK, with participants who were either born or live within this country. That means the findings presented here can only be used to extrapolate about one culture. Another culture is likely to have its own view on the relationship of food to morality, which may affect whether unhealthy food is considered immoral, how morality would be used in food marketing and what the effects of moral labelling might be. For example, it is possible that other food products have a moral tint rather than the unhealthy eating of Western cultures. Furthermore, the moral labels used in Studies 4-7 were all related to Christianity ('Angelic' and 'Devilish') and is likely to not hold the same connotations in other predominantly non-Christian societies. As such, further research would benefit from examining whether the association between morality and eating is present in other cultures, and if so how what the consequences of such an association might be. As a first step, this could be done by conducting the studies presented here with participants from a different culture, but using appropriate alternatives to Christian terms.

Non-clinical samples were used in this thesis to investigate the relationship between morality and eating. However, in several theoretical works on eating disorders (e.g. Bordo, 2003; Chernin, 1985; Fallon, Katzman, & Wooley, 1994; Skårderud, 1991) morality has been used to interpret and understand the meaning of eating disorders. Echoing descriptions of the 'holy anorexic' as discussed in Chapter 2, the modern anorexic uses similar metaphors of purity (Skårderud, 2007) and discourse replete with moral content (Giles, 2006). Furthermore, as discussed previously, moral emotions such as guilt and shame are common within the eating disorder population (e.g, Cartwright & Stritzke, 2008; Sassaroli, Bertelli, Decoppi, Crosina, Milos & Ruggiero, 2005), and even just thinking about eating the forbidden food is seen as morally wrong (Shafron, Teachman, Kerry & Rachman, 1999). Individuals with eating disorders also describe putting the need of others in front of their own (e.g. Buchholz, Henderson, Hounsell, Wagner, Norris & Spettigue, 2007; Hambrook et al., 2011), an arguably

moral quality similar to prosociality. Despite such work, little has been done to investigate the role of morality in the development and maintenance of eating disorders. Extending the research in Chapter 3 and 4, an avenue for future research could be whether individuals with eating disorders are more likely to judge others and themselves more harshly or use moral behaviours to compensate for eating in what they perceive to be a 'wrong' way. This behavioural pattern could be maintained by increasing negative feelings of guilt (Shafran, 1999).

This thesis only studied a small possible subset of potential consequences of moralisation of eating. Beyond the further directions of specific aspects discussed in the previous sections, more work is required to understand the process of eating moralisation in the first place. As discussed in Chapter 2, Rozin (1999) argues that an entity can become moralised by piggybacking onto another already moralised entity or by creating a new moral category. As such, there are two aspects of the moralisation process related to food that is yet to be examined. First, its relation to other moralised entities can be explored. Study 1 made some preliminary indications that chocolate consumption was related to transgressions of moral concerns from Haidt's Care and Fairness foundations above the other foundations. This could suggest that the moralisation of eating is piggybacking onto Care and Fairness concerns. However, many aspects of the moralisation of health (Brandt & Rozin, 1999), which is likely related to the moralisation of eating, seem to be closer to purity concerns, such as contamination fears and ideas relating to 'treating your body as a temple'. Second, although morality has been linked with food for a long time, it is unclear how an individual move from viewing food and eating as a neutral entity to it having a moral tint. There is some evidence showing that certain emotions, such as disgust, can moralise a neutral object or situation (Landy, 2015) Does it happen through an emotional association, as is argued in relation to the role of disgust? Alternatively, it is possible that repeated exposure to food associated with moral terms might aid individual moralisation.

The majority of hypotheses formation in this thesis was built on the moral balance effect. Although there have been two theories that have gone some way to explain this effect, there is still a general lack of theory within this field. As a result, this thesis did not specifically aim to build or inform an existing theory. Future research could directly test the role of moral credits and credentials in how people make eating choices, by for example manipulating the presence of an audience.

