University of Reading

What you see is what you eat

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Declaration of original authorship

I confirm that this is my own work and the use of all material from other sources has been properly and fully acknowledged.

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Abstract

Over the last decades, the definition of self-control has been a matter of debate. Self-control failure has been traditionally understood as deficits in inhibitory control (Baumeister, 1994). While, in recent years, some researchers have defined self-control as the process of resolving conflict between two competing goals (Inzlicht et al., 2021). However, there has been limited research on conflict identification, that is, in order to activate self-control, one must first identify a self-control conflict, defined by an incompatibility between temptations (e.g., eating high-caloric yet delicious food) and long-term goals (e.g., eating healthily) (Myrseth & Fishbach, 2009). We hypothesized that problems to identify conflict impair self-control. Firstly, we examined whether unhealthy eating norms affected peoples' conflict identification. We found that social norms caused people to perceive desired unhealthy food as healthier. This perception was associated with an increase in the intentions to purchase unhealthy food. Additionally, in the presence of unhealthy eating norms, health commitment (i.e., the importance and ease of eating healthily) was associated with an unhealthier perception of unhealthy food, less desire and fewer purchase intentions. While there were significant effects of social norms on conflict identification, the findings were inconsistent across the studies. Secondly, we developed a new Categorisation task to measure conflict identification. We explored the role of goal saliency on peoples' abilities to identify conflict between temptations and long-term goals. We found that dieters and people with problematic self-control showed more conflict identification when goals were salient. This research contributes to the improvement in the understanding of self-control by integrating individual differences and social components in studying conflict identification.

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Chapter 1

General Introduction

Introduction

People often plan and set intentions to achieve various goals. However, many of these goals pose a conflict with other competing desires (Duckworth et al., 2016; Hofmann et al., 2012; Inzlicht et al., 2021). Specifically, this conflict is triggered by the simultaneous desire for both short-term goals (i.e., temptations) which represent an immediate reward and long-term goals which represent more abstract and delayed rewards. For instance, a student might want to study to fulfil an academic goal but also wants to socialise and spend time with friends. In such a dilemma, conflict identification is required to activate self-control to resist immediate desires and temptations in order to successfully pursue the long-term goal (Myrseth & Fishbach, 2009). That is, the ability to resist temptations relies first on the identification of conflict. Given the central role of self-control in the pursuit of multiple goals across a variety of domains, it has been studied extensively with different perspectives on the success of resisting temptations and attaining goals (Duckworth et al., 2018; Hennecke et al., 2019; Milyavskaya & Werner, 2018).

Self-control has been defined as the ability to inhibit urges, impulses and desires (Muraven & Baumeister, 2000; Tangney et al., 2004) and change behavioural tendencies in accordance with one's long-term goals (Tuk et al., 2015). It has been conventionally viewed that self-control is a limited resource, such that, the ability to inhibit and resist depletes overtime in subsequent tasks following prior exertion of control (Baumeister, 1994). However, there have been challenges in replicating this effect (Carter et al., 2015; Hagger et al., 2016). Recent research has not found evidence for the depletion effect (Vohs et al., 2021). While these theories argue that self-control failure is due to poor inhibition, others suggest that problems in self-control are due to a lack of conflict identification between two opposing goals; temptations (e.g., high caloric food) and long-term goals (e.g., weight loss) rather than deficits in inhibitory control (Fujita, 2011; Myrseth & Fishbach, 2009). For instance, people fail to identify such a conflict because they see the temptation as an negligible exception in the present moment (Fishbach & Dhar, 2005). For example, a person might decide to have a piece of cake but plan to exercise

after. Similarly, problems in seeing conflict also emerge when people search for reasons to justify their choices to indulge in temptations (e.g., unhealthy food) such as rewarding oneself after a long day (Effron et al., 2013; Prinsen et al., 2013). Taking a broader perspective, the decrease in peoples' self-control is not necessarily attributed to their limited resources but to varying levels of motivation (Inzlicht & Schmeichel, 2012). For instance, autonomous long-term goals (i.e., want to pursue) representing intrinsic values are more likely to be attained than controlled goals (i.e., have to pursue) representing extrinsic values (Milyavskaya et al., 2015; Werner & Milyavskaya, 2019). These differences in motivation, consequently, affect their ability to recognize the discrepancies between temptations and goals (Koestner et al., 2002).

Further, given that self-control is understood as the process of resolving conflict when faced with two competing goals (Fujita, 2011; Inzlicht et al., 2021), it is crucial to investigate the process of conflict identification that occurs before this conflict is resolved. Therefore, in this thesis, we build on the theory of conflict identification (Myrseth & Fishbach, 2009) to develop a valid measure and show that self-control relies on the ability to identify the discrepancies between temptations and goals. In particular, we aim to show that problems in conflict identification may contribute to impaired self-control that extend existing knowledge on self-control beyond impulse inhibition.

In this chapter, I will first review some prominent models in the conceptualisation of self-control. Then, I will discuss the theoretical accounts and empirical findings that provide different views on how conflict between temptations and long-term goals influences the success of self-control. Specifically, I will address the differences between the identification and experience of conflict. Following this, I will discuss the influence of both individual differences and situational factors in self-control. Lastly, I will provide an overview of the aims, research questions and empirical chapters of this thesis.

Models of Self-Control

There are numerous models that explain different theories in the understanding of self-control but do not explicitly discuss conflict identification (for overviews, see Inzlicht et al., 2021). In this section, I will focus on the dominant models that have been studied in various fields of psychology such as cognitive neuroscience and social psychology that provide insights into the main fundamental concepts and processes in self-control.

Dual Systems Model of Self-Control

One of the most prominent theories is the dual systems theory which claims that there are two distinct systems that are involved in determining one's behaviour (Hofmann et al., 2009; Metcalfe & Mischel, 1999). One system is a highly automatic and impulsive system which responds effortlessly to temptations that represent the incentive value of immediate over more delayed rewards. This system facilitates the fulfilment of an immediate desire which is associated with more approach and habitual responses to the temptation (Hofmann & Van Dillen, 2012). In contrast, the other system is a more conscious, deliberate and controlled system which requires more effort in decision making processes that involve more rational judgement and evaluations to inhibit and override immediate impulses to attain the long-term goal.

According to this theory, a self-control dilemma occurs when there is a conflict between these two systems (Fujita, 2011; Hofmann et al., 2009). For example, in the marshmallow test (Metcalfe & Mischel, 1999), children were faced with two competing goals, one served an immediate reward of eating the delicious marshmallow and the other served a delayed but larger reward of waiting longer to receive more marshmallows. The researchers were interested in understanding the processes in which individuals experience impulses for immediate desires and how they are able to control and overcome these desires for a larger reward (i.e., delay of gratification). According to the researchers' explanation of the findings, children who successfully waited longer in order to receive the larger reward showed more operational thought such as diverging their attention away from the temptation to downregulate the hot system (i.e.,

system 1). The researchers also explain that the children showed more mental control to activate the cool system (i.e., system 2) by changing the representation of the temptation that focuses on the abstract and informational (e.g., thinking about the marshmallows as clouds) rather than the appetitive qualities (e.g., thinking about how delicious they are).

In sum, this model locates conflict identification within system 2. Such that, the dominance of the hot versus cool system undermines one's self-control. While others suggest that conflict identification is not isolated to one system but relies on the interaction between system 1 and 2 which determines whether one acts on the impulse or overcomes it (Myrseth & Fishbach, 2009).

The Process Model of Self-Control

In contrast to effortful inhibition, other theoretical accounts such as the process model of self-control suggests that people have effortless strategies that minimize the experience of a temptation that conflicts with a long-term goal in order to facilitate goal pursuit (Duckworth et al., 2016; Gillebaart et al., 2016; Hofmann & Kotabe, 2012). This model suggests that situational strategies aimed at eliminating surrounding temptations in the environment enhance successful self-control. Accordingly, less effort is required to resist the temptation because these strategies are established at an earlier stage in the process of impulse initiation. Thus, making it easier and more effortless to pursue the long-term goal. Consistent findings show that successful self-control is associated with temptation avoidance rather than resistance (Hofmann & Kotabe, 2012). As shown in Figure 1, people use preventive strategies to avoid the emergence of an anticipated or present desire in response to temptations before it occurs. Accordingly, there are two strategies that people use to avoid temptations; situation selection and modification. Situation selection is a strategy in which people select an environment that is consistent with their long-term goals to reduce the chances of temptation encounter in anticipation of conflict. For example, choosing a restaurant that only offers healthy food. The other strategy is situation modification in response to the present conflict, whereby, people re-arrange and modify features

of their environment to eliminate temptations (e.g., not having unhealthy snacks visibly available on the kitchen counter).

This theoretical model is consistent with the hot and cool systems theory (Metcalfe & Mischel, 1999), in which people reduce the dominance of the hot system to prevent self-control failure. This means the earlier the interventions are established, the more effective the preventive strategies are in the success of self-control. Successful self-control also depends on conflict identification at the early stages of pre-commitment and habit formation which circumvent the need for conflict recognition in subsequent situations which require self-control (Crockett et al., 2013; Fishbach et al., 2003).

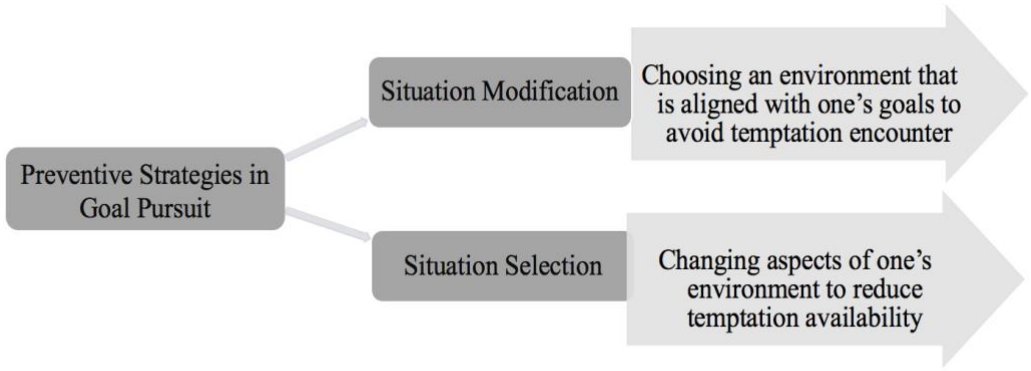

Figure 1. The Process Model of Self-Control.

Models Focusing on Goals

Although the process model assumes that successful self-control involves the avoidance of conflicting temptations (Duckworth et al., 2016). Other theories, namely, the counteractive control theory, suggests that the exposure to temptations facilitates self-control (Trope & Fishbach, 2000). In particular, when people are exposed to temptations, they bolster the positive value of the long-term goal, thereby, increasing goal attainment through an activation of relevant goals. Goal systems theory assumes that goals are connected to their corresponding means via facilitative and inhibitory links (Kruglanski et al., 2002). In the facilitative links, when goals are activated, the corresponding goal representations and means become more accessible. In contrast, in the inhibitory links, the representations of the competing goals (e.g., temptations)

become deactivated. This suggests that seeing temptations facilitates self-control through the activation of goals and the corresponding means. Furthermore, the exposure to both temptation and goal stimuli also promotes self-control through the activation of conflict (Shah et al., 2002). This suggests that when conflict is activated, people automatically reduce the accessibility of the competing temptation. This means, the threat associated with the temptation elicits a self-control conflict. Thus, the avoidance of conflict as a predictor of successful self-control is likely caused by the anticipation of conflict in response to the temptation.

While temptations and goals can activate conflict, the way in which they are perceived influences the dynamics of self-control (Fishbach & Dhar, 2005). Specifically, when temptations and goals are perceived as competing one another, a dynamic of highlighting is activated, whereby, the goal is evaluated more positively and people consistently choose items that are consistent with the long-term goal. That is, conflict is identified as the temptations and goals are perceived as incompatible. Whereas, when temptations and goals are perceived as a unified set, a dynamic of balancing between the goals is activated, whereby, people evaluate the temptation more positively and alternate between choosing the temptation and the long-term goal (Fishbach & Zhang, 2008). Although, the goal systems theory suggests that goals serve to remind people of the self-control problem and shield them from opposing desires (Shah et al., 2002), when a person is in a dynamic of balancing, goals can permit temptation indulgence in the moment (Monin & Miller, 2001). Thus, the theory of conflict identification suggests that self-control is activated only when temptations are perceived to conflict with long-term goals (Fishbach & Zhang, 2008).

In summary, the models reviewed in this chapter provide an overview of the key theories and constructs in self-control (see Inzlicht et al., 2021 for more models). The focus of this research is to understand the factors that determine conflict identification. Specifically, the aim is to investigate how conflict identification differs according to individual differences and situational contexts and how this influences self-control. Therefore, I will now review the

theories and empirical findings on the factors that influence self-control and how self-control is conceptualised.

Personality and Individual Differences in Self-Control

Over the decades, research has shown how self-control is influenced by individual differences (Mischel et al., 1989; Tangney et al., 2004). Indeed, some people are more successful in self-control than others (de Ridder et al., 2012). A crucial aim of the research on self-control has been to understand what determines successful self-control (Gillebaart et al., 2016; Hofmann & Kotabe, 2012). A range of research has explored how personality and individual differences influence the success of self-control. For instance, children who were able to delay the gratification of consuming the marshmallows at the age of four years showed better cognitive and socioemotional development later in life (Mischel et al., 1989). Similarly, people with higher levels of trait self-control experience more positive outcomes in life such as better health and well-being as well as more successful interpersonal relationships (Terrie E. Moffitt et al., 2011; Tangney et al., 2004; Vohs & Luce, 2010). Consistent research also shows that for some people, self-control unfolds more easily and effortlessly, whereby, people with more trait self-control show temptation avoidance (Duckworth et al., 2016). Accordingly, instead of overcoming conflict, the success of self-control is associated with conflict avoidance (Hofmann & Kotabe, 2012). This suggests that people with higher levels of trait self-control experience fewer conflicting temptations. Consistent evidence shows that people with higher trait self-control show effortless control in goal attainment with more habitual and automatic rather than controlled behavioural tendencies (de Ridder et al., 2012; Gillebaart et al., 2016).

Although there is much evidence to support this theory, the idea of temptation avoidance is limited and does not explain the interplay between conflict and other self-control mechanisms. The difference in the ease of control could be a result of increased motivation and therefore, the control may seem effortless (Converse et al., 2019). For instance, people who are more motivated to pursue certain goals (e.g., healthy eating) show more automatic attention

orientation towards healthy compared to unhealthy food (Milyavskaya et al., 2015) and more liking of healthy food (Werner & Milyavskaya, 2019). Similarly, recent findings show that people with more trait self-control and goals pursued for "want to" compared to "have to" reasons, experience fewer temptation encounters and perceive future temptations to be less disruptive (Leduc-Cummings et al., 2017). Consistently, people with stronger healthy eating goals distance themselves away from unhealthy tempting food (Cole et al., 2021). Importantly, the further away people place temptations, the less tempting they feel to indulge in those temptations. This suggests that when people are motivated to eat healthily, they push temptations away from themselves. These findings also indicate that people who are successful at managing their healthy eating goals, prefer to keep a distance from temptations and perceive them as further away from themselves.

The evidence reviewed suggests that people with more motivation and trait self-control do not experience conflict because they do not feel an automatic pull of temptations. That is, personality traits and individual differences interact with other self-control processes such as conflict and motivation that influence one's ability to resist temptations. Yet, it is not clear whether these individuals are more successful in identifying conflict, because they can only avoid temptations if they identify these to be problematic (Myrseth & Fishbach, 2009).

Summing up, the literature discussed above provides an overview of the relationship between individual differences and successful self-control. In addition to these individual and personality differences in self-control, there are differences in the experience and identification of conflict that also influence self-control. Therefore, I will now review the different theories in understanding the role of conflict in self-control that distinguish between the experience and identification of conflict.

The Conceptualisation of Conflict in Self-Control

In this section, I discuss the different views on the conceptualisation of conflict in self-control and highlight existing gaps in the understanding of self-control in which this thesis aims

to address. While findings show that successful self-control is associated with a decrease in the experience of conflict, conflict monitoring theory argues that identifying conflict is required to initiate control (Botvinick et al., 2001). According to the integrative model of self-control, conflict is triggered when a desire and long-term goal are incompatible (Kotabe & Hofmann, 2015). This conflict initiates control motivation, in which, it interacts with control capacity to determine control effort as shown in Figure 2. In this process, the dominance of the competing forces; desire and control effort determines behaviour. Indeed, the effortless strategies in conflict avoidance of those with high trait self-control require an individual's attention to see the temptation as a problem or conflict in the first place. While some temptations are apparent (e.g., a piece of cake), others are less obvious (e.g., a chocolate bar). Such that, less obvious and weaker compared to stronger temptations cause a decrease in conflict recognition and these temptations are more likely to go unnoticed, making them more difficult to resist (Aiaanse et al., 2014). For instance, the accessibility of dieting words was reduced when participants were presented with weaker (i.e., a moderately attractive cake) compared to stronger temptations (i.e., a highly attractive cake) (Kroese et al., 2011). In addition, those participants who were exposed to weaker compared to stronger temptations consumed larger amounts of the cake. This suggests that in comparison to strong temptations, weak temptations hinder the activation of self-control processes through an underestimation of the threats. Similarly, smaller compared to larger packaging of temptations (e.g., crisps) resulted in an increase in participants' food consumption (Coelho Do Vale & Zeelenberg, 2008). This indicates that participants consumed larger amounts as a reduction in conflict recognition when the temptations were perceived as less problematic due to the smaller packaging. Therefore, the success of resolving self-control conflicts, relies on first identifying that a desired temptation is a problem for one's long-term goal pursuit (Myrseth & Fishbach, 2009).

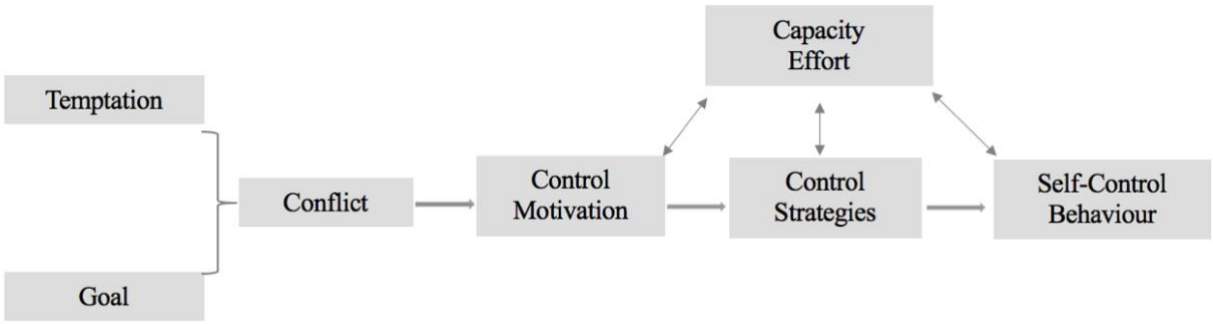

Figure 2. Integrative Model of Self-Control (adapted from Kotabe & Hofmann, 2015).

Although research has focused on the experience of conflict, much less has focused on the underlying mechanisms and the distinction between the experience and identification of conflict. It is evident that both the amount and intensity of experienced conflict as well as conflict identification influence self-control. However, these two processes affect self-control differently. Some researchers refer to an affective conflict experience such as feeling torn between temptations and long-term goals which is detrimental to the success of self-control (Becker et al., 2019). For instance, successful self-controllers experience fewer temptations that conflict with their long-term goals (Hofmann et al., 2012; Milyavskaya et al., 2015; Werner & Milyavskaya, 2019) and experience less conflict in response to self-control dilemmas (Stillman et al., 2017). In addition, when exposed to temptations, dieters with problematic self-control experienced stronger cravings for temptations, which consequently predicted an increase in the indulgence of unhealthy food (Kelly et al., 2015). Similarly, people with self-control difficulties experience more response conflict shown by slower reaction times when choosing between unhealthy and healthy food (Gillebaart et al., 2016). This suggests that they experience more conflict in response to temptations and goals. Whereas others refer to an identification of conflict between temptations and long-term goals which is required for one to activate self-control (Myrseth & Fishbach, 2009). For example, people with difficulties in self-control show faster reaction times when choosing unhealthy compared to healthy food (van der Laan et al., 2014). This indicates that faster reaction times were associated with less conflict identification. Such

that, problematic self-control is associated with a lack of conflict identification. However, the underlying mechanisms of conflict experience and identification remain unclear (see table 1 for a summary).

Table 1. The Definitions of Conflict in Self-Control.

Theory	Conflict	Self-Control
Conflict Monitoring (Botvinick et al., 2001)	The process is defined as the initiation of control following the detection of conflict.	Conflict detection is required to activate self-control through monitoring for conflicts in information processing.
Conflict Identification (Myrseth & Fishbach, 2009)	The process is defined as the ability to identify discrepancies between temptations and goals.	Conflict identification is a pre-requisite for self-control.
Conflict Experience (Becker et al., 2019; Hofmann et al., 2012)	The process is defined as the experience of the desire to pursue the temptation while also being motivated to pursue the goal.	Conflict experience is associated with unsuccessful self-control.
Conflict Resolution (Gillebaart et al., 2016)	The process is defined as the resolution of a response conflict, in which there is a "pull" between temptations and goals.	Conflict resolution is associated with successful self-control. The resolution of conflict is determined by the

ability to identify and solve the conflict.

Given these different approaches in understanding conflict in self-control, it is not evident how the experience of conflict results in better self-control and whether it is also associated with varied levels of conflict identification. It could be that successful self-controllers do not experience conflict because they are able to identify and resolve conflict. Though scarce, more recently, research shows that repeated exposure to conflicting choices (e.g., a muffin and an apple) results in people becoming faster and more successful at resolving these response conflicts (Gillebaart et al., 2020).

In sum, it is not clear whether conflict resolution is improved due to changes in conflict identification abilities. As highlighted above, given the limited research in studying conflict identification, in this thesis, we aim to further investigate the interplay between individual and situational factors (i.e., social norms and current goals) on peoples' abilities to identify conflict. This will help improve the understanding of the mechanisms of self-control.

Factors Influencing Self-Control

In light of the preceding section, growing research suggests that conflict between temptations and goals is influenced by different personal and situational factors. In particular, peoples' self-control is determined by differences in trait self-control (de Ridder et al., 2012; Galla & Duckworth, 2015). That is, people with higher levels of trait self-control show more ease and success in the pursuit of goals (Berkman et al., 2017). In addition to the influence of personal factors on self-control, some environments undermine peoples' self-control such as social contexts in which an individual is likely to be influenced by the attitudes and behaviours of others (Cruwys et al., 2012). Therefore, in this section, I will discuss the relevant literature on how personal and situational factors that I will study in my thesis influence self-control.

The Influence of Personal Factors

Recent research provides extending evidence on the characteristics of successful self-controllers in response to conflict (Gillebaart et al., 2016). Specifically, the success of self-control is influenced by individual differences in trait self-control in the experience and resolution of response conflict. This means that people with more trait self-control are faster and more successful at overcoming conflict. Similarly, in a mouse-tracking study, individuals with higher levels of trait self-control were more successful in choosing goal congruent (e.g., healthy) compared to goal incongruent (e.g., unhealthy) food options, whereby, they displayed smooth rather than abrupt mouse-trajectories in resolving this conflict (Stillman et al., 2017). Interestingly, those with better self-control demonstrated less real-time conflict shown by faster mouse-trajectories. This suggests that effective self-control is not due to impulse inhibition but dynamic conflict resolution between temptations and long-term goals.

Further research also shows that people who are effective in self-control feel less conflicted by temptations (Crockett et al., 2013; Hofmann et al., 2012). Interestingly, individual differences in successful self-control could be explained by varying levels of motivation. For instance, it has been found that successful goal pursuit is associated with increased motivation to pursue autonomous goals (Milyavskaya et al., 2015). Autonomous motivation results in an ability to recognize the reasons for their choices and behaviour, in which, goals are constructed to be resistant to conflict (Converse et al., 2019). However, it still remains unclear whether this resistance to conflict is due to an enhanced ability to identify conflict.

Although there has been research on successful self-control and conflict, it is not yet clear what determines conflict identification. In this thesis, we aimed to address this gap by focusing on situational factors such as social norms and goal saliency that influence conflict identification. While we focus on situational contexts in this thesis, it is likely that there are other influencing factors that determine conflict identification. Therefore, I will now review the

literature on the effects of social norms and goals on self-control relevant to the studies conducted in this research.

The Influence of Situational Factors

In addition to individual factors, there are situational and social cues that also influence one's self-control. Given that goal pursuit often occurs in the presence of other people, it is important to understand the role of interpersonal influences on self-control. Research on pursuing goals with others has yielded mixed findings. Some evidence shows that the presence of others can support one's goal pursuit by monitoring goal directed behaviour and providing feedback (Ashford et al., 2003) as well as reminding a person of their goals (Nielsen & Bauer, 2019). In addition, consistent evidence shows that the presence of others influences peoples' motivation through a magnification of their behaviour and efforts (Steinmetz et al., 2016). In contrast, further research shows that others' eating behaviour elicits indulgence in people to conform to model that behaviour (Dzhogleva & Lamberton, 2014).

The Definition of Social Norms. Often, in situations, people are exposed to external information such as social norms that represent rules conveying acceptable attitudes, values and behaviour within a social group (Cialdini & Trost, 1998). There are two types of norms, descriptive (i.e., what others do) and injunctive norms (i.e., what a person is expected to do) (Cialdini et al., 1990). While, both these different norms influence peoples' thoughts and behaviour (Allcott, 2011), descriptive norms are stronger in influencing attitudinal and behavioural change compared to injunctive norms (Bertoldo & Castro, 2016; Lally et al., 2010; Stok et al., 2014). For instance, descriptive norms displaying students' high vegetable consumption resulted in greater subsequent intake of vegetables compared to injunctive norms showing the health benefits of vegetables (Robinson et al., 2014).

How Social Norms Influence Behaviour. One mechanism in which social norms influences behaviour is by changing one's consideration of behaviour through thought representations of the varied expected behaviours, the possibility and desirability of the

behaviour (Hook, 2020). That is, social norms provide structure on the different behaviours that become accessible in a given situation, the value of the behaviour and how likely it is to be performed. This process determines whether a behaviour is enacted or resisted. Social norms also provide guidance on the appropriateness of behaviour (Burger et al., 2010; Mollen et al., 2013). Ample research has demonstrated that social norms strongly influence peoples' eating behaviour (Robinson et al., 2014). Indeed, peoples' behaviour is socially learned by observing and modeling others' behaviour through a process of internalization and acquisition (Bandura & Walters, 1977). For instance, people adjust their food intake according to the observed model (Vartanian et al., 2013), that is, they eat more food when the model consumes larger compared to smaller amounts of food. Consistent evidence shows that people eat more when dining with others compared to when eating alone through behavioural modelling (Cavazza et al., 2011). This effect is also demonstrated when the model is not present (Prinsen et al., 2013). Modelling occurred when participants saw environmental cues signaling what other participants had eaten (e.g., a number of empty sweet wrappers or a list of information on the amount of food consumed). Interestingly, the effects of social norms on peoples' eating behaviour occur unconsciously, in which, participants are unaware of social influence (Hermans et al., 2012; Vartanian & Shaprow, 2008).

Norm Internalization. Following that social norms influence behaviour without conscious awareness, research suggests that these norms are internalized as they do not only change peoples' behaviour in the moment (e.g., modelling) but also over time and in response to novel information (Ledgerwood & Callahan, 2012). People form their perception of others' attitudes and thoughts and unconsciously adopt and integrate these as their own (Mackie & Smith, 2017). Indeed, people often adopt others' attitudes, thoughts and feelings to share their reality and understanding of the world (Echterhoff et al., 2005). That is, people adapt and align their attitudes and perspectives to those of others (Echterhoff et al., 2009). This is because sharing a reality with others validates peoples' attitudes (Asch, 1951) and alters their perception

of the experience (Steinmetz et al., 2016). For instance, when eating a pleasant or an unpleasant chocolate with another person, people rated the pleasant chocolate more positively and the unpleasant chocolate more negatively compared to when this experience was not shared with another person (Boothby et al., 2014).

Social Norms Influence the Evaluation and Perception of Temptations. In addition to the influence of social norms on the integration of others thoughts and experiences, social norms also evoke indulgence through influencing one's liking of temptations. For instance, people show increased liking of objects that were simply viewed by others (Bayliss et al., 2006). Similarly, social norms conveying others' food preferences increased peoples' subsequent liking of that food (Higgs, 2015). In addition to changing peoples' evaluations of temptations, social norms also affect their perception of conflict. Specifically, individuals perceived tempting unhealthy food more healthily and showed an increase in liking when presented with social norms of people liking that food (Templeton et al., 2016). I interpret this as conflict identification because if a temptation is considered healthier, it interferes less with a health goal and thus does not pose a conflict. Similarly, when people were primed to focus on the enjoyment rather than the responsibility of choosing fruit beverages, they perceived these juices more healthily (Sah et al., 2021).

Taken together, the literature reviewed suggests how situational and external cues can impede one's perception of conflict between immediate temptations and competing goals. Although, the underlying mechanism of this effect remains unclear. In the following chapters, we address this gap by exploring the interaction between social norms and individual differences using varied measures of conflict identification to look more closely into the mechanisms of self-control. We build on recent theorizing to suggest that impaired conflict identification contributes to problems in self-control.

The Influence of Goal Saliency

Goal saliency is another influencing factor that determines one's self-control (Fishbach et al., 2003). Given that many of peoples' goals occur unconsciously as well as consciously, external surrounding cues can influence goal pursuit (Strack & Hannover, 1996). In particular, when a goal is on the forefront of people's mind, they are more likely to make choices in line with it (Stroebe et al., 2013). Such that, these cues activate goal consistent cognitive representations of one's desired state (Shah et al., 2002). Specifically, when goals are made salient, contradicting alternatives become more accessible (Kleiman et al., 2016). This means that people are more likely to identify conflict between temptations and goals, thereby, facilitating self-control. Consistent findings show that people often desire and positively evaluate temptations, however, when their health goals are activated, they negatively evaluate and avoid temptations (Fishbach & Ferguson, 2007; Huang & Bargh, 2014). Goal saliency enhances goal pursuit by increasing the value of consistent goals, while decreasing the value of temptations. Conversely, goal inconsistent primes such as enjoyment can motivate people to choose the temptation instead of the goal (Papies & Veling, 2013).

Another way in which goal saliency facilitates goal directed behaviour is by increasing one's motivation in the course of goal pursuit (Papies, 2016). More recently, findings suggest that goals activate self-control more strongly when people identify with these goals (Cole et al., 2021). Such that, thinking of goals as a part of a person's identity enhanced goal consistent choices compared to thinking of the importance of goals. When people identified with their goals, they experienced fewer difficulties and were more successful in pursuing their goals. This indicates that the motivation to pursue goals increases when a person identifies with the goal.

Taken together, it is evident that goals increase one's motivation, thereby, increasing the chances of successful goal pursuit. Although it is apparent that goal saliency improves self-control, research on the interpersonal relationship between goals and conflict identification is

limited. Thus, in this thesis, we explore the role of goal saliency on conflict identification and whether this effect is moderated by individual differences.

Summary

In this chapter, I outlined the different definitions of self-control and reviewed the prominent models in the conceptualisation of self-control. Following this, I discussed the different theoretical accounts in the understanding of the role of conflict in self-control and provided evidence to distinguish between the different perspectives on conflict. I then described empirical work on how individual differences and situational factors influence self-control.

The evidence reviewed showed that relatively limited research has investigated the role of conflict identification in self-control. Conflict identification remains an understudied component of self-control with no direct measure. Therefore, in this thesis, we aim to develop a valid measure of conflict identification to further understand the underlying mechanisms of self-control beyond impulse inhibition. In addition, little research has explored the variance across both individual differences and situational factors in the study of conflict identification. Therefore, we aim to integrate individual differences and situational factors (i.e., social norms and goal saliency) to provide a broader picture of how people perceive conflict and how this influences self-control.

The Present Work

Overview of the Research Aims and Empirical Chapters

Given the limited research on conflict identification and that much of the existing literature has focused on the experience and resolution of conflict, we are interested in understanding how conflict identification influences self-control. In this thesis, we often refer to conflict between a goal and temptation, though, we sometimes may refer to it as conflict between goals. Importantly, we will build on the theory of conflict identification which suggests that the ability to resist temptations relies first on the recognition of conflict between temptations and long-term goals (Myrseth & Fishbach, 2009). Specifically, in the following empirical chapters, we aim to explore how and when self-control is impaired to understand the mechanisms of self-

control failure. That is, why people sometimes succumb to temptations. We hypothesise that people indulge in temptations due to an inability to perceive a self-control conflict.

In the context of this thesis, we will explore the early processes in self-control, in which we aim to develop a number of varied experimental paradigms and different measures of conflict identification. We will highlight three main factors in self-control, individual differences, peoples' current goals and situational factors such as social contexts that influence conflict identification to address the current gaps in the literature. The aim of this research is to investigate how conflict identification differs according to individual differences and situational contexts and how this influences self-control. We also aim to integrate this research with the current self-control literature to improve the understanding of conflict identification. Lastly, we will test whether problems in the ability to identify conflict impair one's self-control.

First, in Chapter 2 and 3, we will combine self-control and social influence theories to explore whether in-groups' food preferences (i.e., social norms) influence peoples' self-control, specifically, the appeal, desire, health perception and purchase intentions of tempting unhealthy food. The majority of the existing research has focused on the effects of social influence on peoples' food choice and behaviour (Hermans et al., 2013; Prinsen et al., 2013; Robinson et al., 2012). Although, little is known about the underlying causes of these behavioural changes. While there is first evidence to show that when exposed to unhealthy eating norms, people rate unhealthy food more appealing and healthier (Templeton et al., 2016), it is not clear how these social norms impair health perception. Therefore, across a number of studies, we investigate whether people perceive unhealthy food more healthily when their in-group members like and eat it and whether this effect is moderated by individual differences such as dieting status and problematic self-control as shown in Table 2. We will test the hypothesis that unhealthy eating norms cause people to fail to see a conflict of unhealthy food with their health goals (i.e., perceive the food to be healthier) because eating the food seems normal and less problematic. Importantly, we further examine whether this perception is influenced by changes in the appeal,

desire and responsibility for desiring unhealthy food. By measuring these factors that might impede successful self-control such as an increase in the desire for the temptation (Hofmann et al., 2012; Papies et al., 2008; van Koningsbruggen et al., 2011) we will test how under such conditions that increase the chance of self-control failure people might be less likely to see a conflict. This will allow us to explore whether unhealthy eating norms cause people to license and permit their desire to consume unhealthy food, thus, making unhealthy food appear healthier and less harmful. To this end, we test whether changes in the perceived healthiness of unhealthy food influence eating-related behavioural intentions.

Second, in Chapter 4, we incorporated self-control and goal research to introduce a different perspective in understanding why people face difficulties and often fail in self-control. In this research, we will investigate the effects of goal activation on peoples' categorisation of temptations and goals (i.e., unhealthy and healthy food pairs) as conflicting or complementing one another using a newly developed Categorisation task as a measure of conflict identification. In particular, we explore how peoples' perception of food items related to temptations and goals is influenced by their current level of conflict identification. We also aim to explore whether this effect is moderated by individual differences in self-control difficulties. We hypothesise that the saliency of the relevant goal such as health goals will increase one's chances to identify a conflict. Recent research suggests that problems in self-control are attributed to increased response conflict, that is, feelings of conflict (Becker et al., 2019) as well as difficulties in resolving conflict (Gillebaart et al., 2016). However, it is not apparent what influences these changes in the abilities to resolve conflict. Thus, it is not clear whether conflict resolution is influenced by the ability to identify conflict. We propose that problems in the identification of conflict could contribute to these issues. Therefore, we investigate whether changes in conflict identification influence subsequent behavioural intentions in a food choice task. This research will provide a different approach in understanding why people succumb to temptations and how goal saliency facilitates self-control (Broers et al., 2017; Houlihan, 2018).

In summary, we aim to extend existing accounts on conflict identification using different approaches such as social norms and goal activation to understand when and how people activate self-control. In particular, we will explore the factors that determine conflict identification. This will help clarify the role of conflict identification and the mechanisms involved in successful and unsuccessful self-control.

Table 2. Summary of empirical chapters

Chapters	**Situational Factor Manipulation**	**Self-Control (Conflict Identification) Measure**	**Aims**
Chapter 2	Descriptive unhealthy eating norms of in-group members' food preferences and eating behaviour.	Studies 1& 2: The appeal and health perception of unhealthy food. Study 3: The desire, health perception, responsibility for desire and purchase intentions of unhealthy and healthy food.	Investigate the influence of social norms on peoples' conflict identification (i.e., health perception) and behavioural intentions.
Chapter 3	Descriptive unhealthy or healthy eating norms of in-group members' food preferences.	Study 1: The desire, health perception, responsibility for desire and purchase intentions of unhealthy food. Study 2: The appeal and health perception of unhealthy and healthy food.	Examine the role of implicit social norms on peoples' conflict identification and behavioural intentions.

Chapter 4	Goal activation facilitated by a health prime.	Pilot, studies 1 & 2: The categorisation of unhealthy and healthy food as complementing or conflicting one another (i.e., the perception of food pairs). Study 3: The categorisation of food pairs and food choice in a behavioural intention task.	Examine the effects of goal activation on the perception of conflict. Explore the relationship between goal activation, the perception of conflict and food choice.

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Chapter 2

Hidden Dangers: Unhealthy Norms Impair the Health Perception of Desired Unhealthy Food

Abstract

Unhealthy eating norms cause people to consume unhealthy food. Here we ask why, specifically, we test whether unhealthy norms impair peoples' ability to perceive unhealthy food as conflicting with their health goals, that is, to perceive it as unhealthy. This is important because only when consumers perceive food as unhealthy, they will activate self-control that is necessary to resist unhealthy yet tempting food. Across three experiments, we investigated how information about others' food preferences and eating behaviour influences the perception of the health value of unhealthy but tasty food. Unhealthy eating norms were introduced using a series of unhealthy food items that were presented with statements of similar people (i.e., ingroup members) liking (or eating) this food. In Experiments 1 and 2, unhealthy eating norms caused people to perceive unhealthy food as healthier. This effect was limited to desired unhealthy food. Indeed, in Experiment 3, increases in desiring unhealthy food were associated with a healthier perception of this food but only when exposed to unhealthy eating norms. A healthier perception of unhealthy food was also associated with an increase in wanting to purchase unhealthy food. This suggests that social norms allow consumers to justify the consumption of desired unhealthy food by making the food appear healthier and thus less detrimental to their health goals. This shows how social norms thwart self-control in the pursuit of health-related goals.

Keywords: social norms; social influence; self-control; conflict identification; temptations; goal pursuit; eating behaviour; food preferences/liking; food choice

Introduction

In their daily lives, people aim to achieve a variety of goals, including those related to health, such as the goal to eat more healthily. However, in pursuit of these goals, consumers are often faced with competing desires that threaten the achievement of such goals. For example, dieters often want to indulge in unhealthy tempting food while also maintaining their health goals. Avoiding temptations such as tasty but unhealthy food requires self-control. Self-control, therefore, significantly impacts people's health and well-being (de Ridder et al., 2012; Hofmann et al., 2012; Moffitt et al., 2011). Despite peoples' efforts to resist temptations, many succumb to these desires (Papies, 2012). Self-control in such a dilemma requires consumers to identify a self-control conflict that signals a discrepancy between an immediate temptation and a long-term goal (Myrseth & Fishbach, 2009). For instance, a dieter needs to recognise that a tasty burger would harm their dieting goals. People seem to fail to identify such conflicts, for instance, because consuming the tempting items appears to them erroneously as a negligible exception (Fishbach & Dhar, 2005). Thus, problems in identifying self-control conflicts contribute to peoples' difficulties in pursuing their health-related long-term goals. In the present chapter, we ask how social norms affect peoples' identification of a self-control conflict by measuring their health perception of unhealthy food. Specifically, we ask whether unhealthy eating norms cause people to overlook a conflict of unhealthy food with their health goals (i.e., consider the food to be less unhealthy) because the norm 'normalises' eating the food and makes it appear less harmful.

People frequently pursue goals with others. Indeed, consumers are constantly exposed to situational and social cues that have strong effects on their thoughts, feelings and behaviour (Papies, 2016). In particular, social norms act as rules that convey acceptable attitudes, values and behaviours within a social group (Cialdini & Goldstein, 2004) and influence peoples' (eating) behaviour (Robinson et al., 2014). For example, people eat more in the presence of others compared to eating alone (Higgs & Thomas, 2016) and model the eating behaviour of

their fellow diners (Hermans et al., 2013). Similarly, peoples' unhealthy snacking increases when they see others eating (Schüz et al., 2015). Even when others are not directly present, norms influence behaviour. For instance, participants conformed to the eating behaviour of remote confederates whereby the participants saw a list on their food tray of what previous participants had eaten (Feeney et al., 2011). People even consumed more chocolate in a taste test when they saw empty chocolate wrappers in a bowl as an indication of what others had consumed compared to those who were not presented with any information on others' behaviour (Prinsen et al., 2013). Longitudinal evidence also suggests that when someone in a person's social network becomes overweight, that person is more likely to gain weight themselves (Christakis & Fowler, 2007). In sum, social norms cause short- and long-term shifts in behaviour that can negatively impact diet and weight with detrimental effects to one's health (Reilly & Kelly, 2011).

The majority of research has focused on the effects of social influence on peoples' food choice and behaviour. However, less is known about the underlying causes of these behavioural changes. Theorists have suggested that we conform to social norms because it is intrinsically rewarding (Klucharev et al., 2009). Further, social norms not only influence behaviour but also alter peoples' attitudes and evaluations towards food (Higgs, 2015). Importantly, liking predicts food choice and consumption (Boesveldt et al., 2018). For instance, people who were manipulated to believe they had a more positive experience with food than they did showed more future consumption of that food (Robinson & Higgs, 2012). In a similar vein, eating with another person makes this experience more positive (Boothby et al., 2014). People also like food more when being exposed to social norms indicating that their peers like it (Nook & Zaki, 2015). In sum, following social norms is a positive experience and enhances the appeal of food (Nook & Zaki, 2015).

In the present chapter, we argue that unhealthy eating norms might also cause people to perceive unhealthy food as less destructive to their health-related goals because the norm makes eating this food seem normal. For instance, social norms reduce peoples' risk perception (Knoll

et al., 2015). Indeed, people eat more in the presence of others because these social norms provide guidance on the appropriateness of behaviour (Burger et al., 2010; Mollen et al., 2013). Further, exposure to others' negative compared to neutral evaluations of a drink or food resulted in people rating those items less positively (Robinson & Higgs, 2012). In line with this reasoning, first evidence shows when people see others' ratings which favour unhealthy food, they rate these items as more appealing and healthier (Templeton et al., 2016). However, the authors themselves point out that it is not clear why liking norms impair health perception (Templeton et al., 2016).

Health perception plays an important role in eating behaviour, such that, inaccuracy in the perceived healthiness of food is associated with a higher Body Mass Index (BMI) (Carels et al., 2006). There are different categorisations of one's BMI, ($BMI < 25$) represents normal weight individuals and a ($BMI \geq 25$) represents overweight or obese individuals. Importantly, by not seeing that eating such food harms their health goal, this means, by perceiving it as less unhealthy, people miss to identify a self-control conflict. Identification of self-control conflicts is an important step in activating self-control, whereby it signals a need to resolve the conflict between immediate desires and long-term goals (Botvinick et al.). Specifically, a person can only activate self-control when a self-control conflict is recognised. However, various factors seem to prevent successful conflict identification such as when consuming the temptation appears to be a negligible exception (Fishbach & Dhar, 2005). In the present chapter, we ask whether social norms favoring the temptation are another factor preventing conflict identification. Therefore, we investigate when and why unhealthy eating norms cause people to perceive food temptations as less problematic to their health goals.

To test this account, we employed a newly developed paradigm to measure peoples' perceived healthiness of unhealthy tempting food when presented with their ingroups' food preferences and behaviour conveying unhealthy eating norms. By taking into account the factors that might impair successful self-control such as enhanced liking or desiring of the temptation

(Hofmann et al., 2012; Papies et al., 2008; van Koningsbruggen et al., 2011) we also investigate whether under conditions that increase the chance of self-control failure consumers might be less likely to identify such a conflict. That is, we investigate the possibility that social norms 'license' the consumption of foods that a consumer wants to eat, for example, consumers may use others' (i.e., in-groups) preferences to support and license the desire to indulge. This would suggest that social norms allow consumers to justify the consumption of desired unhealthy food by making the food appear healthier and thus less detrimental to their health goals. In contrast, previous research has suggested that the effect of social norms on the health perception of unhealthy food is generic and thus not limited to desired food but any food that has been associated with in-groups' preferences (Templeton et al., 2016). Importantly, exploring the role of liking and desiring unhealthy food will allow us to highlight the potential danger of social norms for consumers with reduced self-control capacity, in addition to shedding light on the underlying mechanism.

Empirical Studies

We conducted three experiments to investigate why consumers sometimes succumb to their desires to eat unhealthily. Specifically, we examined whether social norms influenced peoples' appeal and desire of unhealthy food and their ability to identify a self-control conflict, as indicated by the perceived healthiness of food. We further explored whether these changes in desire and health perception influenced goal consistent behaviours such as consumption intentions. Across three experiments, we aimed to address three questions: 1) Do people perceive unhealthy food more healthily when others like and eat it? 2) Is this is a generic effect (i.e., do all participants consider food healthier when a norm is present) or is it specific to conditions or people with limited self-control (i.e., participants who want the food)? and 3) Does this perception influence behaviour (i.e., do participants want to purchase unhealthier food when they have a healthier perception of unhealthy food)? We hypothesised that in the presence of unhealthy eating norms, people perceive unhealthy food as healthier indicating a decrease in the

recognition of a self-control conflict. Subsequently, this increases the intentions to consume unhealthy food.

Study 1

Methods

Participants

One hundred twenty-nine undergraduate students from the University of Reading participated in exchange for course credits. The study was approved by the School of Psychology Research Ethics Committee. The sample size was determined according to a statistical analysis obtained from a similar study (Templeton et al., 2016) with an effect size size ($f^2 = .35$). A power calculation using G*Power analysis (Faul et al., 2009) was conducted to achieve a power of .8 at an α of .05. After data cleaning, 4 participants who presented straight-lining patterns in their responses (e.g., the same response across the different scales) were excluded from the analysis to ensure the data are real and accurate. The final sample size involved a total of 125 participants (113 females, 18 dieters) with an average of 20.50 years (*SD* = 4.36) and a BMI of 22.13 (*SD* = 4.79).

Design

The study aimed to investigate the effect of social influence on peoples' ability to identify a self-control conflict. Specifically, we examined whether unhealthy social norms influenced peoples' health perception of unhealthy but tempting food. To test this, we created ostensible social norms regarding food preferences and eating behaviour of unhealthy food among students at the University of Reading. We used the in-group of participants (i.e., other Reading students) because social norms are stronger in influencing peoples' behaviour when it is their own group (Cruwys et al., 2012). The study was advertised to the participants as a marketing and consumer study aimed at identifying the best-selling products among Reading students. This was a between-subjects design which consisted of two conditions, the students were either allocated to

the social influence or control condition. We also tested whether the appeal of the food items was impacted by the norms.

Apparatus and Stimuli

The study was computerised and administered via Qualtrics. The stimuli consisted of a variety of 11 hedonic food images; 4 unhealthy-sweet (e.g., chocolate), 7 unhealthy-savoury (e.g., pizza), in addition to 8 filler stimuli (e.g., laptop), all with a size of (6.3 cm high × 8.3 cm wide). The food stimuli were chosen based on their calorie and nutrient contents. In particular, food items that were high in sugars and/or saturated fats with more than 400 calories per serving were classified as unhealthy. In a pretest, the food items were selected based on their palatability and appeal. Neutral stimuli such as electronic gadgets were included to conceal the purpose of the study. The images were presented in the same random order in each condition.

In the social influence condition, each food item was presented individually with statements of their group's preferences or eating behaviour (e.g., *"87.2% of Reading students choose this food in a restaurant"; "82% of Reading students eat this food"*). In contrast, in the control condition, the same images were presented without any statements. Each of the food images were presented individually with two questions under the image; "*How appealing is this item in your opinion?*" presented on a 7-point Likert scale (1= *Not at all* to 7= *Very appealing*) and "*How unhealthy or healthy is this item in your opinion?*" (1= *Very healthy* to 7= *Very unhealthy*). Additionally, each of the neutral items were presented with two questions; "*How appealing is this item in your opinion?*" presented on a 7-point Likert scale (1= *Not at all* to 7= *Very appealing*) and "*How functional is this item in your opinion?*" (1= *Not at all* to 7= *Very functional*).

To be able to characterize the sample, the participants completed questions on goal importance ("*How important is it for you to eat healthily?*") and attainment ("*How difficult is it for you to eat healthily?*") both represented on a 7-point Likert scale (1= *Not at all* to 7= *Very much*). These questions were also included as potential measures of goal commitment (Fishbach

et al., 2003). Furthermore, we used several questions to gauge people's habitual health-related behaviours and self-control, specifically, about their exercise behaviour ("*How many hours do you exercise a week?*") represented as an open-ended question and weight fluctuation ("*In a typical week, how much does your weight fluctuate?*") on a 4-point Likert scale (0 = *never* to 3 = *always*). We also asked the participants about their dieting frequency ("*In general, how often are you dieting?*") on a 5-point Likert scale (0 = *never* to 4 = *always*), their current diet status ("*Are you currently dieting?*") (no coded as 1 and yes as 2) and a measurement of their (BMI); (weight: kg/ height: m2). For exploratory purposes, we included a question on participants' attribution of food consumption, specifically (How much do you agree with this statement; "*My weak willpower is why I consume unhealthy food"*) responses ranged from (1= *Not at all* to 7= *Very much*). The appeal and health perception ratings showed sufficient reliability, $\alpha = .729$, $\alpha = .905$.

Procedure

At the start of the study, the participants were provided with an information sheet that explained the purpose of this current research and the tasks involved. The participants were told that this was a marketing study investigating 'visual attitudes' and preferences of consumers to find out which items consumers like and how they evaluate them. Participants then provided consent.

Following this, we asked all the participants about their demographics such as age, gender, and university affiliation to prepare the ostensible allocation to their in-group for the social influence condition. They were then randomly allocated to one of the two conditions. To induce a sense of group membership, the participants in the social influence condition were told that the computer will pause to process their responses and assign them to a group of similar others based on their shared demographics and university affiliation. To create social norms, we presented the participants with bogus information on Reading students' food preferences and behaviour. To ensure the credibility of these norms, the participants were told that previous ratings of their in-

group had been collected from a large survey and would be presented to them as calculated percentages. For all the participants, the task was to rate the appeal and health perception of these food items. Upon completion of the evaluation task, all participants were required to complete the questions described before that assessed goal importance, self-control and health and eating related habits. Finally, they were debriefed.

Results

Sample Characteristics

We explored the participants' health-related behaviours such as their dieting status (M = 1.15, SD = .36), dieting frequency (M = 1.21, SD = 1.04), weight fluctuation (M = 1.5, SD = .86), importance of eating healthily (M = 5.62, SD = 1.31) and difficulties in eating healthily (M = 3.76, SD = 1.51) as well as their exercise hours per week (M = 4.04, SD = 3.21).

Randomization

There were no significant differences between the conditions in age, dieting status or frequency, exercise, BMI, gender, attribution of food consumption, weight fluctuation, health importance, or health difficulties (ps > .072), indicating successful randomization between the conditions.

Appeal and Health Perception Scores

This study investigated whether group members' unhealthy food preferences and eating behaviour influence the health perception of unhealthy "*tempting*" food. We also tested the appeal of unhealthy food. Higher scores of health perception demonstrate unhealthier responses towards unhealthy food.

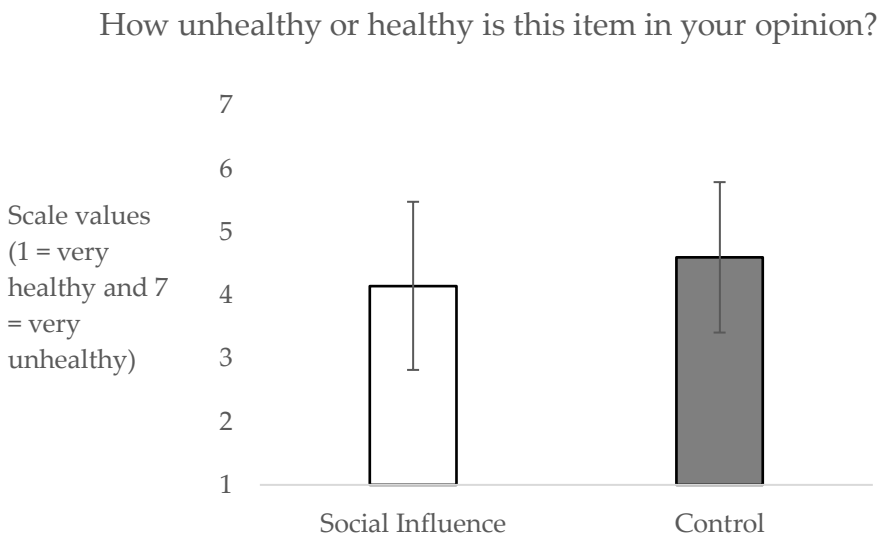

Figure 1. The effect of social norms on the perceived healthiness of unhealthy food. Higher scores indicate an unhealthier perception, (*Nsocial influence = 63*), (*Ncontrol = 62*).

Independent samples t-test analyses were performed to test the effect of condition on the health perception of unhealthy food. The social norm manipulation influenced the perceived healthiness of unhealthy food. Importantly, as shown in Figure 1, participants in the social influence condition rated the unhealthy food as healthier (M = 4.14, SD = 1.33) than those in the control condition (M = 4.60, SD = 1.19), $t(123) = -2.02$, $p = .045$, $d = .27$. The appeal ratings of the unhealthy food items did not differ between the social influence and control condition (M = 5.01, SD = .92); (M = 5.16, SD = .90), $t(123) = -.97$, $p = .330$, $d = .16$.