7.4 Conclusions

The broad conclusion of the research presented in this thesis is that linking morality and eating has perceptual, judgemental and behavioural consequences. The findings show that eating and food is not perceived as a neutral entity but when unhealthy eating behaviour is engaged with, it is associated with changes in moral judgement and how much help is given to another person. Furthermore, the evidence also shows that associating morality with food is common, with approximately a third of sampled advertisements using morality to present their product. Isolating the label and food from the advert, the evidence showed that labelling a food with either a moral term denoting good or bad has different effects on how people respond to unhealthy and healthier food. Labelling food with these moral terms did not influence self-reported desire of the food. But when the healthiness of the food and moral goodness or badness of the label were congruent, people were more likely to select or consume the food. This distinction between self-report (of desire) and behaviour (to select or consume) suggests that the effects of moral terms are outside of people's awareness, requiring elucidation in future studies. The research presented here has provided the first steps towards understanding how the long-standing link between morality and eating might impact how we relate to and behave towards food. In addition to replicating the current studies to assess their reliability using wider ranges of food and participants, the wider impact of the consequences remains to be understood, both for moral judgement and behaviour and eating behaviour. In that way, a more comprehensive understanding of the relationship between morality and eating can be developed.

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Appendices

Appendix 5.1

Using the categorisation by Pechey et al. (2013) as a guide (see Table 8.1), each individual food product was categorised as either healthier, neutral or less healthy.

Figure 8.1
Healthiness food categories used by Pechey et al. (2013)

Food category	Healthiness
Sweet snacks/puddings	
Margarines/cooking oils	
Low-fibre bread products	
Processed meats	
Savoury snacks	
Chocolate/confectionery	
High-fat cheese	
Butter/animal fats	
Regular pasta/rice	Unhealthy
High-energy drinks	
Processed potato	
Low-fibre cereals	
High-fat milk	
Less healthy ready meals	
High-fat dairy (e.g. cheese)	
High-energy soups	
High-energy sauces	
Carcass meats/poultry	
Morning goods	
Other lean protein	
Canned/dried fruit	Neutral
Spreads/condiments	
Dairy drinks	
Non-alcoholic beer	
High-fibre cereals	
Fresh fruit	
Vegetables	
Legumes	
Healthier ready meals	
Low-fat milk	
Potatoes	
High-fibre bread products	Healthier
Juice	
Low-fat cheese	
Low-energy sauces	
Low-energy drinks	
Brown pasta/rice	
Low-energy soups	

Appendix 5.2

The coding scheme developed in Chapter 5 resulted in 39 different themes (see Table 8.2)

Table 8.2

Overview of each text and image coding category by moral and immoral themes

Moral goodness themes		Moral badness themes	
Text	Imagery	Text	Imagery
Love/Care	Love/Care	Illicit activity	Illicit activity
Authority/Tradition	Halo	Proscription	
Good	Wings	Devil	
Goodness	Heaven	Naughty	
In line with nature	Wings	Giving in to temptation	
Making a difference	Ingroup imagery (e.g. flag)	Wicked	
On track	Angel	Sinful	
Angel/God/Saint		Guilty	
Elevated		Bad	
Guilt-Free		Indulgence	
Heaven/Paradise			
Divine			
Ingroup superiority			
Bliss			
Doing good work			
Being a better person			
Clean/pure			
Ethical			
Proper			
Freedom/Liberty			
The right thing			

Appendix 6.1

Moral word pairs were constructed by first brainstorming moral terms and then using a dictionary and thesaurus expand the sample of word pairs (see Table 8.3) Seven participants with knowledge of moral psychology then voted on which word pairs they thought were both appealing and credible. Unless the word was already associated with a food product (e.g. innocent, honest, divine), the word pairs that received six or more votes were included in the final sample of pairs.

Table 8.3

Word pairs with moral and immoral connotations

care	/harm	votes	fairness	/cheating	votes
kind	mean	2	fair	unfair	3
gentle	brutal	3	innocent	guilty	6
safe	unsafe/dangerous	2	selfless	selfish	1
empathic	selfish	1	proper	improper	2
altruistic	selfish	2	blameless	blameworthy	3
scrupulous	careless	2	lawful	lawless	2
			just	unjust	2
			honest	dishonest/insincere/deceitful	6
			honourable	dishonourable	3
			legitimate	illegitimate	4

loyalty	/betrayal	votes	authority	/subversion	votes
loyalty	betrayal	4	respectable	disrespectable	1
honour	dishonour	5	submissive	rebellious	4
faithful	unfaithful	4	obey	defy	5
devoted	disloyal	3	obedient	disobedient/rebellious	4
trustworthy	shifty/untrustworthy	3			