Exploratory Analyses

We performed correlational analyses to understand the relationship between the different variables. There was a negative correlation between the importance and difficulties of eating healthily ($r = -.26$, $p = .003$). Although not strongly correlated, these items were computed into a unitary index of health commitment to identify those who highly value the goal of eating healthily and experience fewer difficulties in its pursuit. There was no correlation between appeal and health perception of unhealthy food ($r = -.02$, $p = .854$). Additionally, there was no correlation between appeal and health commitment ($r = -.02$, $p = .870$) or health perception and health commitment ($r = -.04$, $p = .645$).

We conducted further moderation analyses using PROCESS macro (Hayes, 2017) to investigate the effect of social norms on the health perception of unhealthy food moderated by appeal ratings. The findings showed no main effects of condition b = 1.17, t(121) = .89, p = .370, 95% CI [-1.4, 3.7] or appeal b = .15, t(121) = .40, p = .686, 95% CI [-.6, .94] on health perception. There was no interaction between condition and appeal b = -.13, t(121) = -.54, p = .583, 95% CI [-.63, .36].

We also explored the effect of condition on the appeal of unhealthy food moderated by health commitment. The results showed no effects of condition b = .50, t(121) = .67, p = .501, 95% CI [-.97, 1.98] or health commitment b = .08, t(121) = .35, p = .722, 95% CI [-.37, .54] on the appeal of unhealthy food. The interaction between condition and health commitment was not significant b = -.06, t(121) = -.46, p = .641, 95% CI [-.36, .22]. Similarly, we investigated the effect of condition on the health perception of unhealthy food moderated by health commitment. The findings demonstrated no main effects of condition b = -.11, t(121) = -.11, p = .911, 95% CI [-2.2, 1.9] or health commitment b = -.25, t(121) = -.77, p = .440, 95% CI [-.89, .39] on health perception. There was no interaction between condition and health commitment b = .12, t(121) = .58, p = .585, 95% CI [-.2, .52].

Discussion

The results show that unhealthy norms affect consumers' perception of unhealthy food (Templeton et al., 2016). When an unhealthy norm was established, people rated unhealthy food more healthily. Accordingly, these norms made unhealthy food appear healthier. This indicates that unhealthy eating norms potentially make it less likely to identify a self-control conflict. The findings support our hypothesis which suggests that in-group members' preferences and behaviour influenced peoples' health perception. This suggests that our self-control processes, namely, conflict identification, is susceptible to changes in external cues such as social norms. We did not find a change in appeal. However, both conditions rated the food items already as

very appealing, this suggests, the manipulation had likely little room to further enhance these ratings.

Further, previous research suggests that people conform to others' preferences but not to others' actions (Tu & Fishbach, 2015). For instance, exposure to others' preferences of a chewing gum flavour (e.g. xy likes this flavour) compared to their actions of eating it (e.g. xy chooses and eats this flavour) evoked more conformity (Tu & Fishbach, 2015). The authors suggest that this is because when people learn about people's behaviour they share the behaviour mentally and therefore it appears like they have already had the items. In contrast, others' preferences have a stronger influence on conformity because people adopt those preferences as their own. Therefore, because the participants in our study saw both their in-groups' preferences and behaviour, the social influence manipulation may not have been strong enough to affect the participants' appeal ratings. This could indicate that liking is a more conscious evaluative decision.

In Experiment 2, we therefore aim to understand *when* social norms influence conflict identification. To this end, we will create two separate social influence conditions, in which one condition will present the participants with their in-group members' food preferences and the other condition will present their in-groups' behaviour. This will allow us to test whether norms always impair health perception or whether this effect requires the norm to project preferences for unhealthy food and thus evokes liking of the food in participants.

By this, this approach will also improve our understanding of the mechanisms underlying the effect. For instance, it is unclear whether people might infer that (any) food is healthier when they learn about a social norm favoring this food because they consider it as an indication of this food being 'safe' (Brunstrom, 2005). Alternatively, people might use a norm to justify their desire to eat the food, and, consequently, the effect of norms on health perception would be limited to the food they like. Similarly, so-called 'licensing' effects illustrate how people use

(irrational) reasons to justify the indulgence of unhealthy food such as the reason of 'needing' to reward oneself after a stressful day (Effron et al., 2013; Prinsen et al., 2013).

Importantly, the latter explanation would only be relevant when consumers find the food appealing and want to consume it such as when presented with the preferences of others. Thus, if others' preferences influence participants' appeal and health perception of unhealthy food, then this would suggest that social norms may allow consumers to license desiring unhealthy food by considering it to be healthier. In contrast, if people use social norms as a proxy for judging the healthiness or safety of (any) food, we expect the effect in both conditions or more pronounced when learning about others' behaviour. This is because information about others' behaviour (i.e., having consumed this food) might be the best indicator of the food's safety and thus serves as guidance on the appropriate action or a signal on the safety of that food.

We also extended study 1 in this experiment by using a wider sample from the UK that was not restricted to university students.

Study 2

Methods

Participants

Two hundred and eighty-seven participants took part in this study via the online academic recruitment platform Prolific in exchange of £0.50 for their time. According to a power calculation using G*Power, the sample size was determined from a pilot study to obtain a statistical power of .8 and a medium effect size ($f^2 = .15$). The inclusion criteria involved a minimum of 18 years of age and native English speakers who are residents in the United Kingdom to ensure accurate understanding of the study and to control for cultural differences in preferences and behaviour. Twenty-four people were excluded from the analysis due to straight lining responses. The final sample consisted of 263 participants (35 dieters) aged between 18-26 ($M = 18.17$, $SD = .72$) years; (166 females, 95 males, 2 other), who had a BMI average of

(22.97) *SD* = 6.04. This was approved by the ethics committee of the School of Psychology and Clinical Language Sciences.

Design

The aim of this experiment was to assess whether different social norms that either represent in-groups' preferences compared to their behaviour influence conflict identification. In order to create a feeling of group membership online, this study used an adaptation of the Minimal Group Paradigm (MGP) (Tajfel et al., 1971). This was designed to induce ostensible group membership based on peoples' demographics and preference ratings of 10 different painting styles. The between-subjects design consisted of three conditions; two experimental social influence conditions (preferences or behaviour) and a control condition.

Apparatus and Procedure

At the start of the study, the participants were provided with an information sheet and a consent form. They were than randomly allocated to one of the three conditions. All of the participants completed a set of demographic questions (gender, age, ethnicity and education). This was followed by a question in each of the three conditions; "*Are you a city or country person*?" to allow us to categorise the participants in the experimental conditions to a bogus group of 'similar' people. After this, those in the experimental conditions rated 10 different painting styles and were told that these had previously been rated by others. Participants in the social influence conditions were then told that the program would pause to calculate their responses and accordingly they would be allocated to a group of similar consumers. Hereafter, the participants were shown social influence statements of their 'group' members that were presented with the food images. The two experimental conditions differed in whether the social statements referred to their group's preferences e.g., "*Everyone in your group likes this*" or behaviour e.g., "*Everyone in your group eats this*". This was implemented to investigate the different effects of in-group members' preferences compared to their behaviour on conforming to social norms (Tu & Fishbach, 2015). In addition to the word "*everyone*", there were also other

variations within the experiment to induce a sense of the collective group such as "*the majority*", "*all of your group members*" and "*most of the people in your group*". These statements were varied to avoid repetition within the experiment and represent more realistic and credible statements. We also tested whether the differences between the conditions changed the appeal of the food. Participants in the control were only shown the food images without any social influence statements. The appeal and health perception ratings showed sufficient reliability, α = .709, α = .825. After the task, the participants answered the same questions as in the previous experiment on their health and eating related habits. Finally, they were debriefed.

Results

Sample Characteristics

The participants reported their dieting status (*M* = 1.14, *SD* = .34), dieting frequency (*M* = 1.02, *SD* = 1.1), weight fluctuation (*M* = 1.45, *SD* = .86), importance of eating healthily (*M* = 5.10, *SD* = 1.56) and difficulties in eating healthily (*M* = 4.02, *SD* = 1.56) with (*M* = 4.69, *SD* = 5.14) exercise hours per week.

Randomization

There were no significant differences between the conditions in age, gender, BMI, exercise, weight fluctuation, attribution of food consumption, health importance or difficulties (*p*s > .066), indicating effective randomization between the conditions. However, there were differences between the conditions in dieting status, $F(2, 263) = 5.35$, $p = .005$, $\eta 2\ p = .039$. In line with (Templeton et al., 2016), we tested whether dieting status predicts appeal or health ratings or interacts with condition to determine whether it needs to be controlled for. None of these analyses were significant, $p = .880$, $p = .153$, $p = .179$, $p = .621$. Therefore, we did not control for it in line with (Templeton et al., 2016).

Appeal and Health Perception

Extending from the first study, here we investigated the effect of exposure to ingroup's preferences compared to exposure to their eating behaviour on the health perception of unhealthy tempting food. We also tested the appeal of unhealthy food.

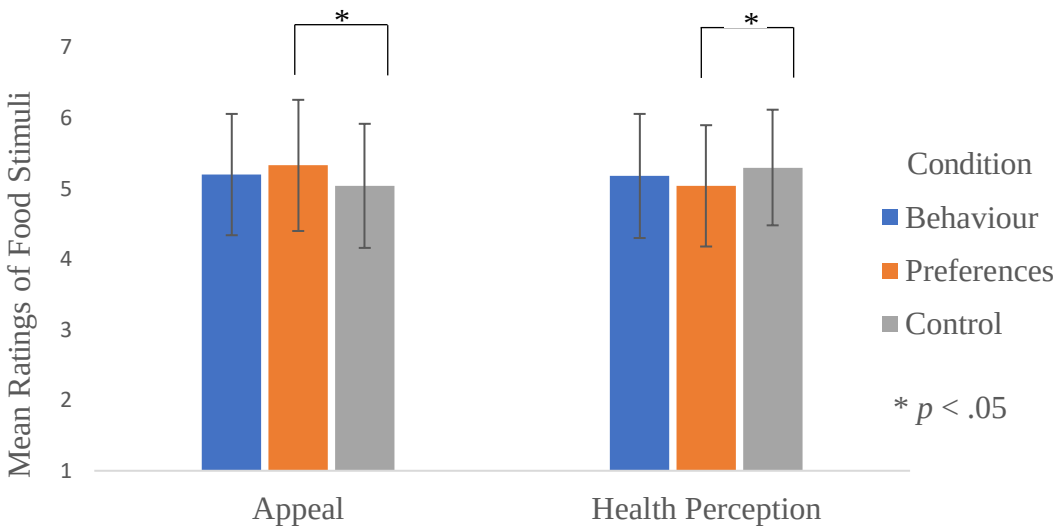

Figure 2. The differences in appeal and health perception ratings between the conditions, (*Nbehaviour = 91*), (*Npreferences = 79*) and (*Ncontrol = 93*). Higher scores indicate more appeal and an unhealthier perception of unhealthy food.

A one-way analysis of variance was conducted to explore the effect of condition on the appeal ratings and health perception of unhealthy food items. There were no significant differences between the three conditions in appeal or health perception ratings, $F(2, 263) = 2.361$, $p = .096$, $\eta 2\ p = .018$; $F(2, 263) = 1.981$, $p = .140$, $\eta 2\ p = .015$. In order to test our a priori hypotheses, we used post hoc Fisher's LSD comparisons that revealed, as expected, significant differences between the social influence (preferences) condition ($M_{appeal} = 5.33$, $SD_{appeal} = .93$); ($M_{health\ perception} = 5.04$, $SD_{health\ perception} = .86$) and control condition ($M_{appeal} = 5.04$, $SD_{appeal} = .88$); ($M_{health\ perception} = 5.3$, $SD_{health\ perception} = .82$) in both the appeal ratings ($p = .033$) and health perception of unhealthy food ($p = .048$). Consistent with the hypothesis, Figure 2 shows that the participants in the social influence (preferences) condition rated unhealthy food as more appealing and healthier compared to those in the control condition. The were no differences in

appeal or health perception between the social influence (preferences) condition compared to the social influence (behaviour) condition (M_{appeal} = 5.21, SD_{appeal} = .86); ($M_{health\ perception}$ = 5.18, $SD_{health\ perception}$ = .88). Further, the appeal and health perception did not differ between the social influence (behaviour) condition and control condition.

Exploratory Analyses

Correlational analyses were performed to understand the relationship between the appeal, health perception of unhealthy food and health commitment. There was a significant positive correlation between health commitment and health perception (r = .16, p = .008). This suggests that more health commitment is associated with unhealthier ratings of unhealthy food. However, there was no correlation between appeal and health perception of unhealthy food (r = .07, p = .229). Additionally, there was no correlation between appeal and health commitment (r = .07, p = .245).

We examined the relationship between condition and the appeal of unhealthy food as a moderator on health perception. The results revealed no main effects of condition b = -.18, t(262) = -.47, p = .634, 95% CI [-.95, .58] or appeal b = .02, t(262) = .17, p = .861, 95% CI [-.28, .34] on health perception. There was no interaction between condition and appeal b = .02, t(262) = .30, p = .757, 95% CI [-.12, .16].

We also tested whether condition influenced the appeal of unhealthy food moderated by health commitment. The results showed no effects of condition b = -.05, t(262) = -.17, p = .863, 95% CI [-.66, .55] or health commitment b = .01, t(262) = .08, p = .929, 95% CI [-.27, .3] on the appeal of unhealthy food. The interaction between condition and health commitment was not significant b = .02, t(262) = .37, p = .711, 95% CI [-.10, .15]. Similarly, we investigated the effect of condition on the health perception of unhealthy food moderated by health commitment. The findings demonstrated no main effects of condition b = -.3, t(262) = -1.02, p = .306, 95% CI [-.87, .27] or health commitment b = .02, t(262) = .15, p = .880, 95% CI [-.25, .29] on health

perception. There was no interaction between condition and health commitment b = .05, $t(262)$ = .85, p = .391, 95% CI [-.07, .18].

Discussion

The findings of this study show a similar pattern of findings as in the first study which show that unhealthy norms are associated with a healthier perception of unhealthy food. Interestingly, the results of the second study show that social norms conveying in-group members' preferences increase both the appeal and healthiness of unhealthy food. However, social norms that represent in-groups' behaviour did not influence the appeal or health perception of unhealthy food. This could suggest that social norms which project peoples' preferences influence health perception because people try to license their liking of the unhealthy food.

These findings are in line with research showing that unhealthy norms are associated with a healthier perception of unhealthy food (Templeton et al., 2016). Importantly, our results extend those by showing that the effect is limited to situations where social norms induce preferences and thus liking of the food. That is, increased liking may be associated with a justification of indulgence, therefore, a healthier perception of unhealthy food. This provides insight into why people perceive unhealthy food as healthier in the presence of social norms. In order to further understand this mechanism, we reworded the appeal question into desiring this food in Experiment 3 to clearly tap into the motivation to consume this food. This will allow us to test more directly whether desiring the items in the moment causes a biased health perception.

Further, in Experiment 3, we aimed to investigate whether changes in the desire and health perception of unhealthy food as a consequence of unhealthy norms conveying preferences influence peoples' subsequent behavioural intentions. In particular, we tested our hypothesis that possibly a reduced perception of conflict hinders the activation of self-control. Further, in this experiment, to establish a clear unhealthy norm, we included healthy items with social statements of the in-group disliking those items and liking unhealthy items. Additionally, we added questions on peoples' responsibility of desire and intentions to purchase the food items. We will investigate

whether unhealthy norms that increase the desire and healthiness of temptations are associated with changes in peoples' food choices.

Study 3

Methods

Participants

One hundred and sixty-one people participated this study via Prolific in exchange of £1. The sample size was determined based on power calculations using G*Power from a similar study (Hur et al., 2015) with a medium effect size ($f^2 = .2$) at a power of .8 and an α of .05. The inclusion criteria were the same as that in Experiment 1 and 2. The participants who demonstrated straight lining responses were excluded from the analysis ($n = 5$). The final sample consisted of 156 participants aged between 18 to 50 years ($M = 30.55$, $SD = 8.64$), 102 females and 40 dieters with a BMI ($M = 26.62$, $SD = 7.14$).

Apparatus, Stimuli and Procedure

The group categorisation, cover story and procedure remained the same as in Experiment 2 except for the following changes. In this experiment, we had two conditions, the social influence (preferences) condition and control condition (no group categorisation or social norms). We varied the food stimuli and included healthy as well as new unhealthy food items to ensure an unhealthy norm was established. As in the previous studies, these food items were selected according to their calorie content with food items containing fewer than 100 calories per serving classified as healthy food. The evaluation task consisted of 10 healthy food items, 5 healthy-sweet (e.g., fruit), 5 healthy-savoury (e.g., vegetables) and 10 unhealthy food items, 5 unhealthy-sweet (e.g., cake), 5 unhealthy-savoury (e.g., burger) with a size of (6.3 cm high × 8.3 cm wide). In the social influence condition, the participants were presented with each individual item of an unhealthy food with a statement of their in-group members liking the item (e.g., *"The majority of*

people in your group like this") as well as healthy food items presented with their in-group disliking the item (e.g., *"Your group does not like this"*).

In the evaluation task, the participants were presented with four questions with each food item. The first question measured their health perception ("*How unhealthy or healthy is this in your opinion?*") on a 7-point Likert scale, (1 = *very healthy* to 7 = *very unhealthy*). The other three questions were statements that the participants had to rate on a 7-point Likert scale (1 = *strongly disagree* to 7 = *strongly agree*). The statements measured the desire ("*I desire this product?*"), responsibility ("*I feel responsible for desiring this product?*") and purchase intentions ("*I would purchase this product if it was sold?*"). These questions were included to test whether unhealthy norms would reduce a person's responsibility of indulgence and whether this was associated with more desire and unhealthy food choices. However, the responsibility question did not seem to measure what we intended it to measure though we based it on previous research, where reduced responsibility was associated with impaired self-control (Hur et al., 2015). In contrast, in our study, there was an indication that higher levels of responsibility were associated with less trait self-control (r = -.06, p = .433). Additionally, it was associated with more intentions of purchasing unhealthy food (r = .53, p < .001) and more desire ratings of unhealthy food (r = .49, p <.001). Further, though not significantly, the data indicate that more responsibility scores were associated with a healthier perception of unhealthy food (r = -.11, p = .152) and higher BMI (r = .08, p = .326). We therefore did not analyse it further.

Additionally, we explored whether health perception would influence purchase intentions. The desire, health perception, responsibility and purchase questions revealed sufficient reliability for the unhealthy food ratings, α = .764, α = .724, α = .886, α = .773 and healthy food ratings, α = .798, α = .776, α = .892, α = .791.

All participants then completed the same self-control questions as in the previous experiments. However, we removed the questions on weight fluctuation and attribution of food consumption to measure other factors. The participants completed some questionnaires as

potential moderators such as the 10-item Rosenberg's Self-Esteem Scale (Rosenberg, 1965), the 15-item Self-Control Scale (Tangney et al., 2004), and the Cognitive Restraint Sub-Scale of the Three-Factor Eating Questionnaire (Stunkard & Messick, 1985) that were not analysed further. These questionnaires were added for students to analyse for their undergraduate thesis.

Results

Sample Characteristics

The participants reported their dieting status (M = 1.74, SD = .44), dieting frequency (M = 2.3, SD = 1.11), importance to eat healthily (M = 5.37, SD = 1.46) and difficulties to eat healthily (M = 3.9, SD = 1.62) along with their exercise hours per week (M = 4.53, SD = 5.15).

Randomization

There were no differences between the conditions in age, gender, dieting status or frequency, BMI, log transformed exercise, health importance or difficulties, ps > .094.

Desire, Health Perception and Purchase Intentions

We used correlational analyses to explore the effects of condition on the desire, health perception and purchase intentions of unhealthy food to understand how social norms influence one's self-control processes. In the social influence condition, the desire for unhealthy food was marginally correlated with health perception of unhealthy food (r = -.2, p = .062). This means that more desire for unhealthy food is associated with a healthier perception of unhealthy food. However, in the control condition there was no correlation between the desire and health perception of unhealthy food (r = .13, p = .254). The desire for unhealthy food was positively correlated with purchase intentions in both the social influence condition (r = .87, p < .001) and control (r = .90, p < .001). This suggests that more desire for unhealthy food is associated with unhealthier purchase intentions. The health perception of unhealthy food was correlated with purchase intentions in the social influence condition (r = -.23, p = .040). This means that healthier ratings of unhealthy food were associated with more purchase intentions of unhealthy

food. However, in the control condition, there was no correlation between health perception and purchase intentions (r = .09, p = .427).

We further investigated the effects of condition on the relationship between health commitment, desire, health perception and purchase intentions of unhealthy food. In the social influence and control condition, the desire for unhealthy food was associated with less health commitment (r = -.31, p = .005); (r = -.22, p = .053). Similarly, in the social influence and control condition, unhealthy purchase intentions were associated with less health commitment (r = -.33, p = .003); (r = -.22, p = .052). However, there were no correlations between health perception and health commitment in the social influence condition (r = .01, p = .883) or the control (r = .01, p = .976).

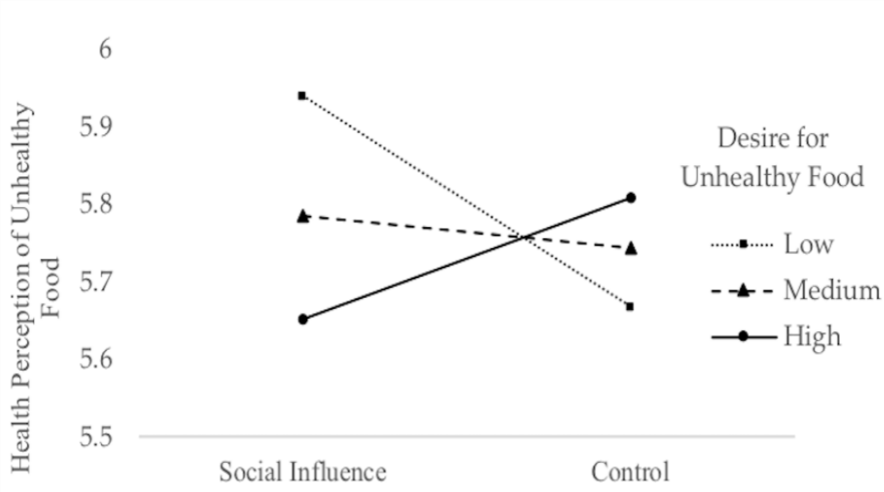

Figure 3. The relationship between condition and health perception with the desire for unhealthy food as a moderator (*Nsocial influence* = 78), (*Ncontrol* = 78). Higher scores of health perception signal more conflict identification and higher scores of desire indicate increased liking of unhealthy food.

Importantly, there were no significant effects of condition on the health perception or desire of unhealthy and healthy food without controlling for moderators, *p*s >.05.[1]

1 A 2 x 2 repeated measures ANOVA was performed to investigate the differences in the health perception and desire for different food types. Condition (social influence, control) was between participants and food type (healthy, unhealthy) was within participants factors. The results revealed that unhealthy food was rated as unhealthier compared to healthy food, F(1, 154) = 2326.4, p < .001, η2 p = .94. There was no significant interaction between condition and health

We conducted further moderation analyses to test our a priori hypothesis that enhanced desires for unhealthy food are related to impaired health perception. There was a significant main effect of condition on the health perception of unhealthy food, b = -1.24, $t(152)$ = -2.27, p = .024, 95% CI [-2.3, -.16]. Additionally, there was a significant main effect of the desire ratings for unhealthy food on health perception, b = -.55, $t(152)$ = -2.32, p = .022, 95% CI [-1.03, -.08]. As expected, the results represented in Figure 3 showed a significant interaction between condition and the desire for unhealthy food, b = .33, $t(152)$ = 2.20, p = .028, 95% CI [.03, .63]. Specifically, exposure to unhealthy norms was associated with a healthier perception of unhealthy food that were desired , b = -.23, $t(152)$ = -2.08, p = .038, 95% CI [-.44, -.01]. In contrast, this effect was not significant in the control condition, b = .11, $t(152)$ = 1.02, p = .308, 95% CI [-.1, .32]. This suggests that exposure to unhealthy norms biases the health perception of desired unhealthy food.

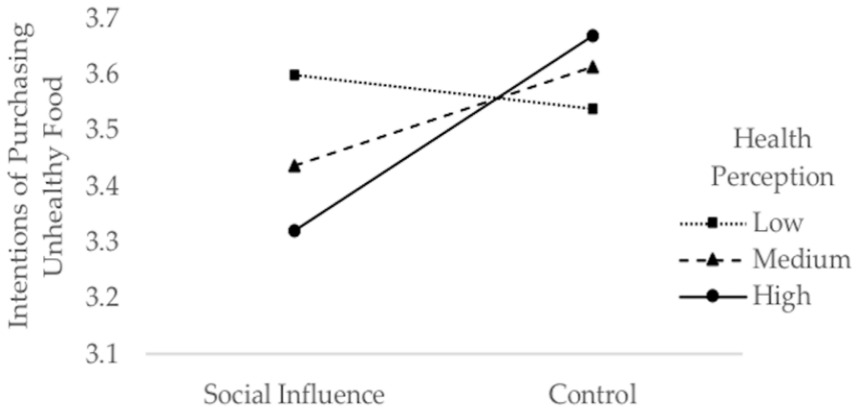

Figure 4. The relationship between condition and unhealthy purchase intentions with the health perception of unhealthy food as a moderator (*Nsocial influence* = 78), (*Ncontrol* = 78). Higher

perception, $F(1, 154)$ = .51, p = .340, η2 p = .006. The effect of condition on health perception was not significant, $F(1, 154)$ = .051, p = .821, η2 p = .000. We then examined the differences in the ratings of food desire. The results showed that unhealthy food was more desiring than healthy food, $F(1, 154)$ = 8.57, p = .004, η2 p = .053. The interaction between desire and condition was not significant, $F(1, 154)$ = .52, p = .471, η2 p = .003. There were no differences between the conditions in desire ratings, $F(1, 154)$ = 1.055, p = .306, η2 p = .007.

scores of health perception signal more conflict identification (unhealthier ratings) and higher purchase scores indicate increased intentions to purchase unhealthy food.

Another moderation analysis was conducted to test whether changes in perceived healthiness of unhealthy food predicted consistent purchase intentions depending on condition. The results demonstrated a main effect of health perception of unhealthy food on the intentions to purchase that food, b = -.58, t(152) = -2.21, p = .028, 95% CI [-1.12, -.06]. There was no significant main effect of condition, b = -1.87, t(152) = -1.82, p = .074, 95% CI [-3.93, .19]. However, Figure 4 illustrates a marginally significant interaction between condition and health perception, b = .35, t(152) = 1.94, p = .054, 95% CI [-.01, .7].

Simple slope analyses were performed to investigate the direction of this effect. The data show that in the social influence condition, healthier ratings of unhealthy food resulted in an increase in unhealthy purchase intentions, b = -.24, t(152) = -2.12, p = .036, 95% CI [-.46, -.016]. However, in the control condition, health perception did not significantly moderate the relationship between condition and purchase intentions, b = .11, t(152) = .78, p = .431, 95% CI [-.167, .39]. This shows that impaired health perception moderates the effects of social influence on food choice. [2]

We further explored the effects of condition on the purchase intentions of unhealthy food moderated by the desire for unhealthy food. The findings showed no main effects of condition, b

2 Further moderation analyses showed a significant main effect of the responsibility for desiring unhealthy food on purchase intentions, b = .85, t(152) = 4.59, p < .001, 95% CI [.48, 1.21]. There was also a significant main effect of condition on purchase intentions, b = .96, t(152) = 2.44, p = .015, 95% CI [.18, 1.73]. The interaction between condition and purchase intentions moderated by the responsibility for desire was significant, b = -.25, t(152) = -2.12, p = .035, 95% CI [-.48, -.02]. Simple slopes analyses showed that in the social influence condition, lower feelings of responsibility for desire were associated with fewer unhealthy purchase intentions, b = .59, t(152) = 7.33, p < .001, 95% CI [.43, .76] compared to the control condition, b = .34, t(152) = 3.95, p < .001, 95% CI [.17, .52]. These findings suggest that those with lower levels of responsibility for consumption show fewer purchase intentions in the social influence compared to those in the control condition. This confirms that lower self-control (i.e., higher feelings of responsibility) are associated with unhealthy consumption.

= .13, *t*(152) = .49, *p* = .624, 95% CI [-.42, .69]. There was a main effect of the desire for unhealthy food, *b* = .97, *t*(152) = .78, *p* < .001, 95% CI [.7, 1.22]. This suggests that higher levels of the desire for unhealthy food were associated with unhealthier purchase intentions. There was no interaction between condition and the desire for unhealthy food, *b* = -.03, *t*(152) = -.45, *p* = .653, 95% CI [-.19, .11].

Another moderation analysis was conducted to explore whether the effects of condition on the health perception of unhealthy food were moderated by the desire for healthy food. The results showed no main effects of condition, *b* = -.20, *t*(152) = -.43, *p* = .667, 95% CI [-1.13, .72] or the desire for healthy food, *b* = -.22, *t*(152) = -1.0, *p* = .300, 95% CI [-.64, .20]. There was no interaction between condition and the desire for healthy food, *b* = .04, *t*(152) = .76, *p* = .761, 95% CI [-.23, .31].

We also investigated the effects of condition on the desire for unhealthy food, health perception and purchase intentions moderated by health commitment. The results showed no main effects of condition, *b* = -.14, *t*(152) = -.31, *p* = .754, 95% CI [-1.02, .7] or health commitment on the desire for unhealthy food, *b* = -.11, *t*(152) = -1.6, *p* = .107, 95% CI [-.26, .02]. Similarly, there was no interaction between condition and health commitment on the desire for unhealthy food, *b* = .02, *t*(152) = .57, *p* = .567, 95% CI [-.06, .11]. Additionally, there were no main effects of condition, *b* = -.02, *t*(152) = -.05, *p* = .956, 95% CI [-.89, .84] or health commitment on the health perception of unhealthy food, *b* = .01, *t*(152) = .13, *p* = .893, 95% CI [-.14, .15]. The interaction between condition and health commitment on the health perception of unhealthy food was not significant, *b* = -.01, *t*(152) = -.09, *p* = .922, 95% CI [-.09, .08]. Moreover, there were no main effects of condition, *b* = -.25, *t*(152) = -.54, *p* = .585, 95% CI [-1.16, .66] or health commitment on purchase intentions of unhealthy food, *b* = -.14, *t*(152) = -1.88, *p* = .060, 95% CI [-.2, .01]. The interaction between condition and health commitment on purchase intentions was not significant, *b* = .03, *t*(152) = .80, *p* = .422, 95% CI [-.05, .13].

Further moderation analyses were conducted to investigate the effect of condition on the health perception of healthy food moderated by the desire for healthy food. The findings demonstrated no main effects of condition, $b = .41$, $t(152) = .80$, $p = .422$, 95% CI [-.62, 1.4], or the desire for healthy food, , $b = .16$, $t(152) = .71$, $p = .477$, 95% CI [-.29, .62]. There was no interaction between condition and the desire for healthy food on health perception, $b = -.09$, $t(152) = -.63$, $p = .525$, 95% CI [-.39, .20].

In this study, we explored the effects of condition on purchase intentions of healthy food moderated by the desire for healthy food. The findings showed no main effects of condition, $b = .26$, $t(152) = 1.05$, $p = .294$, 95% CI [-.22, .75]. There was a main effect of the desire for healthy food, $b = 1.01$, $t(152) = .89$, $p < .001$, 95% CI [.78, 1.22]. This suggests that higher levels of the desire for healthy food were associated with healthier purchase intentions. There was no interaction between condition and the desire for healthy food, $b = -.07$, $t(152) = -.97$, $p = .332$, 95% CI [-.2, .07]. We also explored whether condition influenced the purchase intentions of healthy food through the moderating role of health perception. There were no main effects of condition, $b = .02$, $t(152) = .08$, $p = .936$, 95% CI [-.63, .68] or health perception of healthy food on purchase intentions, $b = .02$, $t(152) = .05$, $p = .955$, 95% CI [-.60, .63]. There was no interaction between condition and the health perception of healthy food, $b = .01$, $t(152) = .05$, $p = .955$, 95% CI [-.35, .37].

Furthermore, we examined the effects of condition on the desire for healthy food, health perception and purchase intentions moderated by health commitment. The results showed a main effect of health commitment on the desire for healthy food $b = .19$, $t(152) = 2.61$, $p = .009$, 95% CI [.04, .34]. However, there was no main effect of condition $b = .51$, $t(152) = 1.10$, $p = .269$, 95% CI [-.40, 1.43]. Similarly, there was no interaction between condition and health commitment on the desire for healthy food, $b = -.04$, $t(152) = -.98$, $p = .328$, 95% CI [-.14, .04]. Additionally, there were no main effects of condition, $b = -.14$, $t(152) = -.30$, $p = .759$, 95% CI [-1.07, .78] or health commitment on the health perception of healthy food, $b = -.03$, $t(152) = -.44$

p = .6, 95% CI [-.18, .11]. The interaction between condition and health commitment on the health perception of healthy food was not significant, b = .02, t(152) = .52, p = .599, 95% CI [-.07, .12]. Moreover, there were no main effects of condition on the purchase intentions of healthy food, b = .27, t(152) = .58, p = .561, 95% CI [-.65, 1.19]. However, there was a main effect of health commitment, b = .16, t(152) = 2.1, p = .036, 95% CI [.01, .31]. This suggests that more health commitment was associated with healthier purchase intentions. The interaction between condition and health commitment on purchase intentions was not significant, b = -.01, t(152) = -.38, p = .700, 95% CI [-.11, .07].

General Discussion

It has been well-established that eating-related social norms strongly influence eating behaviour. Here, we introduce a different perspective that shows why consumers conform to such social norms. To do so, we combined different theoretical perspectives to understand why consumers may experience difficulties in trying to resist temptations by integrating research from self-control, social norms, and consumer science to explore how desire and health perception of unhealthy food influence food choice. The findings from Experiment 1 showed that when people see food preferences of their ingroup, those food items appear healthier. This confirms our assumption that social norms cause consumers to overlook that unhealthy food would conflict with their health goals. In Experiment 2, the results demonstrated that seeing others' food preferences enhanced the liking of the tempting food items as well as biased their health perception. Although eating might also imply liking, we did not find these effects when seeing norms reflecting others' eating behaviour. This suggests that norms need to induce preferences for food to bias health perception. In a similar vein, in Experiment 3, the desire for unhealthy food moderated the effects of social norms on health perception. This suggests, only when people desired the tempting food, in-groups' preferences distorted the health perception of the food, leading to unhealthy food choices. In sum, our research suggests that exposure to social

norms impairs the health perception of desired unhealthy items and leads to the consumption of desired unhealthy food.

Our results support previous evidence showing that people experience difficulties in resisting temptations in social contexts (Higgs & Thomas, 2016). We extend those findings by demonstrating a different perspective on how and why these effects occur. Specifically, the results show that unhealthy norms influence peoples' health perception of tempting food. This indicates a potential distortion in the evaluation of the detrimental costs of pursuing the temptation (Experiments 1 and 2). Importantly, successful self-control necessary to resist such unhealthy but tempting food requires recognising that a temptation is in conflict with a long-term goal which is a crucial step in activating self-control (Myrseth & Fishbach, 2009). Relatedly, the results indicate that a reduced conflict perception, shown by healthier ratings of unhealthy food, makes it less likely and more difficult to activate self-control and refrain from choosing such temptations (Experiment 3). Consistent with previous research, our results show that social influence altered peoples' food preferences and health perception (Templeton et al., 2016). Our research extends those findings by highlighting a different perspective suggesting that these effects could be due to a lack of conflict identification consequently leading to food choices that hinder self-control success.

The present results show that increased liking of and the desire for tempting items influenced health perception. We assume that this makes the temptation appear less problematic. In Experiment 1, we did not find a moderation by appeal or desire, however, all participants liked all of the unhealthy food items. In Experiment 2, only in-groups' preferences but not their behaviour increased liking and the perceived healthiness of unhealthy food. This suggests that norms which project in-groups' preferences may influence conflict identification, whereby, people try to license their liking of temptations. In Experiment 3, health perception was only impaired for desired items in the social influence condition. Based on these findings, it is suggested that the effects of unhealthy norms are stronger when people like and desire the

temptations. This indicates that people might use these norms to justify their desires and corresponding choices (Fishbach & Dhar, 2005). Accordingly, our findings suggest, when desiring a temptation, people may use unhealthy norms as a way to license indulgence. A detailed summary of each study is presented in table 1.

Table 1. Summary of the empirical studies

Experiments	**Design**	**Aims and Justification of Changes**	**Findings**
Study 1	The social influence condition consisted of statements reflecting both in-groups' food preferences and behaviour presented as ostensibly calculated percentages collected from a previous survey. The group categorisation was based on shared demographics and university affiliation.	We aimed to investigate the effects of seeing unhealthy eating norms on the appeal and health perception of food.	The participants did not show any differences in the appeal ratings. However, those in the social influence condition rated unhealthy food more healthily compared to those in the control condition.

	The sample consisted of students from the University of Reading.		
Study 2	The study consisted of two separate social influence conditions, one condition consisted of in-groups' food preferences and the other, their in-groups' behaviour presented as statements of liking or eating unhealthy food such as (*everyone, the majority, all and most*). The group categorisation was based on shared demographics and the	We designed two social influence conditions to investigate when these norms influence the appeal and health perception. This was changed to understand the mechanism, whether people are influenced due to the norms evoking liking of the food (i.e., desire) or serving as a proxy to judge the healthiness or safety of the food (i.e., deduction of information).	The participants in the social influence condition conveying in-groups' preferences compared to the control condition showed an increase in both the appeal and healthiness of unhealthy food. There were no differences in these ratings in the social influence condition conveying in-groups' behaviour.

	Minimal Group Paradigm. The study was conducted online via Prolific.	We used worded statements instead of calculated percentages to induce strong unhealthy eating norms. We used the Minimal Group Paradigm to create a sense of group membership as the study was conducted online. We recruited a wider sample that was not restricted to students.	
Study 3	The social influence condition consisted of in-groups' food preferences, presented as statements of liking unhealthy food and disliking healthy food with words such as	We changed the appeal question to the desire for food. This was to tap into the motivation to consume the food. In this study, we added two more questions, the responsibility for	There were no differences between the social influence and control condition in any of the measures. However, the desire for unhealthy food moderated the effects

	(*everyone, the majority, all and most*). The group categorisation was based on shared demographics and the Minimal Group Paradigm. The study was conducted online via Prolific.	this desire to investigate whether social norms reduce a perception of responsibility and increase the intentions to purchase unhealthy food. The order of the questions was changed. The health perception was presented as the first question followed by the desire, responsibility and finally, the purchase intentions question. This was to investigate how the order of the health perception question would influence the effects of social norms when adding the other questions.	of social norms on the health perception of unhealthy food. This suggests that health perception was only impaired for desired items in the social influence condition. In addition, the health perception of unhealthy food moderated the effects of social norms on the purchase intentions of unhealthy food. This suggests that a healthier perception of unhealthy food was associated with unhealthier purchase intentions.

		We included healthy as well as unhealthy food items to establish a clear unhealthy eating norm.	

Limitations

In these studies, we did not investigate the influence of out-groups' preferences or behaviour on peoples' appeal, desire or health perception of food. There is evidence that shared identity and affiliation with a reference group have stronger effects on behaviour (Cruwys et al., 2012). In addition, we acknowledge that the correlation between the variables health importance and difficulties is not large enough to combine into one index. However, this was inspired by research which combined similar variables into a unitary index as a measure of goal commitment (Fishbach et al., 2003). Moreover, the experiments did not measure the extent to which the participants identified with their presented group. Such that, the effects of these social norms could vary according to the strength of one's group identification. Nevertheless, the unhealthy norms influenced the perceived healthiness of temptations. Furthermore, we did not have information on the participants' food intake on that day. It could be that the participants refrained from unhealthy food during that day and as a result, unhealthy norms reduced their perception of seeing indulgence as a problem. This means, the food they consumed (e.g., healthy food) or refrained from (e.g., unhealthy food) consuming that day, could have entitled them to choose unhealthily through balancing between temptations and goals (Fishbach & Shaddy, 2016). However, in such a case, the findings may also suggest that unhealthy norms are associated with increased licensing behaviour, such that people see temptations as substituting the goal (e.g., indulgence) rather than reinforcing it (e.g., refrain). This perception, therefore, could potentially

make it less likely for people to activate self-control. Finally, it should be noted that there were inconsistencies in the findings across the experiments which could be due to the differences in the methodologies used because the studies were run parallel to each other. Specifically, the changes in the social influence statements across the studies from ostensibly calculated percentages to statements and the inclusion of statements disliking unhealthy food could contribute to the inconsistencies in the findings. In addition, we used extreme statements such as "*Everyone in your group likes this*" which could have reduced the credibility of the social norms. However, as the findings suggest that social norms influence the health perception of unhealthy food increases our confidence in the credibility of the norm manipulation. In Experiment 3, we did not find a main effect of the manipulation potentially because the inclusion of healthy food items and maybe also the question on feeling responsible for desiring the food could have highlighted the importance and thus, the motivation to eat healthily (Fishbach et al., 2003). This could have dampened the chance of detecting a generic effect in all of the participants. Importantly, other laboratories have reported similar effects which raises our confidence in the finding (Templeton et al., 2016). Nonetheless, future work should test the consistency of these findings using a larger study.

Implications and Future Direction

The findings provide a different perspective in the understanding of the transmission of social norms beyond social modelling (Hermans et al., 2013). In particular, the results indicate that our eating behaviour may be susceptible to social influence through biases in conflict identification, namely, health perception. This introduces a new perspective on the effects of social influence on self-control suggesting that when people want to indulge in pursuing temptations, established norms may increase this desire and reduce a perception of conflict. Therefore, these environmental cues may support their choices and permit indulgence.

We recommend that future work explores the role of the identification of the health value of unhealthy food in promoting healthy eating. For instance, research should investigate whether

changing the health perception of unhealthy food would facilitate healthier eating behaviour. Importantly, these social effects should be examined longitudinally to test whether exposure to food related norms alters the perception of conflict overtime and reinforces new eating habits. Our findings may shed light on understanding why people are more likely to gain weight when socially connected to others who are overweight (Christakis & Fowler, 2007). Future research should also investigate whether improving people's household eating habits could improve their self-control by reducing the impact of unhealthy norms on people's health perception. Moreover, research should also replicate this effect in real-life settings to assess whether increasing one's conflict identification can help people improve their daily food choices. For example, people can increase their identification of the negative consequences of choosing an unhealthy snack on their health-related goals. Further, applied research should explore whether healthier eating habits could be improved by using salient labels that make people easily identify the health value of food. In conclusion, three experiments show how unhealthy norms influence peoples' health perception of unhealthy food. This indicates that when an unhealthy norm is established, peoples' perception of a self-control conflict is distorted. Experiments 1 and 2 show that in the presence of these norms, unhealthy food is perceived as healthier. Importantly, Experiment 2 and 3 show that this effect is driven by an increase in liking. Finally, Experiment 3 shows the effect of this biased perception of healthiness on subsequent food choices.

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Chapter 3

Going Against the Norm: Health Commitment as a Protective Factor Against Social Influence

Abstract

Conventional views have often focused on the definition of self-control as the ability to override impulses (Baumeister, 1994; Tangney et al., 2004). However, little is known about the role of conflict identification in self-control, defined by the ability to see temptations (e.g., chocolates) as conflicting with one's long-term goals (e.g., healthy lifestyle) in order to activate control (Botvinick et al., 2001; Carver & Scheier, 1982; Myrseth & Fishbach, 2009). To improve our existing knowledge of self-control, it is important to investigate which factors facilitate and prevent conflict identification (e.g., the perception of temptations in relation to goals); and its effect on the success or failure of self-control. To this end, we created situations using social norms which conveyed unhealthy or healthy eating norms to influence peoples' reactions towards temptations. We explored how these norms influenced a variety of processes relevant in self-control such as the desire for unhealthy food, feeling responsible for this desire, purchase intentions, and health perception of unhealthy tempting food. In study 1, in the presence of unhealthy eating norms, health commitment (i.e., the importance and ease of eating healthily) was associated with less desire and fewer purchase intentions of unhealthy food. Similarly, in study 2, higher levels of health commitment were associated with an increase in conflict identification shown by an unhealthier perception of unhealthy food. The findings suggest that in health committed individuals, social norms caused reactions opposite to the norm. This provides evidence which suggests that health commitment is a protective factor against social influence.

Keywords: false consensus, self-control, conflict identification, temptations, goal pursuit, health commitment

Introduction

In our environment, we are surrounded by temptations on a daily basis such as delicious and high caloric food (Hofmann et al., 2012) while simultaneously wanting to achieve other goals such as the goal of eating healthily (Fishbach et al., 2003). Temptations therefore, often impede peoples' goal pursuit (Papies & Hamstra, 2010). The exposure to temptations activates the goal of eating enjoyment which increases the desire for such temptations (Hofmann et al., 2009; Noel & Dando, 2015; Reichelt et al., 2015). Other external cues such as social norms promoting indulgence (e.g., having cake for celebrations) enhance the desire for temptations, making it more difficult to resist (Higgs, 2015). Given the strength and frequency of these impulses and desires (Hofmann et al., 2012), self-control is required to overcome them (Hofmann et al., 2009). In order to activate self-control, one must first identify a self-control conflict, that is, an incompatibility between temptations (e.g., chocolate) and long-term goals (e.g., weight loss) (Inzlicht et al., 2021; Myrseth & Fishbach, 2009). This means, conflict identification is a pre-requisite for self-control.

There are different factors which influence conflict identification and therefore, self-control. For example, increased liking of temptations is associated with less conflict identification (Fishbach & Dhar, 2008). When presented with temptations, individuals show positive evaluations and approach behaviour towards temptations, conversely, when they are reminded about their dieting goals, they rate temptations less positively and show more avoidance behaviour. Additionally, conflict is reduced when people attribute their desire or consumption of food to external factors. For instance, anthropomorphized temptations (e.g., cookies with a face, or computers that have human features such as 'Alexa' or 'Siri') which contain humanlike traits such as a name or face impaired self-control (Hur et al., 2015). This was demonstrated by an increase in the consumption of temptations (e.g., cookies) and a decrease in the participants' self-reported conflict towards this consumption. This suggests that peoples'

perception of conflict is reduced as a consequence of reduced feelings of responsibility due to the presence of another agent (i.e., external attribution).

Other external factors can influence peoples' perception of conflict through changes in the health perception of temptations. For example, when people were asked to focus on how they might deserve to enjoy unhealthy food versus when they were asked how important it is to make responsible eating choices for oneself and/or others, they perceived fruit juices to be healthier for their children (Sah et al., 2021). This suggests that an individual's conflict identification is reduced shown by a healthier perception of temptations when they are in a mindset of food enjoyment compared to responsible eating. In our experiments, we aimed to further understand conflict identification and the processes and factors that shape it. Here, we explored how social norms influence conflict identification by measuring the desire for unhealthy food, health perception, feelings of responsibility for this desire and intentions of purchasing unhealthy food.

Social Norms

Eating often occurs in a social context. Interestingly, people consume more food in the presence of others compared to eating alone (Castro & Brewer, 1992) and change the amount of their food consumption in line with that of the person they are dining with (Herman & Polivy, 2005). Additionally, people also select the same food choices after observing a confederate choosing a particular snack out of a set of choices (Tanner et al., 2008). This suggests that people use social information as a reference or guidance on appropriate behaviour.

Social norms are conceptualised as two types of norms, descriptive (what others do) and injunctive social norms (what an individual is expected to do) (Cialdini et al., 1990). Although, both types of social norms influence peoples' thoughts and behaviour (Allcott, 2011; Anderson et al., 2017), descriptive compared to injunctive norms are more influential in attitudinal and behavioural change (Bertoldo & Castro, 2016; Lally et al., 2010; Stok et al., 2014). For example, the use of descriptive norms describing students' high vegetable consumption resulted in greater subsequent intake of vegetables compared to injunctive norms displaying the health benefits of

vegetables (Robinson et al., 2014). Descriptive social norms influence peoples' evaluation of food by changing their liking of food (Robinson et al., 2013). Specifically, after consuming a snack, participants who read comments on others' disliking the snack rated it as less appealing compared to those who read neutral comments. This means that negative compared to neutral social information about food results in reduced liking of that food. In contrast, social norms conveying unhealthy food preferences increased peoples' subsequent liking of that food (Templeton et al., 2016). Similarly, neuroimaging research has shown that social norms set by others' preferences are associated with an increase in peoples' positive evaluation of those stimuli (Mason et al., 2009). Specifically, when viewing symbols that were socially tagged compared to symbols with no social information, the participants exhibited more activity in the brain regions (i.e., the caudate) which signal reward processing.

The Effects of Perceived Similarity/Closeness on the Influence of Social Norms

The effect of social influence is not inevitable. Social influence begins with an underlying process of social comparison, whereby, a person compares his/her current thoughts and/or behaviour to either established norms (Roth et al., 2001) or others' past and/or present choices or behaviour (Polivy & Pliner, 2015). Though this comparison occurs in the absence of conscious awareness (Vartanian et al., 2013), it is often on dimensions of personal relevance and importance such as individuals' self-definition (Miller, 1984; Papies & Nicolaije, 2012). As a consequence, if the observed social norm is not relevant, then a person is less likely to conform. For instance, men ordered less of a steak when it was named a "ladies cut" compared to a "chef's cut" (White & Dahl, 2006). This suggests that social norms are less influential when they are not relevant to the individual.

An additional influencing factor on conforming behaviour is the extent to which individuals perceive themselves in relation to people they are close to, for instance, people often coordinate their actions (e.g., food choices) and goals (e.g., weight loss) with their close others (Fishbach & Shaddy, 2016), perceiving themselves as an extended part of others (Aron et al.,

1991). However, this self-other overlap is based on the extent to which people identify with others (Aron et al., 1992; Norton et al., 2003). That is, social norms have varying effects on peoples' behaviour which differ according to their self-evaluation of assimilation or not to others (Mussweiler, 2003). This evaluation alters one's perceived similarity between the self and others which consequently leads to behavioural contrast or assimilation (Berger & Rand, 2008). Such that, undergraduate students consumed less alcohol when they were told that graduate students (i.e., an outgroup) consumed a lot of alcohol. On the other hand, when people are primed to focus on the similarities more than the dissimilarities to the standard of comparison they show more behavioural assimilation compared to contrast (Mussweiler, 2003).

While research shows that people tend to conform to the behaviours of aspirational others (Escalas & Bettman, 2005), other findings suggest that people go against the norm when it is associated with a person or group they do not wish to imitate, even if this means avoiding more desirable behaviours. For example, students consumed less unhealthy food when they were told that outgroup members were the largest consumers of unhealthy food on campus (Berger & Rand, 2008). Similarly, when an outgroup of video gamers was associated with eating large amounts of unhealthy food, participants chose to eat less unhealthy food (Berger & Heath, 2007). This indicates that when a reference group of others is perceived to be different, people adjust their choices and behaviour to avoid imitating that group. Participants chose and consumed less food after observing an overweight confederate choosing to eat a large portion of food compared to when the confederate was thin (McFerran et al., 2009). However, the participants chose and consumed more food when the overweight confederate chose to eat a small portion compared to when the confederate was thin. This suggests that adjusting a behaviour to diverge away from the norm of an out-group does not always involve a more preferable behaviour but one that is different to the norm of the dissociative person or group. This demonstrates that the effects of social influence are moderated by assimilation.

Empirical Studies

Earlier research has focused on the effects of social influence on the expression of people's subsequent eating behaviour with limited findings on how it affects the formation of associated beliefs and cognitions. Recent evidence suggests that in the presence of social norms representing unhealthy food preferences, people perceived unhealthy food as healthier (Templeton et al., 2016). In Chapter 2, we found that only when people desired the tempting food, unhealthy eating norms distorted the health perception of the food, leading to unhealthy food choices. In this Chapter, we used the same paradigm as in Chapter 2 in which we first induced a sense of group membership using an adaptation of the Minimal Group Paradigm (Tajfel et al., 1971). Here, we ostensibly categorised the participants to a similar group of consumers based on shared demographics and preferences of a series of different painting styles. Previous findings showed that the extent to which one identifies with a referent group, moderates the effects of social norms on food intake (Liu et al., 2019). Therefore, this was created as a social identity prime to establish an identification with the group's norms. However, in this present study, we only included unhealthy food stimuli without the inclusion of healthy items to establish strong unhealthy eating norms and avoid the effects of a potential health prime. This will help us understand how social norms influence conflict identification by exploring peoples' desire and responsibility for consumption as well as their health perception and purchase intentions.

Specifically, we aimed to replicate and extend our understanding of these findings to a wider online population to further investigate whether unhealthy eating norms influence peoples' desire for unhealthy food, feelings of responsibility for the desire, purchase intentions as well as their health perception of these temptations. As in Chapter 2, we examined whether unhealthy eating norms increase the desire for unhealthy food and reduce an internal feeling of responsibility for this desire. Previous research shows that the desire for temptations increases and the conflict of consumption decreases when consuming these temptations is attributed to

external agents (Hur et al., 2015). Therefore, we aimed to test whether social norms are associated with changes in feelings of responsibility to investigate the mechanisms involved in social influence and self-control. Furthermore, we explored whether social norms were associated with changes in people's perceived healthiness of unhealthy food and their purchase intentions.