sanctity	/degradation	votes	other: moral	other: immoral	votes
noble	ignoble	3	moral/	immoral	6
divine	mortal/devilish	7	obedient/nice	naughty	6
sacred	wicked	7	ethical	unethical	5
sacred	profane/wicked	4	conscious	blasé	4
purification	pollution	3	praiseworthy	blameworthy/disgraceful	3
pure	impure/dirty	5	worthy	unworthy	4
virtuous	vicious	5	proud	ashamed	3
virtue	vice	6			
righteous	wicked/sinful	4			

saintly	sinful	7
angelic	devilish	8
godly	demonic	4
heavenly	hellish	4
holy	sinful/irreligious	5
blessed	cursed	5
wholesome	unwholesome	3
chaste	promiscuous	3
untainted	tainted	2
modest	immodest	3
decent	indecent/obscene	2
proper	improper	3
shameless	shameful	4
spiritual	sensual	6
good	evil	1
restrained	decadent	5
temperance	gluttonous	2

A pilot study was devised in which a convenience sample of 119 participants (age M = 27.98, SD = 12.37, 69.74% women) each rated ten labelled cereal bars and ten labelled chocolate bars. Participants rated how credible they thought the label was on a VAS scale from 1-100, and how appealing they thought the label was on a scale from 1-6. To find the most credible and appealing word pair, the four different snack bar/label combinations for each label pair (moral label cereal bar, immoral label cereal bar, moral label chocolate bar, immoral label chocolate bar) were averaged separately for credibility and appeal. The results showed that participants thought the Angelic/Devilish label combination was both most credible and most appealing (see Figure 8.1 and Figure 8.2).
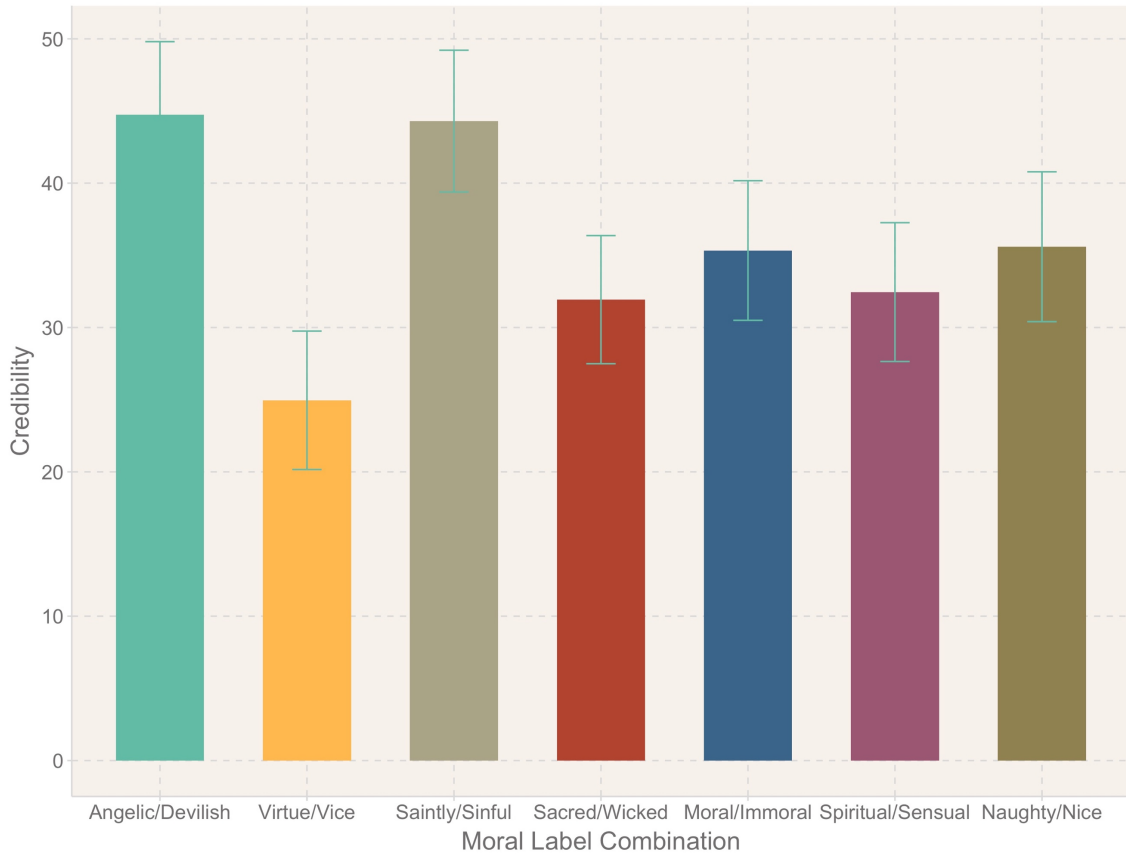
Figure 8.1. Credibility ratings across moral label pairs. Error bars are 95% CIs.