In the first study, we did not expect to find evidence of a perception of dissimilarity. However, after finding it, we conducted the second study to investigate the effects of social norms on peoples' appeal and health perception of tempting unhealthy food using a more subtle social influence manipulation to induce a false consensus. We also aimed to explore whether individual differences moderated the effects of social norms on the outcome variables. Here, we recruited students from the University of Reading to establish a perception of a strong group membership based on their shared university affiliation and demographics. We created a false consensus task to subtly induce social influence and increase the credibility of the norms. In this paradigm, we introduced social norms that either conveyed unhealthy or healthy eating norms according to the condition allocation. In this study, we implemented three conditions, an unhealthy norm, healthy norm and control condition to assess the influence of the different eating norms on peoples' self-control processes (i.e., appeal and health perception of food). In the two experimental conditions, the unhealthy and healthy norm conditions, food stimuli were presented with statements of their in-groups' preferences which varied according to the condition's norm, to either project unhealthy or healthy eating norms. To reinforce the norm, the participants were required to indicate on a response scale the percentage of students they thought agreed with the statements. We then measured the appeal and health perception of both unhealthy and healthy food.

Study 1

Methods

Participants

We recruited 160 participants via Prolific. We determined the sample size according to power calculations using G*Power (Faul et al., 2009) at a power of .8 and an α of .05 based on a similar study (Hur et al., 2015) with a medium effect size ($f^2 = .2$). Participants who presented straight lining responses were excluded from the analysis ($n = 6$). The final sample consisted of ($n = 154$) aged between 18 to 31 years ($M = 23.77$, $SD = 3.85$), 120 females and 38 dieters with a BMI ($M = 24.9$, $SD = 6.83$). The participants reported their importance of eating healthily ($M = 5.32$, $SD = 1.41$) and difficulties ($M = 3.77$, $SD = 1.70$) as well as their exercise hours per week ($M = 5.1$, $SD = 4.16$). The study was granted approval by the ethics committee of the School of Psychology and Clinical Language Sciences.

Design

In this study, we aimed to understand the mechanism in which unhealthy eating norms influence self-control. In particular, we used a between-subjects design to assess whether seeing unhealthy eating norms influences the desire, responsibility of desire, purchase intentions and health perception of unhealthy food and whether this is moderated by individual differences.

Apparatus and Materials

Group Categorisation and Norm Induction. This study consisted of two conditions, the social influence and control condition. In the social influence condition, we induced social norms using a cover story. Here, we told participants that this study was designed to identify the best-selling products based on peoples' shared characteristics and therefore, we are interested in matching them to a group of similar consumers. Following this, to establish a strong sense of group belonging and similarity we provided the participants with questions on their age, gender, ethnicity, education and a question on their self-identification, "*Are you a city or country person*".

To further induce group membership, we used an adaptation of the Minimal Group Paradigm (Tajfel et al., 1971). In this paradigm, the participants were presented with 10 different painting styles in which they rated the appeal of each item on a 7-point Likert scale, (1 = *Dislike very much* to 7 = *Like very much*). Once the participants rated these items, they were ostensibly told that the computer will pause to calculate their responses according to their demographics and painting preferences to match them to a group of similar others. After the group categorisation, the participants were told that they would be presented with products that had been previously rated by members belonging to their group. They were also told that they would be shown their group members' top choices which have been identified as the best-selling products. Hereafter, they were presented with the food evaluation task, in which unhealthy tempting food items were presented with unhealthy eating norms as statements of their "in-groups'" unhealthy food preferences (e.g., *Everyone in your group likes this item*). The norm induction was not included in the control condition. However, they completed the same demographic questions and the food evaluation task without the inclusion of the unhealthy eating norms (i.e., in-groups' food preferences).

Desire, Responsibility, Purchase Intentions and Health Perception. All the participants were presented with 10 unhealthy food stimuli (e.g., cake) and 3 neutral filler items (e.g., watch). The food stimuli were selected according to their calorie and nutrient contents. Unhealthy food was chosen based on items that were high in sugars and/or saturated fats and contained more than 400 calories per serving. For each food item, the participants rated the desire "*I desire this product*", responsibility of desire "*I feel responsible for desiring this product*", purchase intentions of the unhealthy food "*I would purchase this product if it was sold*" on a 7-point Likert scale, (1 = *Strongly disagree* to 7 = *Strongly agree*). Behavioural intentions have been shown to be a reliable measure and strong predictor of actual behaviour (Wood et al., 2016). They also indicated the health perception of the food items "*How unhealthy or healthy is this item in your opinion?*", on a 7-point Likert scale, (1= *Very healthy*, 7= *Very*

unhealthy). For the filler items, the participants rated the desire, responsibility and purchase intentions. However, instead of the health perception question, they were provided with the functionality question, "*How functional is this item in your opinion?*", on a 7-point Likert scale, (1= *Not at all*, 7= *Very functional*).

The desire, responsibility, purchase intentions and health perception questions revealed sufficient reliability for the unhealthy food ratings, (n = 10), α = .727, α = .726, α = .760, α = .891.

Self-control, Health and Eating Habits. We asked the participants about their self-control, health and eating related habits to investigate the effects of these variables as potential moderators in understanding conflict identification. Previous research shows that habits underlie the mechanism of self-control (Adriaanse et al., 2014). Such that, there is a strong relationship between self-control and habits (Galla & Duckworth). We also aimed to measure self-control success by exploring the participants' importance of their health goals and the ease/difficulty in goal pursuit (Fishbach et al., 2003). Therefore, we explored whether these variables were associated with conflict identification. In this study, we assessed self-control processes, in which the participants were provided with a question on their health difficulties "*How difficult is it for you to eat healthily?*" on a 7-point Likert scale (1 = *Not at all* to 7 = *Very difficult*), importance "*How important is it for you to eat healthily?*", (1 = *Not at all* to 7 = *Very important*) and health concern "*How much are you concerned with eating healthily?*", (1 = *Not at all* to 7 = *Very much*).

We further asked the participants about their Body Mass Index (BMI); (weight: kg/ height: m2), weight fluctuation "*In a typical week, how much does your weight fluctuate?*" on a 4-point scale (0 = *Never* to 3 = *Always*) and exercise "*How many hours do you exercise a*

week?". We also explored the participants' dietary restraint, "*In general, how often are you dieting?*", (0 = *Never* to 4 = *Always*), "*Are you currently dieting?*", (no , yes).

We added questionnaires as potential moderators to examine whether the effects of social norms are moderated by differences in peoples' self-esteem, trait self-control and/or cognitive restraint scores. To this end, we provided the participants with the 10-item Rosenberg's Self-Esteem Scale (Rosenberg, 1965) which consisted of 10 items (e.g., "*On the whole, I am satisfied with myself*") on a 4-point Likert scale ranging from (1 = *Strongly agree*, 4 = *Strongly disagree*). Higher scores in this scale represented more self-esteem. The participants were also presented with the15-item Self-Control Scale (Tangney et al., 2004) which consisted of 15 items (e.g., "*I am able to resist temptation*") on a 5-point Likert scale ranging from (1 = *Always*, 5 = *Never*), higher scores reflected more self-control. We also provided the participants with the Cognitive Restraint Sub-Scale of the Three-Factor Eating Questionnaire (Stunkard & Messick, 1985). This questionnaire measured dietary restraint with 9 statements (e.g., "*I deliberately take small helping to control my weight*") on a 4-point Likert scale ranging from (1 = *Definitely true*, 4 = *Definitely false*), disinhibited eating with one question ("*Do you go on eating binges even though you're not hungry?*") on a 4-point Likert scale ranging from (1 = *Never*, 4 = *At least once a week*) and hunger with one question ("*How often do you feel hungry*?") on a 4-point Likert scale ranging from (1 = *Only at mealtimes*, 4 = *Almost always*). Higher scores reflected more hunger as well as higher levels of restrained and disinhibited eating.

Procedure

The study was administered via Qualtrics and advertised as a marketing and consumer study to learn about consumers' preferences. All participants provided written informed consent prior to the study. After this, they were randomly allocated to one of the two conditions. The participants then provided their demographics. Those in the social influence condition were presented with the social identity manipulation and rated the painting styles to be categorised to a bogus group of similar others. However, the manipulation of the group categorisation was not

included in the control condition. Following this, all participants completed the food evaluation task. Thereafter, they were presented with the questionnaires on their self-esteem, self-control and cognitive restraint. Finally, they completed the questions on their health and eating related habits. At the end of the study, the participants were debriefed and reimbursed for their participation.

Results

Randomisation

The results revealed successful randomisation with no differences between the conditions in gender, BMI, dieting status or frequency, exercise, self-esteem, trait self-control, cognitive restraint, health importance or difficulties, *ps* > .219. However, there were differences in age between the social influence (M = 23.14, SD = 3.85) and control condition (M = 24.37, SD = 3.76), p = .047. To address this issue, we controlled for this difference in age. There was still a marginally significant interaction between condition and health commitment on purchase intentions when controlling for age, b = .18, $t(149)$ = 1.9, p = .056, 95% CI [-.00, .38]. We further assessed whether age predicts desire, responsibility, purchase intentions or health perception. None of these analyses were significant, p = .726, p = .315, p = .362, p = .109.

Desire, Responsibility for Desire, Purchase Intentions and Health Perception of Unhealthy Food

In this study, we investigated the effects of social norms on peoples' desire for unhealthy food, responsibility for this desire, purchase intentions and health perception to understand the mechanisms involved in self-control processes. We calculated the average of each of the four measures. According to the findings in Chapter 2, the desire for unhealthy food moderated the effects of condition on the health perception of unhealthy food. Similarly, in Chapter 2, health perception also moderated the effects of condition on the purchase intentions of unhealthy food. We, therefore, explored whether these measures were potential moderators of the effects of social norms.

Table 1. Observed means (with SD's) on ratings of desire, responsibility, purchase intentions and health perception of unhealthy food between the conditions.[3]

	Condition			
	Social Influence		Control	
Variable	***M***	***SD***	***M***	***SD***
Desire	3.5711	.65214	3.6872	.66788
Responsibility	3.1132	.92813	3.1372	.89110
Purchase Intentions	3.5289	.74275	3.6128	.66827
Health Perception	5.2711	1.05297	5.3000	.93309

We explored whether unhealthy eating norms influenced the ratings of desire, responsibility of desire, purchase intentions, and health perception. The conditions did not differ in the desire ratings, $t(152) = -1.1$, $p = .277$, 95% CI [-.32, .09] or responsibility of desiring unhealthy food, $t(152) = -.16$, $p = .870$, 95% CI [-.31, .26]. Additionally, as shown in table 1, there were no differences between the conditions in the purchase intentions, $t(152) = -.74$, $p = .462$, 95% CI [-.31, .14] or health perception of unhealthy food, $t(152) = -.18$, $p = .857$, 95% CI [-.34, .28].

Desire, Responsibility for Desire, Purchase Intentions and Functionality of the Filler Items

We assessed whether social norms influenced the ratings of the filler items to ensure that the ratings in response to the food items were not a generic effect. There were no significant differences between the conditions in the desire $t(152) = -4.9$, $p = .624$, 95% CI [-.42, .25], responsibility for desire $t(152) = -.14$, $p = .890$, 95% CI [-.35, .30], purchase intentions $t(152) = .05$, $p = .955$, 95% CI [-.34, .36] or functionality ratings of the filler items $t(152) = -.98$, $p = .324$, 95% CI [-.5, .18].

3 All responses are towards unhealthy food items on a 7-point Likert scale. Higher ratings reflect more desire, responsibility, purchase intentions and an unhealthier perception.

Exploratory Analyses

Health Commitment (an Index of Successful Goal Pursuit of Healthy Eating). In order to understand the relationship between self-control and health perception, specifically, conflict identification, we investigated the participants' health importance and difficulties. These two variables, the importance and difficulties in eating healthily were significantly correlated (r = -.23, p = .041) and therefore, computed into one variable; "health commitment" to understand self-control processes. The participants' scores were on a 7-point Likert scale (1= "*Not at all*", 7 = "*Very much*"). To this end, the difficulties in eating healthily were first reverse coded and then combined with the importance of eating healthily into a unitary variable. This means, high levels on this compound score reflect more successful goal pursuit.

We further investigated the relationship between health commitment and other self-control measures to assess the validity of the variable as an index of successful goal pursuit of healthy eating (i.e., more goal importance and fewer difficulties in its pursuit). Higher levels of health commitment were associated with higher levels of trait self-control (r = .31, p < . 001) and fewer ratings in the desire for unhealthy food (r = -.21, p = .008).

We also explored the relationship between social influence and self-control processes.

The Role of Moderators on the Influence of Social Norms. According to the findings in Chapter 2, we explored the effects of social norms on the purchase intentions and the health perception of unhealthy food moderated by the desire for unhealthy food. The desire for unhealthy food did not moderate the effects of social norms on any of the dependent measures, p > .05. Similarly, there were no effects of the moderator of health perception on the purchase intentions of unhealthy food p > .05. Furthermore, as health commitment was correlated with the desire and responsibility for the desire of unhealthy food, we explored whether health commitment moderated the effects of condition on the other dependent variables. We found that

health commitment and health importance did not moderate the effects of condition on health perception, $p > .05$ or on the responsibility for desiring unhealthy food, $p > .05$ (Appendix A).

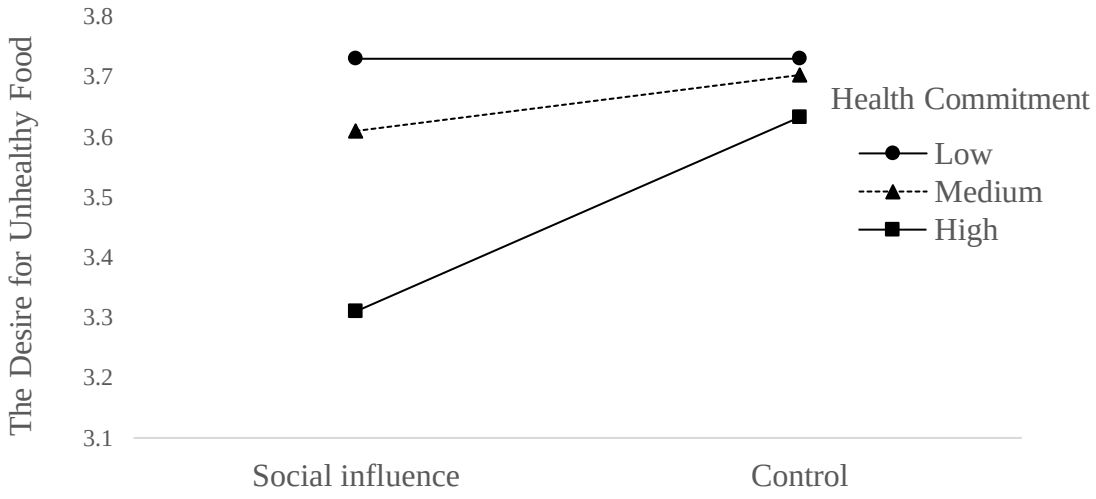

Figure 1. The effects of condition on the desire for unhealthy food moderated by health commitment (*Nsocial influence* = 76), (*Ncontrol* = 78). Higher scores reflect more desire for unhealthy food.

For exploratory purposes, we conducted another moderation analysis to investigate the effect of condition on the desire for unhealthy food moderated by health commitment. There was no main effect of condition, $b = -.59$, $t(150) = -1.35$, $p = .179$, 95% CI [-1.4, .27]. However, Figure 1 shows that there was a main effect of health commitment, $b = -.35$, $t(150) = -2.4$, $p = .013$, 95% CI [-.63, -.07]. There was a marginally significant interaction between condition and health commitment, $b = .15$, $t(150) = 1.7$, $p = .091$, 95% CI [-.02, .33].

Simple slope analyses show a significant effect of health commitment on the desire for unhealthy food in the social influence condition, $b = -.10$, $t(150) = -3.18$, $p = .001$, 95% CI [-.16, -.03]. However, this effect was not significant in the control condition, $b = -.02$, $t(150) = -.72$, $p = .467$, 95% CI [-.08, .04]. This suggests that people with higher compared to lower levels of health commitment show lower levels of desire for unhealthy food when exposed to social norms favouring this food.

Further simple slope analyses reveal that people with higher levels of health commitment show reduced desire for unhealthy food in the social influence compared to the control condition, b = .32, t(150) = 2.12, p = .034, 95% CI [.02, .62]. However, there were no significant effects in both people with lower and medium levels of health commitment, b = -.01, t(150) = -.01, p = .997, 95% CI [-.25, .25]; b = .09, t(150) = .85, p = .391, 95% CI [-.11, .30].

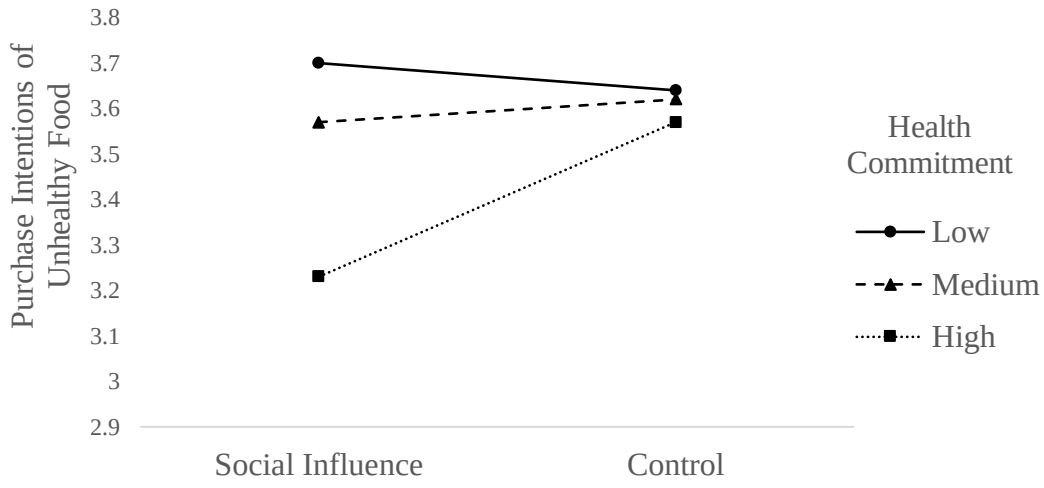

Figure 2. The effects of condition on purchase intentions of unhealthy food moderated by health commitment (*Nsocial influence* = 76), (*Ncontrol* = 78). Higher scores reflect unhealthier purchase intentions.

We further explored another moderation analysis to investigate the effects of condition on the purchase intentions of unhealthy food moderated by health commitment. The results show a main effect of health commitment, b = -.21, t(150) = -2.74, p = .007, 95% CI [-.36, -.06]. There was no significant effect of condition on purchase intentions, b = -.81, t(150) = -1.7, p = .088, 95% CI [-1.75, .122]. However, Figure 2 shows a significant interaction between condition and health commitment, b = .09, t(150) = 1.99, p = .048, 95% CI [.01, .19].

Simple slope analyses were conducted to understand the effect of this interaction in each of the conditions. The data show a significant effect in the social influence condition, b = -.11, t(150) = -3.32, p = .001, 95% CI [-.17, -.04] and a non-significant effect in the control condition, b = -.02, t(150) = -.45, p = .649, 95% CI [-.08, .05]. The findings suggest that higher compared

to lower levels of health commitment are associated with fewer unhealthy purchase intentions in the presence of social norms.

Further simple slope analyses reveal that there were no significant effects for lower and medium levels of health commitment, b = -.06, $t(150)$ = -.47, p = .637, 95% CI [-.34, .20], b = -.05, $t(150)$ = .43, p = .665, 95% CI [-.17, .27]. However, higher levels of health commitment resulted in significantly fewer purchase intentions in the social influence compared to the control condition, b = .34, $t(150)$ = 2.1, p = .038, 95% CI [.02, .65]. We did not find significant effects of health commitment as a moderator on the effects of condition on health perception or on the responsibility for desiring unhealthy food, *ps* >.05.

Discussion

Building on prior research showing that social norms affect peoples' hedonic value and consumption of food (Higgs, 2015), in our first study, we aimed to investigate how social norms influence peoples' perception of temptations (e.g., unhealthy food). In particular, we examined whether social norms influenced peoples' self-control by distorting their abilities to perceive temptations as conflicting with their long-term goals. To test this, we investigated whether in-groups' preferences of unhealthy food influenced peoples' desire for unhealthy food, responsibility for this desire, health perception and purchase intentions.

In this study, we did not find an effect of social norms on these outcome variables. Interestingly, we found effects of social norms on the desire for unhealthy food and purchase intentions when taking into account the individual differences in goal pursuit. Specifically, we examined how social norms influence peoples' perception of temptations moderated by health commitment (i.e., a unitary index of successful goal pursuit of healthy eating) which is characterised by more importance and ease of goal pursuit.

The findings demonstrated that people with higher compared to lower levels of health commitment showed reduced levels of desire and fewer purchase intentions of unhealthy tempting food when exposed to norms favouring unhealthy food. This suggests that health

commitment is associated with increased self-control in such situations, in which temptations are devalued and goal inconsistent choices (i.e., unhealthy food) are inhibited. Our findings confirm previous evidence showing that the devaluation of temptations is a characteristic of health-conscious individuals which facilitates the pursuit of long-term goals (Myrseth & Fishbach, 2009). However, there were no effects of social norms on peoples' responsibility for desire or their perceived healthiness of unhealthy food moderated by health commitment. According to correlational analyses, the responsibility question did not seem to measure what we intended it to (Appendix A). Additionally, the health perception question was presented as the last question after the other questions of desire, responsibility and purchase intentions, which could have prevented that we found a 'biased' health perception here. This could explain why we did not find any effects of the social norms on health perception.

Although we hypothesised that social norms would cause assimilation of the norm (Cruwys et al., 2012), the results demonstrated contrast effects in those with higher levels of health commitment. We propose that seeing unhealthy eating norms could have triggered dissimilarities in health committed individuals, whereby, they perceived their in-group as a dissimilar group and therefore, differentiated themselves from the group's norm. This could also be related to the design of the experiment, in which, the use of extreme statements on others' food preferences could have increased the perception of dissimilarity. In accordance with previous findings, a decrease in one's perceived similarity causes contrast effects (Durkin et al., 2012; Mills et al., 2002). This means that people adjust their behaviour when they do not identify with a group and wish to differentiate themselves from others (Berger & Heath, 2007; McFerran et al., 2009).

In the second study, we aimed to replicate these effects using a subtle manipulation to induce a false consensus. In particular, we aimed to manipulate peoples' beliefs about their in-group's food preferences to subtly induce a healthy or an unhealthy eating norm. In this paradigm, we created ostensible social norms which projected either unhealthy or healthy food

preferences of an in-group. The participants were told that these data were previously collected in a marketing and consumer survey to increase the credibility of the statements. In each trial, the participants were required to indicate in their opinion the percentage of students they thought agreed with the statements of their in-group's food preferences. Accordingly, previous research demonstrates that social information alters peoples' attitudes and beliefs (Herman et al., 2003; Leary & Kowalski, 1990; Schwarz & Wyer, 1985). Thus, by asking the participants about their beliefs regarding their in-group, we aimed to induce a false consensus to form a subtle norm. This approach will improve our understanding of social norms and self-control processes.

Therefore, the aim of this paradigm was to investigate the influence of a false consensus (i.e., our perception of others' beliefs) on the appeal and health perception of food. We examined how social influence affects self-control processes to understand why people sometimes fail in self-control. We hypothesised that unhealthy eating norms would influence a person's appeal and health perception of tempting unhealthy food, in which, conflict is not recognised.

Study 2

Methods

Participants

One hundred ninety-three undergraduate students were recruited from the University of Reading in exchange of 0.25 course credits via SONA. We used G*Power calculations in order to determine the required sample size based on a pilot study with a medium effect size ($f^2 = .08$) at a power of .8 and an α of .05. Data from three participants were excluded due to straight lining responses. The final sample consisted of 190 participants who were randomly allocated to one of the three conditions; unhealthy eating norm ($n = 63$), healthy eating norm ($n = 65$) and the control condition ($n = 62$). The participants were between 18 and 60 years old (164 female, 33 dieters) with an average age of 21.15 years old ($SD = 5.82$) and a BMI of 22.55 ($SD = 4.45$) ranging from 15.62 to 43.56. The importance of eating healthily ranged from 2-7 with an average

of 5.5 (*SD* = 1.25), difficulties in eating healthily ranged from 1-7 with an average of 3.58 (*SD* = 1.55) and an average of 3.38 hours (*SD* = 2.91) of exercise per week. This study was approved by the ethics committee of the School of Psychology and Clinical Language Sciences.

Design

The aim of the study was to examine the effects of unhealthy or healthy eating norms on peoples' appeal and health perception of food. We designed three conditions, the unhealthy norm, healthy norm and the control condition. The participants were randomly allocated to one of the conditions. Here, to induce social influence, we used an adaptation of the response scale manipulation (Wittenbrink & Henly, 1996), whereby, we created ostensible eating norms of students' in-groups' (i.e., other peers of their university) food preferences. According to the condition allocation, the participants in the experimental conditions were presented with their in-groups' food preferences conveying either unhealthy or healthy norms. The control condition did not contain the social influence element.

Apparatus and Materials

Norm Induction. The experiment was advertised to the participants as a consumer study to learn about students' food preferences and how they evaluate them. The participants in the experimental conditions were told that we were interested in how well students know each other at their university. After this, those participants were told that we had collected data from a large survey on Reading students' eating preferences. In this study, we manipulated eating norms by showing the participants in the experimental conditions a series of food images presented with statements of their in-groups' food preferences. In the unhealthy norm condition, the norms projected their in-group favouring unhealthy food (e.g., burger) over healthy food (e.g., salad). For example, an unhealthy food item was presented with a statement of a high percentage of their in-group liking it, (e.g., "73% of Reading students like this"), in contrast, the healthy food item was shown with a low percentage of their in-group liking it, (e.g., "10% of Reading

students like this"). The healthy norm condition, however, presented high percentages of their in-group members liking healthy food and lower percentages of them liking unhealthy food.

Response Scale Manipulation. The participants in the experimental conditions were presented with a series of 28 images which consisted of 10 unhealthy, 10 healthy food and 8 neutral filler items with a size of (6.3 cm high × 8.3 cm wide) along with their in-groups' preferences (e.g., "62% of Reading students like this"). The food stimuli were selected according to their calorie and nutrient contents as in study 1, in which unhealthy food was selected based on items that contained more than 400 calories per serving and healthy food was selected based on items that contained fewer than 100 calories per serving. These food items were chosen based on a pre-test to ensure the items had similar scores of appeal. We included filler stimuli to conceal the aim of the study.

The task was to indicate on a slider response scale in their personal opinion how many students at their university agree with the statements of their in-groups' preferences (e.g., "*What percent of students do you think agree with this?*"). The participants were presented with the same stimuli, however, the statements of the in-groups' preferences and response scales in which the participants made their evaluations were manipulated according to the group allocation as an implicit social norm. Specifically, those in the unhealthy norm condition were provided with statements that contained high percentages of students liking unhealthy food (e.g., "*85% of Reading students like this*") and low percentages of them liking healthy food (e.g., "*15% of Reading students like this*"). Conversely, those in the healthy norm condition were provided with statements of high percentages of students liking healthy food and lower percentages of students liking unhealthy food.

In order to induce a sense of a common social standard, we manipulated the participants' beliefs by varying the response scales of how many students agreed with the statements of their in-groups' preferences. The participants in the unhealthy norm condition were presented with high frequency response scales for the unhealthy food items that started on a slider from 50% to

100% and lower frequency response scales for the healthy food items that started from 0% to 100%. In contrast, in the healthy norm condition, high frequency response scales were presented on a slider from 50% to 100% for the healthy food items to and lower frequency response scales from 0% to 100% for the unhealthy food to create healthy eating norms. These varied response scales were manipulated to represent implicit eating norms. In particular, higher compared to lower frequency response scales indicate that a larger number of people agreed with the statements of their ingroup members' preferences. This manipulation task was not presented in the control condition.