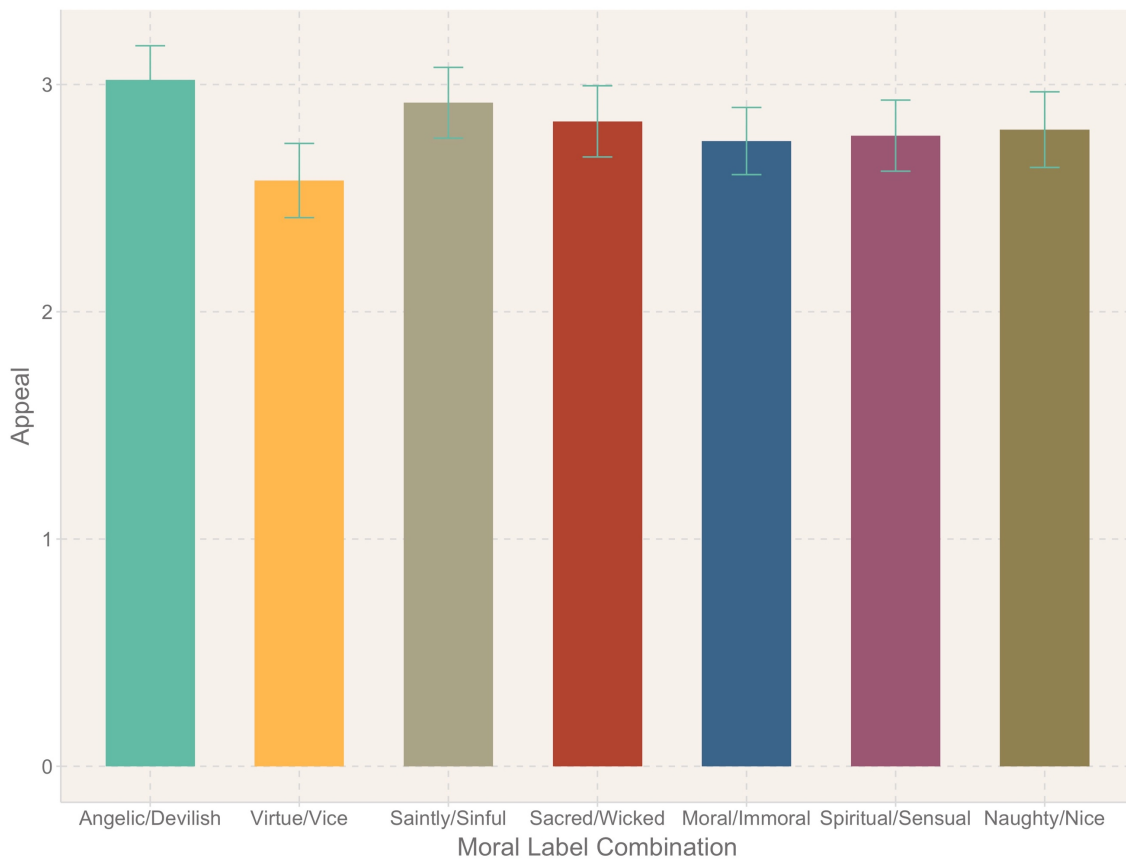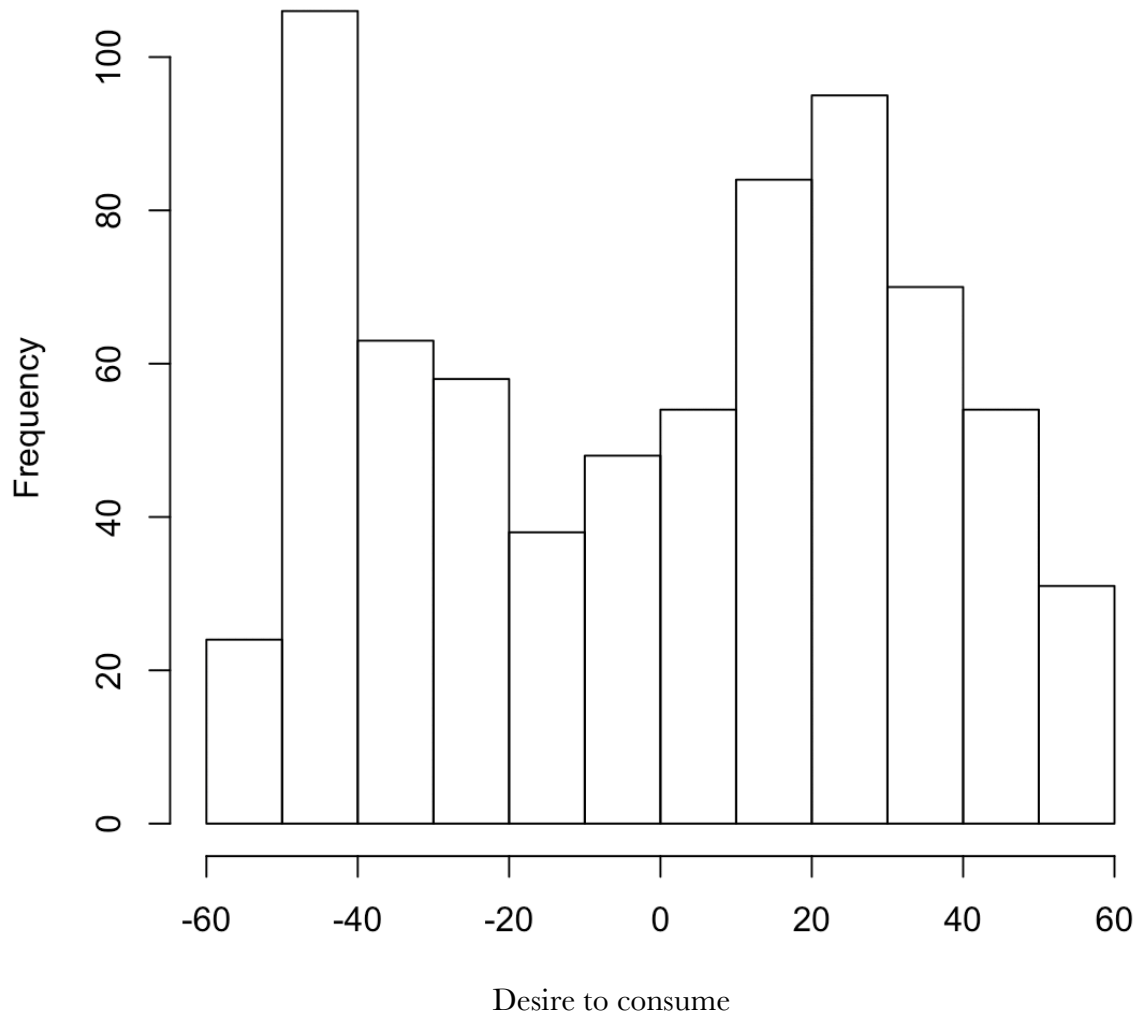*Figure 8.2.* Appeal ratings across moral label pairs. Error bars are 95% CIs.

Appendix 6.2

In Study 4, Chapter 6, the model predicting Desire to Consume from an interaction between label and food type was found to have a bimodal residual distribution (see Figure 8.3).

Desire to consume

Figure 8.3. Bimodal residual frequency distribution of the model predicting desire to consume from label and food type.

Appendix 6.3

For Study 4 in Chapter 6, hunger was significantly different between groups. As such sensitivity analyses was carried out. The results did not change the interpretation of the data (see Table 8.2).

Table 8.2

Sensitivity analysis results of ANOVAs for the Study 4 primary outcome (Desire to Consume) and secondary outcomes (Tastiness, Healthiness and Calories) by Food, Label, RE and MI controlling for Hunger.

Predictor	F	df	p	η^2_p
Desire to Consume				
Food	18.08	1, 700	<.001	.02
Label	.34	2, 700	.71	.001
Food*Label	2.63	2, 700	.07	.01
Food*Label*RE	.16	2, 707	.85	.003
Food*Label*MI	.48	2, 707	.62	<.001
Tastiness				
Food	.28	1, 718	.60	.0001
Label	1.25	2, 718	.29	.003
Food*Label	5.57	2, 718	.004	.02
Food*Label*RE	.44	2, 712	.44	.001
Food*Label*MI	1.49	2, 712	.23	.004
Healthiness				
Food	65.04	1, 718	<.001	.06
Label	1.50	2, 718	.22	.003
Food*Label	4.27	2, 718	.01	.01
Food*Label*RE	.83	2, 712	.44	002
Food*Label*MI	1.45	2, 712	.24	.004
Calories				
Food	5.68	1, 718	.02	.007
Label	.46	2, 718	.63	.001
Food*Label	.57	2, 718	.57	.002
Food*Label*RE	.83	2, 712	.44	.002
Food*Label*MI	1.45	2, 712	.24	.004

Note. RE = Restrained Eating, MI = Moral Identity.

Appendix 6.4

Unlucky randomisation process for the pilot of food consumption as a consequence of moral label type.

For the pilot study, 29 participants were exposed to either 'Angelic' (n = 15) or 'Devilish' (n = 14) labels and measured their intake of healthier cereal bars and unhealthy chocolate bars (within participants factor).

The results showed that participants ate more of 'Devilish' bars overall (see Figure 8.4). However, examining the characteristics of participants in each group ('Angelic' group vs 'Devilish' group) showed that Weight, BMI and SES differed between groups (see Figure 8.5).
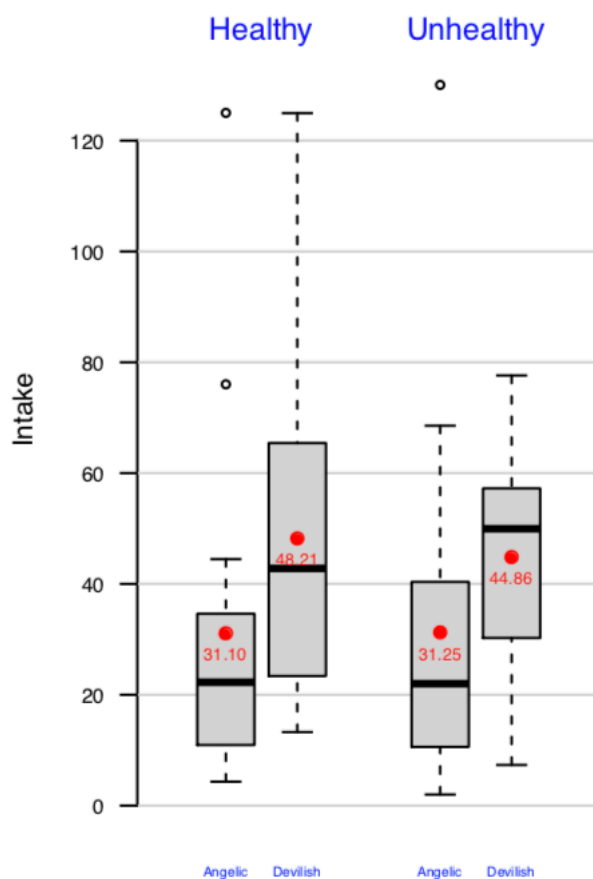