Appeal and Health Perception. In the food evaluation task, all participants were provided with a series of novel stimuli, 10 unhealthy and 10 healthy food items. Additionally, this task also included the repeated stimuli from the response scale task which consisted of 10 unhealthy, 10 healthy food items and 8 neutral filler items. This design was implemented using repeated as well as novel food items which were not previously seen to assess the true effect of the norm induction. This will help improve our understanding of the effects of social norms that extends the findings of social modelling (Hermans et al., 2013). For each food item, the participants were required to indicate on a 7-point Likert scale the appeal "*How appealing is this item in your opinion?*", (1 = *Not at all,* 7 = *Very much*) and health perception "*How unhealthy or healthy is this item in your opinion?*", (1 = *Very healthy,* 7 = *Very unhealthy*). Neutral filler items (e.g., laptop) were included to conceal the purpose of the study. The participants rated the appeal and functionality of the filler items, "*How functional is this item in your opinion?",* (1 = *Not at all,* 7 = *Very functional*). The unhealthy food items showed sufficient reliability for both the appeal and health perception ratings, (n = 20), α = .880, α = .863. Similarly, these same ratings for healthy food items demonstrated sufficient reliability, (n = 20), α = .880, α = .872.

Health and Eating Related Questions. The questions about the participants' health importance and difficulties in addition to their dieting status and frequency, BMI and exercise habits remained the same as in study 1. In this study, we added a question to assess the participants' willpower to understand their attribution tendencies. Specifically, the participants rated the following statement "*My unhealthy food consumption is out of my control*" on a 7-point Likert scale (1 = *Strongly disagree* to 7 = *Strongly agree*).

Social Identification. We explored the participants' social identification to understand the extent to which they identify with social groups, "*Do you value social groups?*", (*no* , *yes*), "*Which social groups do you identify with?",* (school, university, work, family, others) and the strength of the identification "*How strongly do you identify with a social group?*", (1 = *Not at all* to 7 = *Very much*). This was measured to be able to investigate whether social norms influence conflict identification more strongly in those with a stronger sense of belonging to social groups (e.g., by using it as moderator).

Procedure

At the start of the study, the participants provided written informed consent. They were then presented with demographic questions that included age, gender and university affiliation. Following this, they were randomly allocated to one of the three conditions. The participants in the experimental conditions (norm induction) were told that they would be presented with previous data on their in-groups' (i.e., Reading students) food preferences that had been collected from a large survey. Those participants were then presented with the false consensus task in which they rated on a slider response scale how many students they thought agreed with the statements of their in-groups' food preferences. All participants then completed the food evaluation task to rate the appeal and health perception of unhealthy and healthy food. Thereafter, the participants completed the questions on their self-control, health, and identification with social groups. The participants were then debriefed and reimbursed for their time.

Results

Randomisation

There were no differences in age, gender, BMI, dieting status or frequency, weight fluctuation, exercise, willpower, social group identification, health importance or difficulties between the conditions, *ps* > .356, which suggests effective randomisation.

Appeal Ratings of Repeated and Novel Unhealthy and Healthy Food

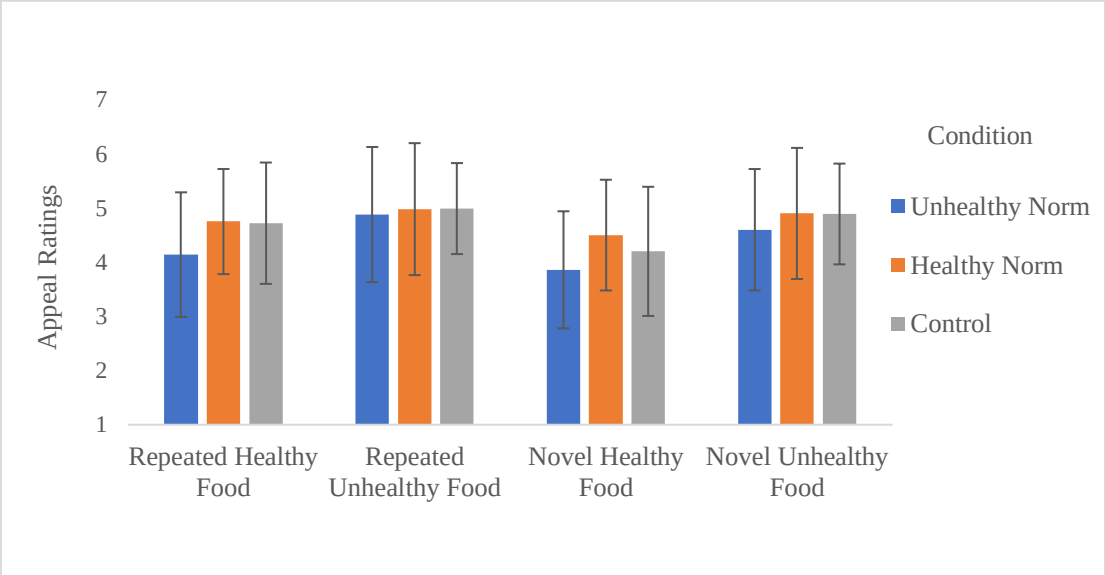

Figure 3. The differences between the conditions in the appeal ratings of repeated and novel unhealthy and healthy food, (*Nunhealthy norm* = 63), (*Nhealthy norm* = 65) and (*Ncontrol* = 62). Higher scores indicate more liking of the food items.

We conducted a three-way mixed repeated measures ANOVA to investigate the differences in the appeal ratings between repeated and novel unhealthy and healthy food. The factors involved health value (unhealthy, healthy) and novelty (repeated, novel) as a within subjects factor and condition (unhealthy norm, healthy norm, control) as between subjects factor. The results, as shown in Figure 3, demonstrate a significant main effect of the health value of food on appeal ratings, $F(1, 187) = 24.05$, $p < .001$, *partial* $\eta 2 = .114$, unhealthy compared to healthy food had higher ratings of appeal. There was no interaction between health value and

condition on the appeal of food, $F(2, 187) = 1.48$, $p = .229$, *partial* $\eta 2 = .016$. This means that there were no differences between the conditions in the appeal of unhealthy and healthy food.

Furthermore, there was a significant difference in the appeal ratings of repeated and novel food, $F(1, 187) = 46.06$, $p < .001$, *partial* $\eta 2 = .198$, repeated compared to novel food items were more appealing. However, there was no interaction between novelty and condition on the appeal ratings of food, $F(2, 187) = 1.32$, $p = .270$, *partial* $\eta 2 = .014$. This means that there were no differences between the conditions in the appeal ratings of repeated and novel food. There was a significant interaction between the health value and novelty of food on appeal ratings, $F(1, 187) = 6.93$, $p = .009$, *partial* $\eta 2 = .036$, both repeated and unhealthy food were rated as more appealing compared to novel and healthy food. The three-way interaction between condition, novelty and health value was not significant, $F(2, 187) = 1.488$, $p = .229$, *partial* $\eta 2 = .016$.

The results showed a significant difference between the conditions in the appeal ratings of food, $F(2, 187) = 5.32$, $p = .006$, *partial* $\eta 2 = .054$. Pairwise comparisons using Bonferroni corrections suggest that in the unhealthy norm condition, the participants had lower appeal ratings of all food compared to the healthy norm condition, $p = .008$. Additionally, food was rated as less appealing in the unhealthy norm compared to the control condition, $p = .038$. There were no significant differences in these ratings between the healthy norm and control condition, $p = .997$.

Health Perception of Repeated and Novel Unhealthy and Healthy Food

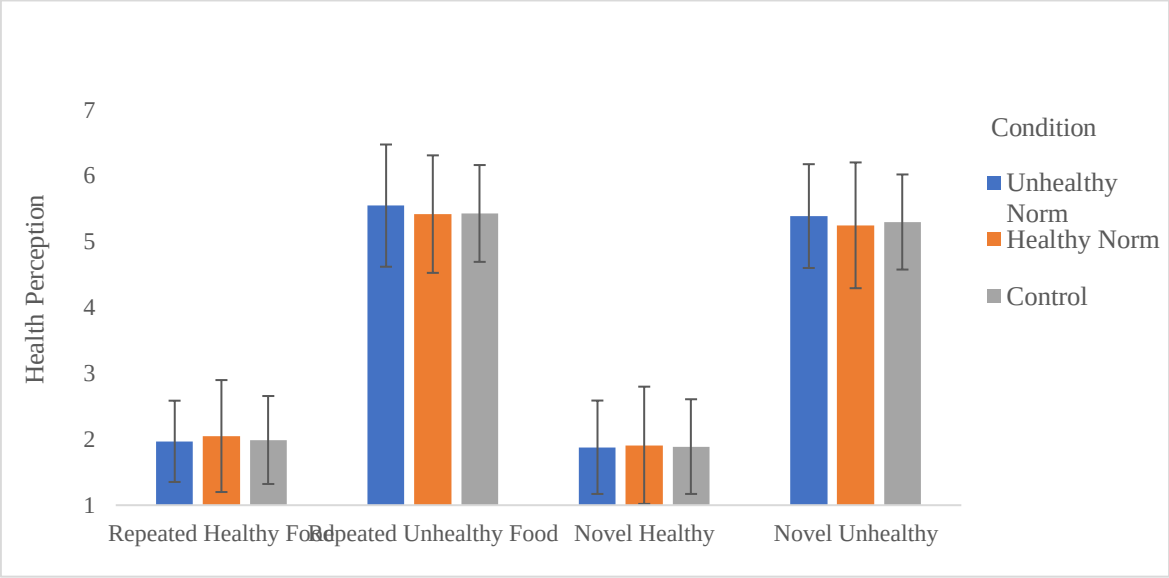

Figure 4. The differences between the conditions in the health perception of repeated and novel unhealthy and healthy food, (*Nunhealthy norm* = 63), (*Nhealthy norm* = 65) and (*Ncontrol* = 62). Higher scores indicate an unhealthier perception of the food items.

We also investigated the effects of condition on the health perception of repeated and novel unhealthy and health food using a three-way mixed repeated measures ANOVA. The factors consisted of health value (unhealthy, healthy) and novelty (repeated, novel) as within subjects factor and condition (unhealthy norm, healthy norm, control) as between subjects factor. The results, as shown in Figure 4, show a main effect of health value on the health perception of food, $F(1, 187) = 1334.9$, $p < .001$, *partial* $\eta 2 = .877$. This suggests that unhealthy food was perceived more unhealthily compared to healthy food. There was no interaction between condition and the health value of food, $F(2, 187) = .35$, $p = .700$, *partial* $\eta 2 = .004$.

The results further show a main effect of novelty on the health perception of food, $F(1, 187) = 30.87$, $p < .001$, *partial* $\eta 2 = .142$, repeated food was perceived more unhealthily compared to novel food. However, there was no interaction between condition and the novelty of food, $F(2, 187) = .33$, $p = .715$, *partial* $\eta 2 = .004$. Similarly, the three-way interaction between condition, novelty and health value was not significant, $F(2, 187) = .06$, $p = .940$, *partial* $\eta 2 =$

.001. The differences between the conditions in the health perception of food was not significant, $F(2, 187) = .19$, $p = .827$, *partial* $\eta 2 = .002$.

Appeal and Functionality of the Filler Items

We performed a one-way ANOVA to examine whether social norms influenced the participants' appeal and functionality ratings of the filler items. There were no significant differences between the conditions in the appeal $F(2, 187) = .88$, $p = .416$, *partial* $\eta 2 = .009$ or functionality ratings of the filler items $F(2, 187) = 2.89$, $p = .058$, *partial* $\eta 2 = .030$.

Health Commitment (An Index of Successful Goal Pursuit of Healthy Eating)

In line with study 1, we also explored the relationship between health commitment and other self-control measures. The importance and difficulties in eating healthily were significantly correlated ($r = -.2$, $p = .009$) and therefore, computed into one variable; "health commitment". Higher levels of health commitment were associated with more exercise hours per week ($r = .23$, $p = .002$) and less attribution of unhealthy food consumption to external factors ($r = -.43$, $p < .001$).

The Effects of Condition and Health Commitment on the Appeal and Health Perception of Unhealthy and Healthy Food

For exploratory reasons, we further explored whether there is a relationship between condition, health commitment and health value on the appeal and health perception ratings of food. We first explored these effects on the appeal of food using a three-way mixed repeated measure ANOVA with health value (unhealthy, healthy) and novelty (repeated, novel) as a within subjects factor and condition (unhealthy, healthy, control) as between subjects design. There was a significant interaction between health value and health commitment on the appeal ratings of food, $F(9, 162) = 3.2$, $p = .001$, *partial* $\eta 2 = .151$. This means that more compared to less health commitment was associated with higher appeals scores of healthy compared to unhealthy food. However, there was no interaction between novelty and health commitment,

$F(9, 162) = .85$, $p = .569$, *partial* $\eta 2 = .045$. Additionally, there was no interaction between novelty, condition and health commitment, $F(16, 162) = .82$, $p = .651$, *partial* $\eta 2 = .076$. Similarly, there was no interaction between health value, novelty, condition and health commitment on the appeal ratings of food, $F(16, 162) = .77$, $p = .710$, *partial* $\eta 2 = .071$.

We then explored the effects of condition, health value, novelty and health commitment on the health perception of food. There was a significant interaction between health value and health commitment on the health perception of food, $F(9, 162) = 3.43$, $p < .001$, *partial* $\eta 2 = .160$. This means that people with higher levels of health commitment rated unhealthy food more unhealthily. Similarly, there was a significant interaction between novelty and health commitment, $F(9, 162) = 2.9$, $p = .003$, *partial* $\eta 2 = .140$. This indicates that people with higher levels of health commitment rated repeated compared to novel food more unhealthily. In addition, there was an interaction between novelty, condition and health commitment, $F(16, 162) = 1.84$, $p = .029$, *partial* $\eta 2 = .154$. However, there was no interaction between health value, novelty, condition and health commitment on the health perception of food, $F(16, 162) = 1.08$, $p = .370$, *partial* $\eta 2 = .097$.

The Moderating Role of Health Commitment on the Influence of Social Norms in Response to Unhealthy Food

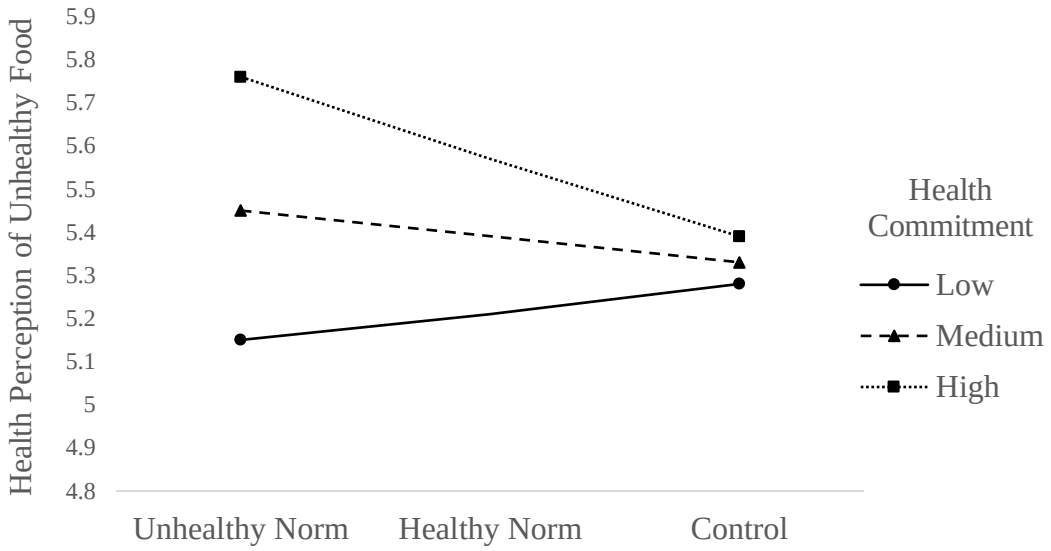

Figure 5. The effects of condition and health commitment on the health perception of unhealthy food. Higher scores of health perception signal more conflict identification and higher health commitment scores indicate more goal value and fewer difficulties in goal pursuit.

We acknowledge that the 4-way interaction between condition, health value, novelty and health commitment on the health perception of food was not significant, however, based on the findings from study 1 and to explore our theoretical reasoning, we were curious to explore the mechanisms in which social norms influence self-control. Therefore, we conducted a moderation analysis to understand the relationship between condition and health commitment on conflict identification, namely, health perception using health commitment as a moderator. The results showed a marginally significant main effect of condition on the health perception of unhealthy food, b = .56, t(186) = 1.83, p = .069, 95% CI [-.04, 1.17] and a significant main effect of commitment, b = .21, t(186) = 3.21, p = .002, 95% CI [.08, .34]. Importantly, as shown in Figure 5, there was also a significant interaction between condition and health commitment, b = -.06, t(186) = -2.03, p = .044, 95% CI [-.12, -.01]. This indicates that in both the unhealthy and healthy norm conditions, more health commitment was associated with unhealthier ratings of

unhealthy food. This interaction was also significant when controlling for valuing social groups, b = -.06, t(186) = -2.01, p = .039, 95% CI [-.12, -.00].

Simple slope analyses were conducted to test the effect of health commitment predicting the perceived healthiness of unhealthy food for each of the three conditions. In the unhealthy norm, there was a significant effect of health commitment on health perception, b = .15, t(186) = 3.76, p < .001, 95% CI [.07, .23]. Similarly, in the healthy norm, there was a significant effect of health commitment on health perception, b = .09, t(186) = 3.45, p < .001, 95% CI [.03, .14]. This suggests that higher levels of health commitment in both the unhealthy and healthy norm conditions are associated with unhealthier ratings of unhealthy food compared to lower levels. However in the control condition, health commitment was not significantly related to health perception, b = .03, t(186) = .69, p = .490, 95% CI [-.05, .10].

We conducted further simple slope analyses to assess the effect of condition on health perception for each of the levels of health commitment. The effect was not significant in those with lower and medium levels of health commitment, b = .06, t(186) = .74, p = .462, 95% CI [-.11, .23]; b = -.05, t(186) = -.85, p = .395, 95% CI [-.19, .07]. However, for those with higher levels of health commitment, there was a partially negative main effect, b = -.18, t(186) = -1.89, p = .060, 95% CI [-.37, .01]. This means that higher levels of health commitment were associated with an unhealthier perception of unhealthy food in the unhealthy norm condition compared to the healthy norm and control condition. Furthermore, when looking closely at repeated compared to novel unhealthy food items, this effect is only significant for repeated unhealthy food (Appendix B).

The Moderating Role of Health Commitment on the Effects of Condition on the Appeal of Repeated and Novel Healthy Food

For exploratory purposes, we investigated the effects of condition on the appeal of repeated and novel healthy food moderated by health commitment. Health commitment did not

moderate the effects of social norms on the appeal of repeated or novel healthy food, $p > .05$ (Appendix C).

The Moderating Role of Health Commitment on the Effects of Condition on the Health Perception of Repeated and Novel Healthy Food

Similarly, we also explored whether health commitment moderated the effect of condition on the health perception of repeated or novel healthy food. Health commitment did not moderate these effects , $p > .05$ (Appendix C).

Discussion

In this study, there were no main effects of social norms on peoples' appeal or health perception. However, the findings showed a similar pattern of findings in both the unhealthy and healthy norm conditions, in which, people with higher compared to lower levels of health commitment perceived unhealthy food more unhealthily. This could indicate that any social norm leads to an unhealthier perception of food. Although, the inclusion of the unhealthy as well as healthy norms in the healthy norm condition could have influenced the health perception, in which, the participants showed an unhealthier perception as in the unhealthy norm condition. Furthermore, this effect was more pronounced in the unhealthy norm compared to the healthy norm condition. Thus, this could suggest that unhealthy eating norms signalled more conflict identification of the detrimental costs of temptations in health committed individuals. Though, in study 1, we did not find the effect of social norms on health perception moderated by health commitment. We assume that in study 2, thinking of the self in comparison to others may have caused the participants to differentiate themselves from the group, therefore, an unhealthier perception of unhealthy food in those with higher levels of health commitment. Alternatively, this different combination of questions might have caused this difference.

Interestingly, the results in study 2, demonstrated a similar pattern of findings as in study 1, such that, in the presence of unhealthy eating norms, health committed individuals showed contrast effects. These findings indicate how temptations for people who are health committed

might reinforce the associated negative costs which threaten their long-term goals. This could suggest that an unhealthier perception of temptations reflects the adaptive strategies of people with more health commitment.

General Discussion

We combined self-control, social norms and false consensus theories to understand how and why temptations enhance goal pursuit for some and undermine it for others. In studies 1 and 2, we did not find an effect of social norms on desire, responsibility for desire, purchase intentions, health perception or appeal. Importantly, the findings revealed the role of health commitment (i.e., more importance and ease of eating healthily) as a protective factor in shielding one's long term goal from the influence of social norms. This was shown by a decrease in the desire and purchase intentions of tempting unhealthy food in study 1 and an unhealthier perception of temptations in study 2. Taken together, though inconsistently, these findings introduce some first evidence, which indicates contrast effects demonstrated by increased conflict identification in people with higher levels of health commitment.

Our findings showed how social norms activate self-control in those with higher compared to lower health commitment. This was demonstrated by the devaluation of temptations, fewer purchase intentions and an unhealthier perception. The findings suggest a contrast to the group's norm (Brehm, 1966). In study 2, the findings further extend our understanding of the results in study 1, in which, health committed individuals went against the norm. In line with these findings, research shows that when individuals have stronger personal norms (e.g., eating healthily), other peoples' attitudes and behaviour (i.e., social norms) are less likely to influence those individuals (Hornsey et al., 2007; Schultz et al., 2018). Consistently, our results suggest that stronger personal norms (i.e., health commitment) reduce the impact of social norms on peoples' subsequent behavioural intentions (de Groot et al., 2021; Göckeritz et al., 2010).

In our research, we suggest that the false consensus task activated an evaluation of oneself in comparison to their in-group which evoked contrast effects in health committed individuals.

This means that as well as assimilation, social norms also result in a perception of dissimilarity. In study 2, it could be possible that when health committed participants evaluated their thoughts of their peers' food preferences, they perceived themselves differently which caused a dissociation from the norm. This indicates that unhealthy eating norms enhanced the perception of conflict through an increase in the health perception of temptations in those with more health commitment. We assume that those participants may have perceived their in-group as different and consequently, differentiated themselves from the groups' norm.

Another possible explanation using the theory of the dynamics of self-control (Fishbach et al., 2009), could be that those with more health commitment could have compared their own goal progress to their group and therefore, the perception of their group as lacking in their goal progress highlighted a greater perception of goal importance and achievability. An alternative interpretation of these contrast effects could possibly be a result of an increase in the motivation of health committed individuals who highly value the goal of eating healthily to contribute to the group's effort and coordinate in attaining the goal. These findings could be explained by the theory of joint-benefits maximization in goal pursuit (Fishbach & Tu, 2016), whereby, people aim to optimise the total benefits for the group as a whole. This could be due to the instructions that were given at the start of the study, in which, the participants were told that the presented data of their in-group's preferences have been collected in previous research. Therefore, health committed individuals may have been motivated to exert more effort to correct the existing norm or introduce a healthier norm. In line with previous theories, people mentally share their goals with others (Oettingen & Schwörer, 2013), whereby, social others are perceived as reference points (Buunk & Gibbons, 2007). Similarly, when people who are highly committed to their goals perceive others to be lacking in their goal progress, their motivation to pursue the goal increases (Fishbach, 2014; Koo & Fishbach, 2008). Thus, it could be that when health committed individuals perceived their in-group as failing in their health goals, they increased their motivation to improve the group's goal pursuit by exerting more effort to compensate and rectify goal disengagement.

The findings support previous research showing the characteristics of people with successful self-control (de Ridder et al., 2012; Hofmann et al., 2012). Our findings show that when confronted with temptations, people with more health commitment devalue temptations (i.e., less desire), decrease their purchase intentions, and perceive them as more detrimental to their long-term goals (i.e., unhealthier ratings). A detailed summary of each study is presented in table 1.

Table 1. Summary of the empirical studies

Experiments	**Design**	**Aims and Justification of Changes**	**Findings**
Study 1	The social influence condition consisted of in-groups' food preferences, presented as statements of liking unhealthy food such as (*everyone, the majority, all and most*). The group categorisation was based on shared demographics and the Minimal Group Paradigm.	The design of this study was similar to study 3 in Chapter 2. However, in this study, we only included unhealthy food stimuli without the inclusion of healthy items to establish strong unhealthy eating norms and avoid the effects of a potential health prime. In this study, we first measured desire, responsibility,	There were no differences between the social influence and control condition in any of the measures. However, the findings demonstrated that people with higher levels of health commitment showed reduced levels of desire and purchase intentions in the social influence condition.

	The study was conducted online via Prolific.	purchase intentions and lastly, the health perception question. This was to investigate how the order of the health perception question would influence the effects of social norms.	
Study 2	We first created a subtle manipulation to either induce an unhealthy norm (The statements were presented as calculated percentages of an in-group liking unhealthy and disliking healthy food) or a healthy norm (The statements were of an in-group liking healthy and disliking unhealthy	We aimed to manipulate peoples' beliefs about their in-group's food preferences to subtly induce a healthy or an unhealthy eating norm. This study was run parallel to other studies, therefore, there are variations in the design such as the statements presented as percentages rather than words such as everyone. In addition,	There were no differences between the conditions in the appeal and health perception of food. However, the findings showed that higher levels of health commitment were associated with an unhealthier perception of unhealthy food in the unhealthy norm condition compared

	food) based on the condition allocation. We then measured the appeal and health perception of both healthy and unhealthy food that were presented without any social influence statements. The sample consisted of students from the University of Reading.	the appeal and health perception remained unchanged from the earlier studies. The social norms were induced in a more subtle way to ensure their credibility and create a common social standard.	to the healthy norm and control condition.

Implications

The present findings have important theoretical implications. First, the results in study 1 highlighted the role of health commitment in devaluing temptations and inhibiting goal inconsistent choices (i.e., unhealthy food choices). Second, in the presence of unhealthy eating norms, the results in study 2 demonstrated unhealthier ratings of tempting unhealthy food as characteristics of those who are better at self-control shown by more importance and fewer difficulties in pursuing their health goals. This extends prior research in understanding the factors involved in successful self-control in people with high trait self-control (Adriaanse et al., 2014; Aiaanse et al., 2014; Hofmann et al., 2012). Importantly, this contributes to the literature on self-control showing that conflict identification is a pre-requite for self-control (Myrseth & Fishbach,

2009). The results, therefore, indicate the importance of conflict identification as a fundamental process in inhibiting the intentions to purchase unhealthy food (i.e., goal inconsistent choices). We further extend our understanding of social influence which suggests that going against the norm could be explained by the theories of group dissociation, increased perception of goal progress and the joint-benefits maximization principle. However, these explanations need to be tested in future research.