Figure 8.4. Boxplot of intake of healthy cereal bars and unhealthy chocolate bars when exposed to either 'Angelic' or 'Devilish' labels.
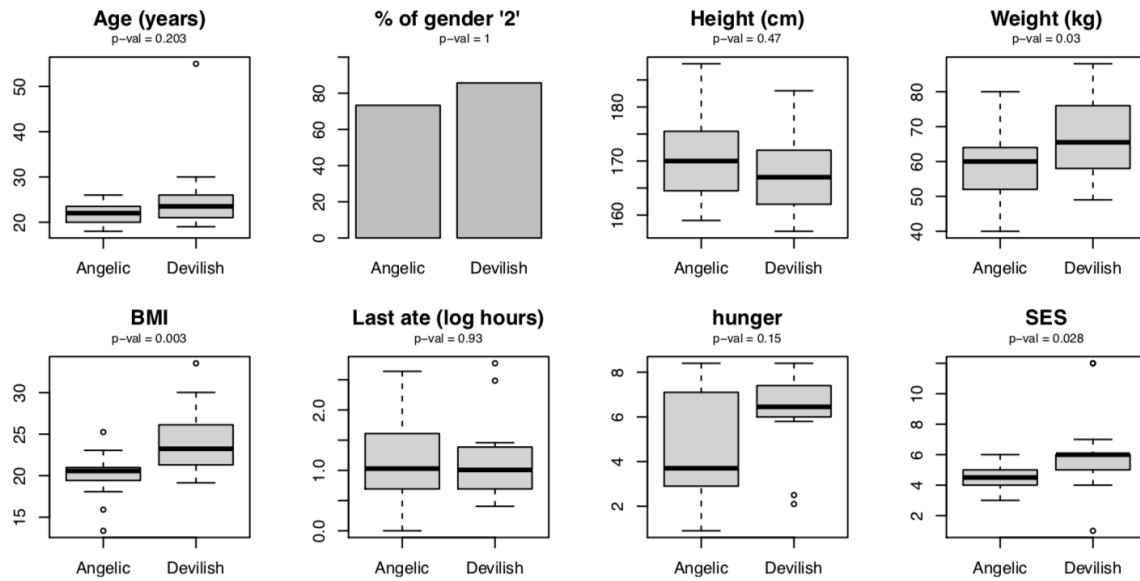
Figure 8.5. Boxplot of participants characteristics across label groups. P-values of equality of location (or proportion) tests are shown below the title of each plot.

A mixed linear model of the food intake was conducted with different predictors including both the label types and the participants characteristics. The results showed that label types were not significant predictors, while Gender, Age and BMI were (see Table 8.3). From this it was gather that the difference in food intake between the moral labels was a result of an unlucky randomisation process.

Table 8.3.
Mixed linear model with fixed and random effects of the mean intake of food as predicted by moral label type and participants characteristics.

	Robust MLM estimator					Classic MLM estimator				
	Estimate	Std. Error	z-value	Pr($>$|z|)	Sig	Estimate	Std. Error	z-value	Pr($>$|z|)	Sig
Fixed Effects										
Intercept β_0	3.544	0.130	27.288	$<$0.001	***	3.534	0.154	22.900	$<$0.001	***
Angelic (sum) $\beta_D/2$	-0.115	0.106	1.087	0.277		0.136	0.135	1.009	0.313	
Devilish (sum) $\beta_D/2$	0.115	0.106	1.087	0.277		0.136	0.135	1.009	0.313	
Unhealthy β_U	-0.071	0.153	-0.464	0.643		-0.083	0.157	-0.525	0.600	
Hunger	-0.056	0.092	-0.603	0.546		-0.009	0.117	-0.075	0.940	
Gender 1 (sum)	0.318	0.108	2.952	0.003	**	0.306	0.137	2.237	0.025	*
Gender 2 (sum)	-0.318	0.108	2.952	0.003	**	-0.306	0.137	2.237	0.025	*
Age	-0.336	0.109	-3.085	0.002	**	-0.353	0.138	-2.557	0.011	*
BMI	0.669	0.122	5.480	$<$0.001	***	0.659	0.155	4.262	$<$0.001	***
Devilish :Unhealthy $\beta_{D,U}$	–					–				
Random Effects										
$\hat{\sigma}_{\tau}^2$	0.028					0.141				
$\hat{\sigma}_{b}^2$	0.323					0.358				
$\hat{\rho}_z$	0.080					0.283				

Note. The intercept corresponds to the log of the average food intake for the cereal bar group. Sum contrasts were used for the variable 'Gender' and 'Morality'. The variable 'Hunger', 'BMI' and 'Age' were standardised.