Future applied research should explore whether increasing people's health perception of unhealthy food would improve healthy eating. For instance, research could test whether reminding consumers of the health value of food using salient labels that emphasize the unhealthiness of unhealthy food (e.g., the number of calories) would help people choose more healthily.

Limitations and Future Studies

Although the findings show the effects of social norms on peoples' self-control processes (i.e., the desire, purchase intentions and health perception of unhealthy food), we cannot claim that these findings are conclusive. Certainly, these findings have many limitations, for instance, study 1 in this chapter and study 3 in Chapter 1 have a similar experimental design, however, deliver different results. In particular, the findings here from study 1 show that health committed individuals demonstrate less desire and fewer purchase intentions of unhealthy food in the presence of social norms (i.e., contrast effects). While, the findings from study 3 in Chapter 1 show that more desire for unhealthy food was associated with a healthier perception of food and this perception was associated with more purchase intentions of unhealthy food in the social influence compared to the control condition. The inconsistencies across these studies could be explained by the inclusion of healthy food items in study 3 in Chapter 1 and the exclusion of them here in study 1. Specifically, the exposure to healthy as well as unhealthy food items in study 3 may have caused the unhealthy social norms to appear less problematic compared to the

exposure to unhealthy food only. This may explain the contrast effects in health committed people in study 1 as a result of extreme unhealthy eating norms.

Furthermore, there were also inconsistencies between study 1 and 2 in this chapter which require future replications and do not allow us to claim with certainty whether these findings would hold. In study 1, health committed individuals contrasted away from the unhealthy eating norms shown by less desire and fewer purchase intentions of unhealthy food. Similarly, in study 2, health committed individuals show contrast effects, however, these are shown by an increase in the health perception of unhealthy food in the presence of social norms. Although, across study 1 and 2, health committed people show similar effects of going against the norm (i.e., fewer purchase intentions and an unhealthier perception of unhealthy food), they do not show an effect of health perception in study 1 or an effect of appeal in study 2. These inconsistencies could be explained by the difference in the experimental design in study 2 which could have evoked a stronger comparison of oneself against the norm and therefore, more conflict in health perception awareness and no effect of appeal compared to study 1.

Another explanation for the inconsistent findings could be that the manipulation of social norms could have been stronger in study 1 compared to study 2. Such that, in study 1, the social norms were presented above each food item when the participants were asked about their desire and health perception. Whereas, in study 2, social norms were first introduced in the false consensus task, following this, appeal and health perception were measured in response to food items that were shown without any social norms. This means that the social norms could have been weaker in study 2 and therefore, there was no effect of social norms on the appeal of unhealthy food but an effect of health perception. Furthermore, in study 1, the social norms were presented as the in-group liking unhealthy food and disliking healthy food. In contrast, in study 2, in the unhealthy norm, we subtly induced norms by presenting the participants with higher percentages of their in-group liking unhealthy food and lower percentages of them liking healthy food and vice-versa in the healthy norm. Such that, the social norms reflected preferences for

both unhealthy and healthy food but varied in the percentage of people liking each food category. Therefore, this could mean that the manipulation was not strong enough to influence appeal responses. Nevertheless, this research sheds light on the different effects of social norms on self-control processes in food related dilemmas.

We recommend future studies to investigate these findings in natural settings using more subtle norms. In addition, future work should explore whether social norms influence conflict identification through changes in the participants' perceived closeness to the group. For instance, experiments could be designed to inform the participants at the start that they would later meet their in-group members. This will allow us to understand why for some people, an unhealthy norm causes them to go against it. We also encourage future research to utilise neuroimaging methods to investigate the differences in brain activity in response to social norms to measure the implicit responses to temptations. It is thus necessary to assess how social norms influence people differently depending on whether this caused an activation of the self or the self as a group. This will improve our understanding of the self-other overlap in peoples' perception of temptations. The implementation of this approach will address whether the effects of increased conflict identification in those who are more committed to their goals are due to a dissociation from the group or an increase in one's perception of goal importance and the motivation to signal to others and to correct the unhealthy eating norm. The latter explanation would suggest an increase in the motivation to achieve the collective success of the group.

In conclusion, the findings revealed that health commitment moderated the effects of social norms on peoples' self-control processes such as the desire, perceived healthiness and purchase intentions of unhealthy tempting food. Specifically, in study 1, we found that when health committed individuals were exposed to unhealthy eating norms, they showed a decrease in their desire for unhealthy food and purchase intentions. Similarly, in study 2, we found that in the presence of unhealthy eating norms, health committed individuals rated unhealthy food more unhealthily (i.e., conflict identification). These findings suggest that people with higher levels of

health commitment showed contrast effects, in which they identified more conflict between temptations and long-term goals when presented with unhealthy eating norms.

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Appendices

Appendix A

Desire, Responsibility for Desire, Purchase Intentions and Health Perception of Unhealthy Food

We further explored the relationship between the desire for unhealthy food, responsibility of this desire, purchase intentions, and health perception. The desire for unhealthy food was associated with unhealthier purchase intentions (r = .80, p < .001). In addition, the responsibility for desiring unhealthy food was associated with more desire (r = .49, p < .001) and more purchase intentions (r = .48, p < .001). Accordingly, this suggests that the responsibility question did not measure what we intended it to. Furthermore, health perception was not significantly correlated with any of these measures.

Effects of Social Norms on the Health Perception of Unhealthy food Moderated by the Desire for Unhealthy Food

We investigated whether changes in the desire for unhealthy food moderated the effect of condition on health perception. The results show no main effects of condition, b = -.03, t(150) = -.03, p = .972, 95% CI [-1.8, 1.75] or the desire for unhealthy food on the health perception of unhealthy food, b = .06, t(150) = .15, p = .878, 95% CI [-.71, .83]. Additionally, there was no interaction between condition and the desire for unhealthy food, b = .01, t(150) = .05, p = .954, 95% CI [-.47, .49].

The Effects of Social Norms on Purchase Intentions Moderated by the Desire for Unhealthy Food

A moderation analysis was conducted to investigate the effect of condition on unhealthy purchase intentions moderated by the desire for unhealthy food. The results show a main effect of desire, b = .97, t(150) = 5.8, p < .001, 95% CI [.63, 1.28]. This suggests that increases in the desire for unhealthy food were associated with unhealthier purchase intentions. There was no main effect of condition, b = .20, t(150) = .53, p = .590, 95% CI [-.54, .95]. The interaction

between condition and the desire for unhealthy food was not significant, b = -.06, t(150) = -.59, p = .554, 95% CI [-.26, .14].

The Effects of Social Norms on Purchase Intentions Moderated by the Health Perception of Unhealthy Food

Furthermore, in this study, we explored the effect of condition on unhealthy purchase intentions moderated by the health perception of unhealthy food. There were no significant main effects of health perception, b = .16, t(150) = .88, p = .378, 95% CI [-.19, .50] or condition, b = .55, t(150) = .87, p = .380, 95% CI [-.68, 1.78]. Similarly, there was no interaction between condition and health perception, b = -.08, t(150) = -.75, p = .448, 95% CI [-.31, .14].

The Effects of Social Norms on the Health Perception of Unhealthy food Moderated by Health Commitment

Further moderation analyses investigated the effect of condition on health perception moderated by health commitment. There were no main effects of condition, b = -.57, t(150) = -.84, p = .401, 95% CI [-1.9, .78] or health commitment, b = -.25, t(150) = -1.18, p = .239, 95% CI [-.69, .17]. The interaction between condition and health commitment was not significant, b = .12, t(150) = .92, p = .357, 95% CI [-.14, .40].

The Effects of Social Norms on the Responsibility for Desiring Unhealthy food Moderated by Health Commitment

Additionally, we investigated whether the effect of condition on the responsibility for desiring unhealthy food was moderated by health commitment. The results show no main effects of condition, b = -.64, t(150) = -1.03, p = .303, 95% CI [-1.8, .59] or health commitment, b = -.29, t(150) = -1.49 p = .137, 95% CI [-.69, .09]. The interaction between condition and health commitment was not significant, b = .14, t(150) = 1.12, p = .263, 95% CI [-.10, .39].

The Effects of Social Norms on the Perception of Unhealthy Food Moderated by Health Importance

We conducted another moderation analysis to investigate the importance of eating healthily on one's health perception of unhealthy food. There were no main effects of condition b = -.66, $t(150)$ = -1.1, p = .289, 95% CI [-1.9, .57] or health importance b = -.14, $t(150)$ = -.85, p = .393, 95% CI [-.49, .19]. The results showed no significant interaction between condition and the importance of eating healthily, b = .12, $t(150)$ = 1.13, p = .258, 95% CI [-.09, .35].

The Effects of Social Norms on the Responsibility for the Desire of Unhealthy Food Moderated by Health Importance

We conducted another moderation analysis to investigate the importance of eating healthily on one's responsibility for the desire of unhealthy food. There were no main effects of condition b = -.30, $t(150)$ = -.53, p = .596, 95% CI [-1.45, .83] or health importance b = -.12, $t(150)$ = -.78, p = .433, 95% CI [-.44, .19]. The results showed no significant interaction between condition and the importance of eating healthily, b = .06, $t(150)$ = .60, p = .547, 95% CI [-.14, .27].

Appendix B

The Effects of Condition on the Health Perception of Repeated and Novel Unhealthy Food Moderated by Health Commitment

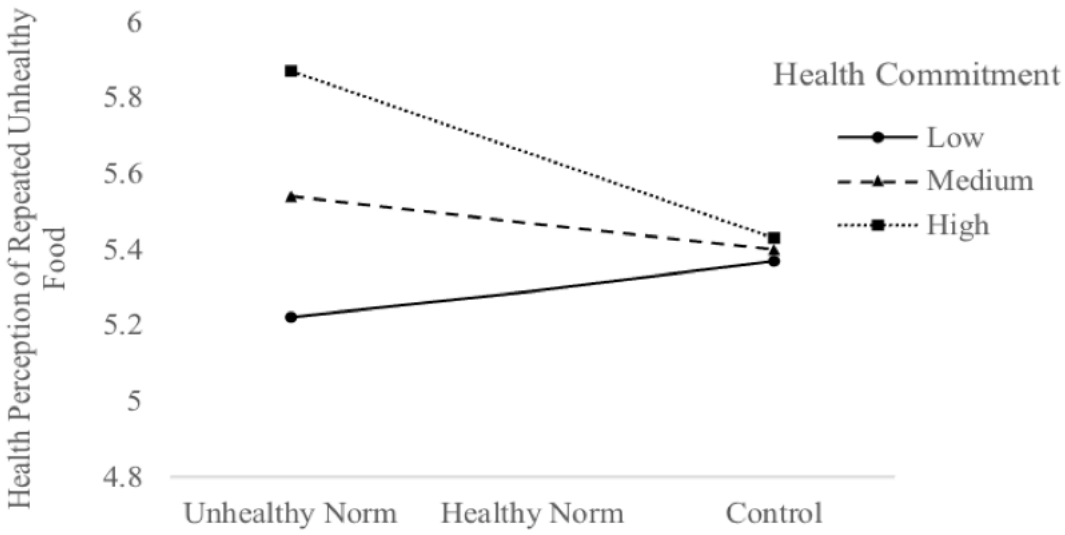

Figure 6. The effects of condition and health commitment on the health perception of repeated unhealthy food. Higher scores of health perception signal more conflict identification and higher health commitment scores indicate more goal value and fewer difficulties in goal pursuit.

For exploratory reasons, we conducted a moderation analysis to examine whether health commitment moderated the relationship between condition and the health perception of repeated and novel unhealthy food. The results showed significant main effects of condition b = .66, $t(186) = 2.02$, p = .044, 95% CI [.02, 1.3] and health commitment b = .23, $t(186) = 3.3$, p = .001, 95% CI [.09, .37] on the health perception of repeated unhealthy food. Additionally, there was a significant interaction between condition and health commitment on the health perception of repeated unhealthy food b = -.07, $t(186) = -2.24$, p = .025, 95% CI [-.13, -.01].

Simple slope analyses reveal that in both the unhealthy and healthy norm condition, more health commitment was associated with unhealthier ratings of repeated unhealthy food, b = .16, $t(186) = 3.77$, $p < .001$, 95% CI [.07, .25]; b = .08, $t(186) = 3.2$ p = .001, 95% CI [.03, .14]. This effect was not significant in the control condition, b = .01, $t(186) = .35$, p = .721, 95% CI [-.06, .09].

Further simple slope analyses show that lower and medium levels of health commitment did not moderate the effect of condition on the health perception of repeated unhealthy food, b = .07, t(186) = .81, p = .415, 95% CI [-.10, .26]; b = -.07, t(186) = -.94 p = .346, 95% CI [-.2, .07]. In contrast, higher levels of health commitment did moderate this relationship b = -.21, t(186) = -2.1, p = .037, 95% CI [-.42, -.01]. This suggests that more health commitment was associated with unhealthier ratings of repeated unhealthy food.

However, there were no effects of condition on the health perception of novel unhealthy food b = .46, t(186) = 1.44, p = .149, 95% CI [-.16, 1.09]. There was a main effect of health commitment b = .19, t(186) = 2.7, p = .005, 95% CI [.05, .33]. This suggests that more health commitment was associated with an unhealthier perception of novel unhealthy food. There was no interaction between condition and health commitment on the health perception of novel unhealthy food b = -.05, t(186) = -1.6, p = .110, 95% CI [-.11, .01].

Appendix C

The Moderating Role of Health Commitment on the Effects of Condition on the Appeal and Health Perception of Healthy Food

We examined the effects of condition on the appeal ratings of healthy food moderated by health commitment. The results show that there was no main effect of condition, b = -.02, t(186) = -.06, p = .947, 95% CI [-.7, .7] or health commitment, b = .13, t(186) = 1.57, p = .117, 95% CI [-.03, .29]. The interaction between condition and health commitment on the appeal ratings of healthy food was not significant, b = .02, t(186) = .76, p = .448, 95% CI [-.04, .10].

We also explored the effects of condition on the health perception of healthy food moderated by health commitment. The results show that there was no main effect of condition, b = -.03, t(186) = -.10, p = .914, 95% CI [-.05, .52] or health commitment, b = -.08, t(186) = -1.3, p = .168, 95% CI [-.20, .035]. The interaction between condition and health commitment on the health perception of healthy food was not significant, b = .01, t(186) = .13, p = .896, 95% CI [-.05, .05].

The Moderating Role of Health Commitment on the Effects of Condition on the Appeal of Repeated and Novel Unhealthy Food

We tested whether condition influenced the appeal of repeated and novel unhealthy food through differences in health commitment. There were no main effects of condition b = -.39, $t(186)$ = -.88, p = .378, 95% CI [-1.2, .48] or health commitment b = -.13, $t(186)$ = -1.4, p = .159, 95% CI [-.32, .05] on the appeal ratings of repeated unhealthy food. Similarly, there was no interaction between condition and health commitment on the appeal ratings of repeated unhealthy food b = .04, $t(186)$ = 1.02, p = .305, 95% CI [-.04, .13].

There was no effect of condition b = -.02, $t(186)$ = -.06, p = .948, 95% CI [-.89, .83] or health commitment b = -.03, $t(186)$ = -.37, p = .709, 95% CI [-.22, .15] on the appeal of novel unhealthy food. Furthermore, the interaction between condition and health commitment on the appeal of novel unhealthy food was not significant b = .02, $t(186)$ = .38, p = .703, 95% CI [-.06, .10].

The Moderating Role of Health Commitment on the Effects of Condition on the Appeal of Repeated and Novel Healthy Food

We investigated the effects of condition on the appeal of repeated and novel healthy food. There were no main effects of condition on the appeal of repeated healthy food b = .31, $t(186)$ = .76, p = .447, 95% CI [-.49, 1.11]. However, there was a significant main effect of health commitment b = .19, $t(186)$ = 2.16, p = .031, 95% CI [.02, .36]. This suggests that higher levels of health commitment were associated with more appeal ratings of repeated healthy food. The interaction between condition and health commitment was not significant b = -.001, $t(186)$ = -.03, p = .975, 95% CI [-.08, .07].

Similarly, there were no main effects of condition b = -.35, $t(186)$ = -.87, p = .382, 95% CI [-1.17, .45] or health commitment b = .07, $t(186)$ = .81, p = .417, 95% CI [-.10, .25] on the appeal of novel healthy food. Furthermore, there was no interaction between condition and health commitment b = .05, $t(186)$ = 1.45, p = .147, 95% CI [-.02, .14].

The Moderating Role of Health Commitment on the Effects of Condition on the Health Perception of Repeated and Novel Healthy Food

Lastly, we also explored whether different levels of health commitment moderated the effect of condition on the health perception of repeated and novel healthy food. The results show no main effects of condition b = .04, t(186) = .16, p = .868, 95% CI [.05, .33] or health commitment b = -.07, t(186) = -1.2, p = .225, 95% CI [-.19, .04] on the health perception of repeated healthy food. There was no interaction between condition and health commitment b = -.01, t(186) = -.15, p = .880, 95% CI [-.05, .05].

Additionally, there were no main effects of condition b = -.10, t(186) = -.35, p = .725, 95% CI [-.70, .49] or health commitment b = -.09, t(186) = -1.43, p = .153, 95% CI [-.22, .03] on the health perception of novel healthy food. The interaction between condition and health commitment was not significant b = .01, t(186) = .37, p = .706, 95% CI [-.04, .07].

Chapter 4

Recognising the Need for Self-Control: The Role of Goal Activation and Problematic Self-Control in Facilitating Conflict Identification in Food-Related Self-Control Dilemmas

Abstract

Although people strive to achieve their long-term goals, they often find it difficult to resist temptations. Self-control research suggests that successful goal pursuit requires an individual to identify goal conflicts. However, it is not clear what causes conflict identification. Here, we propose that people with impaired self-control face difficulties in recognising goal conflicts. We hypothesise that goal activation facilitates conflict identification in those with problematic self-control. To test this, we developed a new measure of conflict identification, in which the participants categorised unhealthy and healthy food pairs as complementing or conflicting one another. The pilot study demonstrates that when health goals are activated, dieters show a tendency to identify more conflict between temptations and long-term goals. Conversely, in the absence of a health prime, dieters show reduced conflict identification. Similarly, study 1 shows that people with impaired self-control identify more conflict when health goals are made salient. In study 2, the findings show that goal activation compared to the control condition, facilitates conflict identification. Consistently, in study 2, in the goal activation condition, people with problematic self-control show an increase in conflict identification. When health goals are activated, people with problematic self-control show healthier food choices through an increase in conflict identification compared to the control condition. We also discuss the implications of our findings and recommendations for future work.

Keywords: self-control, conflict identification, goal activation, temptations, goal pursuit, Categorisation task

Introduction

People are often confronted with competing motives such as the desire to fulfil unhealthy cravings and maintain a healthy lifestyle. The inability to resist such desires has been described as a self-control failure, lack of effort, or poor inhibition (Baumeister, 2002; Vohs & Heatherton, 2000). However, self-control failure might also result from a failure to recognise discrepancies between immediate temptations and long-term goals (Myrseth & Fishbach, 2009), that is, people might miss to identify a self-control conflict before even trying to 'resist' a temptation. For instance, a dieter must identify that a certain food option would negatively affect his/her dieting goals. While this often might be obvious (e.g., considering a slice of very rich cake), it is sometimes less obvious (e.g., considering a biscuit). In the present study, we test when people with and without self-control difficulties identify a conflict and when they miss to see it using a newly developed measure of conflict identification.

Self-Control Conflict

People constantly strive to achieve several goals simultaneously. For example, dieters hold a long-term goal of weight loss that coincides with their immediate desire to indulge in temptations. Successful self-control is contingent on first identifying this conflict and thereafter, implementing self-control strategies (Myrseth & Fishbach, 2009). Importantly, conflict identification is malleable. For instance, we can perceive a burger as a "delicious dish" or a "fattening dish". This means that self-control failure can be a result of insufficient conflict recognition in response to pursuing temptations, consequently, a failure to recognise the need for control (Botvinick et al., 2001; Myrseth & Fishbach, 2009). On the other hand, others argue that self-control difficulties are associated with an increase in the experience of conflict (Wiers et al., 2015). Therefore, given these differences in the understanding of conflict, it is important to differentiate between the experience and identification of conflict. Specifically, the experience of conflict is defined as feeling the urge to indulge in temptations while motivated to resist (Becker et al., 2019). While, conflict identification is defined as the ability to recognise conflict between

temptations and long-term goals (Myrseth & Fishbach, 2009). Identifying conflict is the first step in exerting control over desires and is a fundamental process in successful self-control (Kroese et al., 2011) as it functions as a signal to activate restraint and resolve the conflict according to one's long term goals (Hofmann & Kotabe, 2012; Werner & Ford, 2021). In this research, we aim to investigate conflict identification in food-related self-control dilemmas.

One factor that determines conflict identification is the visual presentation of temptations and goals. For instance, participants showed greater preferences for unhealthy compared to healthy food when the food was presented together in one image (Fishbach & Zhang, 2008). In contrast, when the unhealthy and healthy food were presented separately in two images, healthy food was evaluated more favourably. This suggests that when goals and temptations appear to complement one another, people do not recognize a conflict and prefer temptations. Conversely, when they appear to compete with one another, people prefer goals. Similarly, smaller compared to larger packaging of tempting products such as crisps increased subsequent food consumption (Coelho Do Vale & Zeelenberg, 2008), likely because conflict was not detected as a consequence of a smaller size of temptations. Importantly, the preceding evidence suggests that conflict identification is malleable underlining the importance of testing what shapes conflict identification and how it varies in people with self-control problems.

The Importance of Seeing Conflict

People with self-control problems face difficulties when having to decide between options representing temptations and goals. For instance, in a mouse-tracking study, participants' decision making processes during self-control conflicts were investigated using a computerized food choice task that involved selecting one of two conflicting choices; an immediate temptation (e.g., chocolate) or a long term goal (e.g., apple) (Stillman et al., 2017). Unsuccessful self-controllers displayed abrupt rather than smooth mouse trajectories and spent more time to move towards the items representing the long term goals. This suggests that people with problematic self-control show more difficulties in such dilemmas.

Recent research attributes the difficulties in self-control to increased response conflict, that is, feelings of conflict (Becker et al., 2019). People low in self-control have stronger desires for temptations and as a result experience more response conflict (Hofmann et al., 2012). For example, Gillebaart et al. (2016) explored the effect of trait self-control on response conflict using explicit and implicit measures such as self-reports and mouse trajectories in response to food. In the explicit task, the participants provided negative and positive evaluations of each food item as well as their ratings on how conflicted they felt. The implicit measure involved categorising unhealthy and healthy food items by moving the computer mouse towards one of the two responses, that is, positive or negative. It was found that people with low self-control reported more experienced conflict and took longer to categorise healthy food as positive and unhealthy food as negative. This indicates that people with poor self-control experience difficulties in resolving conflicts. However, as in the study by Stillman et al. (2017) it is not clear whether conflict resolution is influenced by one's ability to identify conflict.

Recent research also shows that people with lower compared to higher levels of trait self-control require more time to resolve response conflicts (Gillebaart et al., 2020). In this study, the participants were first asked to indicate a personally relevant behaviour that they experience difficulties in performing and would like to improve. They then completed a mouse-tracking task where goal-congruent or goal-incongruent stimuli were presented based on each participant's chosen behavioural goals. For example, if the participant indicated a health goal, they were shown a healthy item (e.g., apple) or an unhealthy item (e.g., cake). In the task, each stimulus was positioned either in the upper right or left corner of the screen with a manikin as the fixation icon at the bottom centre of the screen to represent the participant. The participants were required to select the goal-congruent stimulus using the computer mouse. They were then provided with a mobile study application with daily reminders for measurements and questionnaires. The mouse-tracking task was administered at the lab using a computer in the pre and post measurement and via mobile for daily measures. Overtime, repeated exposure to

response conflicts, resulted in faster selections of stimuli that were in line with one's long term goals in both low and high levels of trait self-control. Interestingly, overtime, the reduction in the response time of resolving conflicts was more pronounced in those with low compared to high trait self-control. This indicates that making people aware of conflict, increases their abilities to resolve self-control conflicts. Similarly, when attention is directed to one's food consumption, the intake of unhealthy food is reduced in those with low self-control (Redden & Haws, 2013). However, it is not clear what influences these changes in the abilities to resolve conflict and resist temptations. In this regard, it is not apparent whether these changes in peoples' abilities to resolve self-control conflicts are a result of perceived self-efficacy or an increase in the ability to see conflict. While the differences between successful compared to unsuccessful self-controllers are evident, the mechanisms of these differences remain unclear. Therefore, it is crucial to investigate the processes involved in seeing self-control conflicts that lead to different behavioural outcomes.

Importantly, problems to identify conflict could contribute to these issues. For instance, when faced with a self-control dilemma of choosing between unhealthy and healthy food snacks, weight-concerned individuals showed fewer gaze switches between the snacks, reduced fixation durations and faster reaction times when they chose the unhealthy compared to healthy food snacks (van der Laan et al., 2014) suggesting that they might not have identified a conflict. Indeed, unhealthy food choices were associated with a reduced neural activation of the anterior cingulate cortex which signals conflict (Botvinick et al., 2001). These implicit reactions in response to choosing the temptations could explain that difficulties in self-control reflected in weight-concerned individuals are associated with reduced conflict identification. However, most existing studies do not allow one to decide whether participants identified a conflict or not as measures are very indirect. Therefore, in our research we developed a new categorisation task to measure one's ability to identify conflict between temptations and goals, specifically, whether one perceives unhealthy and healthy food pairs as complementing or conflicting one another.

Goal Saliency Facilitates Goal Pursuit

It is unlikely that even people with self-control difficulties will never see conflict. When are they likely to identify conflict? We assume that the saliency of the relevant goal such as dieting or health goals will heighten chances to identify a conflict. For instance, activation of a goal increases the chances of goal directed behaviour through an increase in the accessibility of goal related representations that can then guide behaviour and judgements (Custers & Aarts, 2005) as successful goal pursuit requires goal representations to be accessible (Stroebe et al., 2013). The accessibility of goal representations then also facilitates the anticipation of the outcome (Fishbach et al., 2003). This changes the way in which temptations are perceived. For instance, when dieters compared to non-dieters were primed with diet-related words, goals were implicitly evaluated more positively than temptations (Fishbach et al., 2010). Similarly, when dieters were primed with weight-watching related words, they chose healthier food options (Papies & Veling, 2013). Furthermore, priming participants with health goals resulted in more time spent looking at healthy compared to unhealthy food which consequently was associated with healthier food choices (van der Laan et al., 2017). This suggests that when goals are activated, temptations are devalued, thereby, more attention is allocated towards goals which facilitates the chances of goal pursuit.

Consistent evidence has also demonstrated that goal activation facilitates goal directed behaviour among dieters (Buckland et al., 2013). However, it is not evident whether these perceptual and behavioural changes are due to varied levels of conflict. In this Chapter, we therefore ask whether activating health goals influences one's ability to detect conflict between unhealthy and healthy food. We propose that goal activation facilitates the recognition of conflict in those with self-control difficulties.