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DURING TASTING

How tasty is this chocolate bar?

Not at all ━━━━━━━━━━━━━━━━━━━━━━━━━ Very much so

How pleasant do you think the taste of this chocolate bar is?

Not at all ━━━━━━━━━━━━━━━━━━━━━━━━━ Very much so

How sweet is this chocolate bar?

Not at all ━━━━━━━━━━━━━━━━━━━━━━━━━ Very much so

How fruity is this chocolate bar?

Not at all ━━━━━━━━━━━━━━━━━━━━━━━━━ Very much so

How earthy does this chocolate bar taste?

Not at all ━━━━━━━━━━━━━━━━━━━━━━━━━ Very much so

How bitter is this chocolate bar?

Not at all ———————————————————— Very much so

How salty is this chocolate bar?

Not at all ———————————————————— Very much so

How strong is the aroma of this chocolate bar?

Not at all ———————————————————— Very much so

How flavourful is this chocolate bar?

Not at all ———————————————————— Very much so

Where in your mouth do you experience the flavour bar?

Back of the mouth ———————————————————— Tip of the
tongue

How sticky is this chocolate bar?

Not at all ———————————————————— Very much so

How chewy is this chocolate bar?

Not at all ———————————————————— Very much so

How healthy is this chocolate bar?

Not at all ———————————————————— Very much so

How nutritious is this chocolate bar?

Not at all ———————————————————— Very much so

How much fibre do you think this chocolate contains bar?

Not at all ———————————————————— Very much so

How many calories do you think ONE BAR of this chocolate contains?

Please enter your estimate here: _____

As a reference point, the following chocolate bar contains 215 calories.

What is the highest amount of money you would be willing to pay for ONE BAR of this chocolate?

Please indicate the amount in £, p: _____

Appendix 6.6

For Study 6 in Chapter 6, ethnicity was found to be unequally distributed across groups. A sensitivity analysis was carried out in which ethnicity was controlled for in all of the statistical analyses. Including ethnicity did not change the interpretation of the data (See Table 8.4).

Table 8.4

Sensitivity analysis results of LMMs for the primary outcome (Consumption) and secondary outcomes (Desire to Consume, Tastiness, Healthiness, Calories and Willingness-to-Pay [WTP]), controlling for Ethnicity.

Predictor	β	SE	df	t	p	d	95% CIs
Consumption							
Food	-.48	.09	197	- 5.06	<.001	.70	-.67, -.29
Label	-.11	.13	318.40	-.90	.37	.12	-.36, .13
Food*Label	.21	.13	197	1.60	.11	.22	-.05, .47
Desire to Consume							
Food	.35	.08	197.40	4.48	<.001	.62	.20, .51
Label	.04	.10	347.70	.39	.70	.05	-.15, .22
Food*Label	-.08	.11	197	-.70	.48	.09	-.30, .14
Tastiness							
Food	.02	.08	196.50	.28	.78	.04	-.13, .19
Label	-.07	.09	369.20	-.84	.40	.12	-.25, .10
Food*Label	.11	.11	197	.99	.32	.14	-.11, .33
Healthiness							
Food	-.97	.08	197	-12.61	<.001	.51	-1.12, -.82
Label	.12	.09	353.70	1.28	.20	.17	-.06, .29
Food*Label	-.03	.27	197	-.11	.91	.02	-.26, .16
Calories							
Food	.71	.19	197	3.69	<.001	.56	.33, 1.09
Label	-.42	.34	262.18	-1.25	.21	.26	-1.07, .23
Food*Label	-.03	.27	197	-.12	.90	.02	-.57, .51
WTP							
Food	-.01	.02	197	-.61	.55	.08	-.05, .02
Label	-.01	.03	254.92	-.25	.80	.03	-.07, .05
Food*Label	.01	.03	197	.24	.81	.03	-.04, .06

Note. The following variables were transformed before being entered into the model: Consumption (cube-rooted), Desire to Consume (square-rooted), Tastiness (square-rooted), Healthiness (square-rooted) and Calories (square-rooted). The reference categories are as follows: Snack (Cereal Bar) and Label (Angelic).