The Present Studies

In the pilot study, we aimed to extend existing research on the identification of self-control conflicts in the food-related domain. Specifically, we examined whether activating

health-related goals facilitates conflict identification in individuals with problematic eating behaviour. To this end, we developed a new Categorisation task. In this task, we investigated conflict identification by assessing people's responses to unhealthy and healthy food pairs (e.g., strawberries and waffles) as complementing or conflicting one another. The aim of this task was to detect one's ability to identify a self-control conflict between immediate and delayed rewards as the food pairs complemented each other from a taste perspective but contradicted each other from a health perspective. We hypothesised that chronic dieters and those with problematic self-control would show difficulties in conflict identification. However, we proposed that a health prime would facilitate conflict identification in individuals with impaired self-control. In particular, we predicted that people with problematic self-control would show more conflicting responses towards unhealthy and healthy food pairs when health goals are salient.

Pilot Study

Methods

Participants

Ninety-seven people participated in this study (77% females; M = 33.89 years, SD = 9.22) and received £1 in exchange for their participation. The sample size was determined according to the statistical analysis obtained from a similar study by Fishbach and Zhang (Fishbach & Zhang) with an effect size of $f^2 = .5$. A power analysis was conducted using the G*Power software (Faul et al., 2009), which indicated that a minimum of 90 participants were required to achieve a statistical power of .8 at an alpha of .05 and an effect size of $f^2 = .5$.

Based on these power calculations, we recruited 97 participants online via Prolific to allow for exclusions. The inclusion criteria involved native English speakers who were resident in the United Kingdom, to ensure accurate understanding of the instructions and to control for cultural differences in food choices and eating behaviour (i.e., combinations of healthy and unhealthy food). The participants (n = 11) with food restrictions were excluded from the analysis. The final sample involved 86 participants (65 females, aged, M = 33.1 years, SD =

8.69, ranging from = 18 to 63) with 28 dieters and an average BMI of 29.03 (*SD* = 8.30), ranging from 17-58. The participants reported their exercise hours per week (*M* = 3.56, *SD* = 2.52), health concern (*M* = 4.9, *SD* = 1.30), and difficulties (*M* = 4.5, *SD* = 1.52).

Design

We employed a between-subjects design to examine the differences in conflict identification between the two conditions, the health prime and control conditions a function of goal saliency. Approval was granted by The School Research Ethics Committee (SREC).

Apparatus and Materials

Health Prime. In this study, we manipulated self-control activation in the experimental condition by asking the participants to generate up to four items or activities that they enjoy but will try to avoid or limit this month to achieve their health goals. We focused on a future-oriented goal manipulation as a prime to activate goals and avoid expectancy effects. In the control condition, the participants were asked to generate up to four music genres that they try to avoid to listen to.

The Categorisation Task. The Categorisation task consisted of a total of 54 different healthy and unhealthy food pairs presented as images on the computer with a size of (6.3 cm high × 8.3 cm wide). The experiment comprised 27 healthy food items (e.g., bananas) and 27 unhealthy food items (e.g., waffles). The healthy and unhealthy food stimuli were selected according to their calorie and nutrient contents, and to be able to create pairs that 'match' each other from a taste perspective. Specifically, food items high in sugar and/or saturated fats with more than 400 calories per serving were classified as unhealthy food and those with fewer than 100 calories were classified as healthy food. The stimuli were chosen to represent tempting food. Accordingly, food high in sugar and fat content is perceived to be highly palatable and appealing (Drewnowski, 1995).

In these trials, different combinations of food items were presented randomly in the centre of the screen that contained healthy-healthy, unhealthy-unhealthy and unhealthy-healthy

food pairs. The food items were selected to represent possible paired food choices (e.g., fish and salad, burger and chips, burger and salad). The inclusion of the healthy-healthy and unhealthy-unhealthy trials was to conceal the purpose of the experiment. There were 50 trials of the unhealthy-healthy food pairs (e.g., burger-salad), 14 healthy-healthy trials (e.g., fish and salad) and 14 unhealthy-unhealthy trials (e.g., burger-chips).

The trials were presented in a random order. In each trial, a food pair was presented against a white background, with each image positioned horizontally opposite one another and each pair was only presented once throughout the study. The response labels were presented below the food images.

The position of unhealthy and healthy food items was counterbalanced between participants. For example, for one participant, the food pair appeared as (right: burger and left: chips) and for another participant as (right: chips and left: burger). Each participants saw healthy and unhealthy items equally as often in each location, e.g., healthy items were not always in the left location.

The participants were required to select one of the two options (complementing or conflicting) based on their personal opinion, whether the different food pairs complemented or conflicted one another. The food pairs remained on the screen until a response was given by using the mouse to select one of the two options presented on the screen. The following trial appeared 750 ms after the participant's response on the previous trial.

Finally, we tested whether responses to the unhealthy and healthy food pairs showed sufficient validity. The conflict identification task demonstrated adequate reliability for those items, $\alpha = .770$.

Additional Questionnaires. In order to understand the relationship between individual differences and conflict identification, we asked participants several questions as follows after the study. We first asked the participants about their current hunger, "*How hungry are you at the moment*?" and thirst "*How thirsty are you at the moment*?" to control for potential confounds, both represented on a 7-point Likert scale, (1 = *never* to 7 = *very much*). Individual characteristics that included dietary restraint, BMI and self-control success in eating behaviour were examined to understand the effects of goal activation on self-control mechanisms, specifically, conflict identification.

We assessed participants' self-control in order to identify those with problematic self-control using the following questions, "*How much are you concerned with eating healthily?*"*;* "*How difficult is it for you to eat healthily?*"; "*How difficult is it for you to stay slim?*". After this, we provided the participants with questions on their health importance to identify health conscious participants, "*How important is it to you to refrain from consuming enjoyable foods such as sweets?*"; "*How much are you concerned with staying slim?*"; "*How frustrated would you be if you would not stay or become slim?*", with higher scores reflecting more health conscious participants. These eight items were presented on a 7-point Likert scale ranging from (1 = *never* to 7 = *very much*). These items showed good reliability, $\alpha = .700$.

We explored the effects of other factors that would influence conflict identification. Specifically, we asked the participants about their dieting status, "*Are you currently dieting?*" represented as a dichotomous question (no coded as 1 and yes as 2) and their physical activity to explore their self-control abilities, "*How many hours do you exercise a week*?" as an open-ended question.

Furthermore, to control for possible confounds, we asked the participants about their food restrictions or allergies, "*Are you a vegetarian*?" as a dichotomous question (no coded as 1 and yes as 2) and "*Do you have any kind of food restrictions or allergies?*" as an open-ended

question. Finally, the participants were required to provide demographic information that included their age and gender.

Restraint Eating Scale. The participants were presented with the ten-item Revised Restraint Scale (RRS), which assessed their dietary restraint (concern for dieting) and weight fluctuation to identify restrained eaters (Herman, 1980). It consisted of ten statements such as (e.g., "*Do you give too much time and thought to food?*", "*What is your maximum weight gain within a week?*") that involved the following ratings (never, rarely, sometimes, often, always) represented on a five-point scale (0-4). The participants' responses were summed up in order to calculate the total score which ranged from (0-35). This questionnaire showed reliability with high internal consistency $\alpha = .833$ (Allison et al., 1992). Higher scores (RRS $\geq$15) represented restrained eating.

Chronic dieting has been consistently correlated with Body Mass Index (BMI) (Snoek et al., 2008); therefore, BMI has been demonstrated to be a comprehensive measurement to explore one's concerns for dieting and reward impulsivity (Veling et al., 2011). Participants provided their height and weight in order to calculate their BMI (kg/m2). There are different categorisations of one's BMI, (BMI < 25) represents normal weight individuals and a (BMI $\geq$ 25) represents overweight or obese individuals. The responses to all these choices were programmed as force responses to control for missing data.

Procedure

The entire study was computerised and programmed using Qualtrics Software. The study was advertised on Prolific as a Product Design Task with a minimum duration time of 10-15 minutes and a maximum of 25 minutes to complete the study. The description of the study was to explore people's product preferences and evaluations as well as their habits as consumers. The recruitment of participants was according to the inclusion criteria (i.e., native English speakers and UK residents). The participants first provided written informed consent. We told the participants that they would perform an evaluation task and answer questions regarding their

preferences and habits. Next, the participants were randomly allocated to one of the two conditions, the health prime or control condition. Based on this allocation, the participants were given two minutes to generate up to four items to avoid, either health related or music genres.

After completing this task for two minutes, the participants were presented with the second part of study, the Categorisation task. The participants were instructed to indicate whether in their personal opinion, the food pairs were complementing or conflicting one another. Following this, the participants provided their demographics and answered the additional questions. Finally, the participants were required to complete the ten-item Revised Restraint Scale (RRS). Upon completion, the participants were thanked and debriefed.

Results

Randomisation

To ensure successful randomisation of the conditions, we conducted t-tests to test for any differences in the individual difference variables. The results showed no differences between the conditions in any of the variables age, hunger, RRS (i.e., Revised Restraint Scale), BMI, dieting status or frequency, exercise or health difficulties, $p >$. 052. However, there were differences between the health prime and control condition in gender, (M = 1.14 , SD = .35); (M = 1.35, SD = .48), $t(84) = -2.3$, p = .024, 95% CI [-.39, -.02] and health concern (M = 5.25 , SD = 1.13); (M = 4.58 , SD = 1.38), $t(84) = 2.47$, p = .016, 95% CI [.13, 1.2]. This indicates that in the health prime condition, there were more females and more health concerned individuals. We will control for these variables in the analyses.

The Categorisation Scores

Complementing classifications were coded as a score of 1 and conflicting as 2. For each of the food pairs, unhealthy-healthy, unhealthy-unhealthy and healthy-healthy, their specific trials were computed by calculating their average responses (sum of scores/ number of trials) with higher scores indicating more conflict identification.

The Effects of Condition on Conflict Identification

The study investigated whether a health prime manipulation influenced conflict identification abilities. The findings using a t-test analysis, as shown in table 1, demonstrated no differences between the conditions in conflict identification responses (unhealthy-healthy) food pairs, $t(84) = -.49$, $p = .625$, 95% CI [-.08, .05]. [4]

Table 1. Observed Mean Differences With (SD's) Between the Conditions in the Categorisation of Food Pairs.

	Unhealthy-Healthy		Healthy-Healthy		Unhealthy-Unhealthy	
Condition	*M*	*SD*	*M*	*SD*	*M*	*SD*
Health Prime	1.51	.15	1.16	.13	1.19	.17
Control	1.53	.17	1.18	.16	1.17	.16

Exploratory Analyses

In this study we investigated the relationship between one's health concern and difficulties that are involved in self-control processes to understand the role of individual differences in conflict identification. Importantly, health concern and difficulties were positively correlated ($r = .24$, $p = .029$). Therefore, these two variables were computed into a unitary index; problematic self-control, to understand the association between being concerned about one's health goals while facing difficulties (goal concern and difficulties) and conflict identification. [5]

4 There were no differences between the conditions in the participants' responses to the other food pairs, (healthy-healthy), $t(84) = -.64$, $p = .523$, 95% CI [-.08, .04], or (unhealthy-unhealthy), $t(84) = .65$, $p = .516$, 95% CI [-.04, .09].

5 Dieting status and frequency were both associated with problematic self-control ($r = .44$, $p < .001$), ($r = .45$, $p < .001$). Problematic self-control was positively associated with weight fluctuation ($r = .23$, $p = .030$).

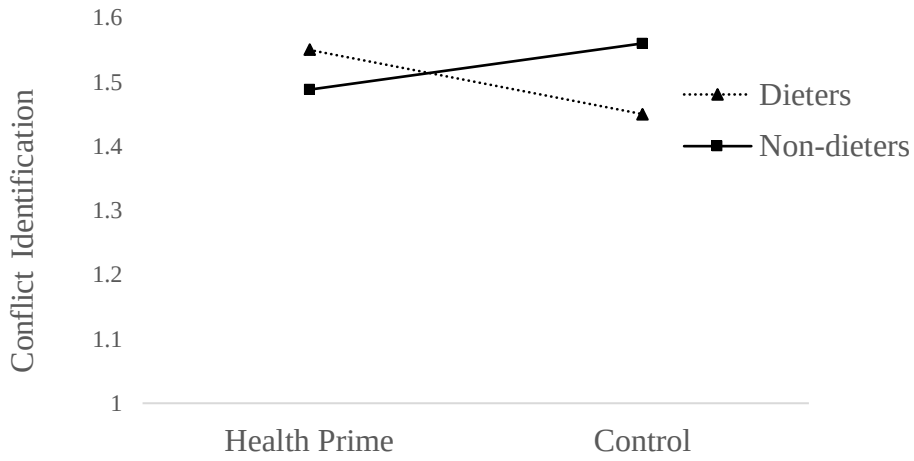

Figure 1. The Moderating Role of Dieting Status on the Effect of Condition on Conflict Identification. Higher Scores Represent More Conflicting Classifications.

Moderation analysis using PROCESS macro (Hayes, 2017) was conducted to explore the association between condition and dieting status on the participants' performance on the Categorisation task of unhealthy and healthy food (i.e., conflict identification). The moderation analysis as shown in the above graph revealed a significant interaction between dieting status and condition, b = -.2, t(82) = -2.4, p = .017; 95% CI [-.3, -.03]. There was a main effect of condition on conflict identification, b = .25, t(82) = 2.5, p = .015; 95%CI [.04, .44]. Additionally, the data showed a significant main effect of dieting status, b = .24, t(82) = 2.13, p = .036; 95%CI [.01, .46]. Simple slope analyses were performed to identify the effect of the moderator at each level of condition. In the health prime condition, there was no significant effect of the moderator on conflict identification, b = .06, t(82) = 1.3, p = .193; 95%CI [-.03, .16]. Conversely, there was a significant effect in the control condition, b = -.11, t(82) = -2.13, p = .036; 95%CI [-.2, -.01]. This suggests a significant difference between dieters and non-dieters in the control condition, meaning that dieters were less likely to identify conflict. Further simple slope analyses were conducted at each level of diet status. The results indicate that there was a marginally significant difference across the conditions between dieters, b = .07, t(82) = 1.8, p = .075; 95%CI [-.01, .15] and non-dieters, b = -.1, t(82) = -1.7, p = .090; 95%CI [-.2, .02]. The results represented in

Figure 1 suggest that dieters showed a tendency to identify conflict under goal conditions even when controlling for differences in gender and health concern. [6]

We also explored the effect of condition on conflict identification through the moderating role of problematic self-control. There were no main effects of condition, b = .20, t(82) = 1.16, p = .247; 95%CI [-.14, .54] or problematic self-control, b = .07, t(82) = 1.15, p = .252; 95%CI [-.05, .19]. The interaction between condition and problematic self-control was not significant, b = -.03, t(82) = -1.07, p = .285; 95%CI [-.10, .03].

Discussion

In this pilot study, we found that dieters under the goal activation condition showed a tendency to identify more conflict compared to the control condition. This suggests, that when health goals are salient and activated, dieters show more conflict identification when presented with temptations and long-term goals. The findings are in line with research showing that goal-related environmental cues lead to goal directed behaviour (Papies, 2016). Our research further investigates the underlying mechanisms involved in responses when exposed to temptations. The findings provide initial indication for why dieters face difficulties in achieving their long term goals which is associated with reduced conflict recognition in the absence of directly activated

[6] Given that there were differences between the conditions in gender and health concern, we addressed this issue by controlling for these two variables. Importantly, there was still the significant interaction between condition and diet when controlling for gender, b = -.18, t(81) = -2.5, p = .013, 95% CI [-.3, -.03] and there was a significant interaction between condition and diet when controlling for health concern, b = -.17, t(81) = -2.42, p = .017, 95% CI [-.31, -.03]. We investigated the relationship between condition and diet on conflict identification while controlling for health concern. There was no main effect of health concern on conflict identification, b = .01, t(81) = .23, p = .812, 95% CI [-.02, .03]. There was a significant main effect of condition on conflict identification, b = .24, t(81) = 2.45, p = .016, 95% CI [-.04, .45] and diet, b = .23, t(81) = 2.08, p = .040, 95% CI [.01, .46]. Furthermore, we investigated whether there was a relationship between condition and diet on conflict identification when controlling for gender. There were no main effects of gender, b = -.03, t(81) = -.73, p = .463, 95% CI [-.11, .05]. There was a significant main effect of condition, b = .26, t(81) = 2.5, p = .012, 95% CI [.05, .47] and diet, b = .24, t(81) = 2.19, p = .031, 95% CI [.02, .47].

health goals. Importantly, we find that when health goals are activated, dieters identify more goal conflicts. Our results help improve the understanding of the factors that contribute to problems in goal pursuit. However, the results demonstrate that non-dieters show an opposite effect reflected by a tendency to show less conflict identification when health goals are activated compared to the control condition. According to the correlational results, dieting was associated with difficulties in self-control shown by more weight fluctuation and difficulties in eating healthily. Therefore, a possible explanation for this opposite effect in non-dieters compared to dieters could be that non-dieters who experience fewer difficulties in pursuing their health goals may have an increased sense of goal competence. Therefore, it is possible that when nudged into thinking about their health goals, they are reminded about their previous progress towards their goals which may liberate indulgence in the moment through functional licensing which is associated with more successful weight management and promotes long-term goal adherence (Prinsen et al., 2018). Whereas, in the control condition, the findings could suggest that non-dieters show a tendency to identify more conflict. Therefore, we assume that when health goals are not salient, non-dieters' goal progress is not apparent to license their indulgence. This suggests that goal activation influences conflict identification differently in dieters and non-dieters. However, this requires future experiments to test this assumption.

Here, we investigated whether increasing goal saliency facilitates conflict identification. This was measured using the newly developed Categorisation task which consisted of identifying whether unhealthy and healthy food items were complementing or conflicting one another. In the following experiment, we examine why people who often experience difficulties in healthy eating struggle in pursuing their long-term goals. Indeed, when restrained eaters who face difficulties in eating healthily are confronted with tempting cues, hedonic thoughts are triggered (Papies et al., 2007) and their long term goal of dieting is inhibited (Stroebe et al., 2008). However, the cause of these changes remains unclear. Therefore, we explore whether these difficulties are associated with poor conflict identification. Here, the control condition was

changed to a more neutral task to eliminate an activation of an avoidance motivation such as that shown in the pilot, in which, the participants were required to generate four music genres that they try to avoid to listen to. We assume the participants demonstrated an avoidance motivation in response to this task, shown by a tendency to identify conflict in the control condition. The same Categorisation task was used, however, the responses were changed from a binary choice (complementing or conflicting) to a 7-point Likert scale, (1= *complementing*, 7 = *conflicting*) to obtain a more detailed understanding of the extent to which the participants recognised conflict and the degrees in which it was varied.

Study 1

Methods

Participants

According to the pilot study, 124 participants were required to obtain a small to medium effect size ($f^2 = .06$). A total of 124 participants were recruited online via Prolific and reimbursed £1 for their participation. Seven of these participants were excluded from the analysis due to food restrictions. The sample consisted of 72 females, 44 males and 1 other, aged between 18 to 50 years ($M = 32.6$, $SD = 8.56$) with 24 dieters and an average BMI of ($M = 26.6$, $SD = 6.14$). The participants reported their exercise hours per week ($M = 3.9$, $SD = 4.31$) with moderate levels of health importance ($M = 5.12$, $SD = 1.23$) and difficulties ($M = 4.24$, $SD = 1.56$). The participants' scores on the Brief Self-Control Scale (BSCS) ranged from 18 -54 ($M = 34.17$, $SD = 7.07$).

Apparatus and Materials

Health Prime. Similar to the manipulation in the pilot study, we manipulated self-control activation in the health prime condition by asking the participants to generate up to four items or activities that they enjoy but will try to avoid or limit this month to achieve their health goals. However, the control condition was changed to prevent the activation of an avoidance mindset.

Therefore, in the control condition, the participants were required to list four items they had in their bathroom.

The Categorisation Task. The design of the task remained the same which involved the same food stimuli and trials, however, the responses were changed from two choices (complementing or conflicting) to a 7-point Likert scale, (1= *complementing,* 7 = *conflicting*). This was modified to ensure the detection of more subtle differences in the responses, whereby, the participants were not constricted to one choice. The mean of these responses was computed by calculating the sum of responses/the number of trials to identify conflict identification abilities. Higher scores represented more conflict identification. Similar to the pilot study, the conflict identification task showed strong reliability for the food items $\alpha = .820$.

Questionnaires. In this study, we used the same questions used in the pilot study. These questions consisted of demographics, self-control and health and eating related habits. In this study, we added a question on one's health importance, ("*How important is it for you to eat healthily*?") represented on a 7-point Likert scale ranging from (1 = *never* to 7 = *very much*). This was included to measure the participants' goal commitment to identify the effects of goal value on conflict identification. Additionally, the Revised Restraint Scale (RRS) was removed and replaced with the Brief Self-Control Scale (BSCS) to assess whether the Categorisation task was associated with differences in trait self-control to further explore this as a measure of conflict identification, a process of self-control. This questionnaire consisted of 13 items such as "*I am good at resisting temptation*". The responses were given on a 5-point scale ranging from (1 = *not at all* to 5 = *very much*), some items were reverse coded and a mean score was calculated (Tangney et al., 2004). Higher scores reflected more self-control. The scale demonstrated strong reliability $\alpha = .796$.

Procedure

The participants were first presented with the information sheet and consent form. After this, the participants were allocated to one of the two conditions to complete the evaluation task.

Next, the participants completed the Brief Self-Control Scale and questions on their health and eating related habits as well as their self-control. Finally, they provided their demographics and were debriefed.

Results

Randomisation

The t-test analyses showed effective randomisation with no differences between the conditions in age, gender, dieting status or frequency, weight fluctuation, exercise, BMI, health importance or difficulties, $p > .065$. However, there were differences between the health prime and control condition in trait self-control, (M = 32.69 , SD = 6.86); (M = 35.5, SD = 7.03), $t(115) = -2.208$, $p = .029$, 95% CI [-5.39, -.29]. We will control for this difference in the analyses.

The Effects of Condition on Conflict Identification

Table 2. Observed Mean Differences With (SD's) Between the Conditions in the Categorisation of Food Pairs.

		Unhealthy-Healthy		Healthy-Healthy		Unhealthy-Unhealthy	
Condition		*M*	*SD*	*M*	*SD*	*M*	*SD*
	Health Prime	3.89	.90	2.40	.72	2.14	.79
	Control	3.68	.62	2.73	.77	2.46	.75

We explored the effects of condition on the categorisation of the different food pairs using t-test analyses. The results show significant differences in the categorisation of healthy-healthy food pairs, $t(115) = -2.4$, $p = .017$, 95% CI [-.60, -.04] and unhealthy-unhealthy food pairs, $t(115) = -2.27$, $p = .025$, 95% CI [-.60, -.05]. Specifically, as shown in table 2, the participants in the health prime compared to the control condition showed more complementing classifications of both the healthy-healthy and unhealthy-unhealthy food pairs. However, there were no differences between the conditions in the categorisation of unhealthy-healthy food pairs, $t(115) = 1.43$, $p = .153$, 95% CI [-.07, .48].

Exploratory Analyses

We explored the relationship between health importance and difficulties to understand the role of individual differences in conflict identification. The variables health importance and difficulties were negatively correlated (r = -.22, p = .016). Therefore, these two measures were combined into one variable (problematic self-control) to identify unsuccessful dieters who highly value their dieting goal and experience difficulties in its pursuit.[7]

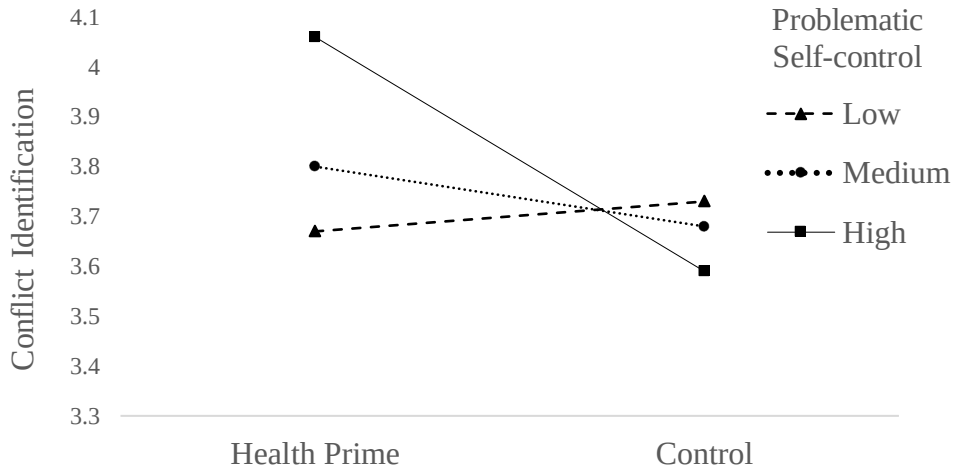

Figure 2. The Moderating Role of Problematic Self-Control on the Relationship Between Condition and Conflict Identification.

In this study, dieting was correlated with problematic self-control. Therefore, it was important to investigate the role of the moderating variable, problematic self-control, which is reflected in dieting. A moderation analysis was performed to look at the effect of the combined

[7] Health importance was positively correlated with trait self-control (r = .28, p < .01) and exercise (r = .20, p =.027) as shown in table 3.1. In contrast, health difficulties were negatively correlated with trait self-control (r = -.44, p < .001) and exercise (r = -.20, p =.029). This suggests that health importance and difficulties are an indication of problematic self-control in the context of eating behaviour. Importantly, problematic self-control was correlated with dieting frequency (r = .38, p < .001), BMI (r = .18, p =.047) and weight fluctuation (r = .30, p <.001). More problematic self-control was associated with less trait self-control (r = -.19, p =.039).

variables, problematic self-control on conflict identification. The results show a significant main effect of problematic self-control, b = .61, t(113) = 2.54, p = .012, 95% CI [.13, 1.08] and a marginally significant main effect of condition, b = 1.46, t(113) = 1.8, p = .068, 95% CI [-.11, 3.03]. The findings, as shown in Figure 2, indicate a significant interaction between condition and problematic self-control, b = -.35, t(113) = -2.08, p = .038, 95% CI [-.68, -.02]. This interaction is still significant when controlling for the difference in trait self-control.[8]

Importantly, as expected, higher levels of problematic self-control significantly moderated the relationship between condition and conflict identification, b = -.47, p = .020; 95%CI [-.86, -.07]. This suggests that those who value healthy eating, yet face difficulties in achieving this, reported more conflicting classifications of unhealthy and healthy food pairs when primed with a health goal. In contrast, for both low and medium levels of problematic self-control, there were no significant effects, b = .05, p = .754; 95%CI [-.29, .40], b = -.12 , p = .402; 95%CI [-.40, .16], indicating that conflict identification is not dependent on the saliency of a health goal for people with low or medium health importance and difficulties.

Further simple slope analyses were conducted to test the differences in each of the two conditions. In the health prime condition, those who highly valued healthy eating and were higher in self-control difficulties showed an increase in conflict identification, b = .26, t(113) = 2.62, p = .009; 95%CI [.06, .45]. This suggests that the health prime enhances conflict identification in those with self-regulatory difficulties. There was no effect of the moderator in the control condition, b = -.09, t(113) = -.66, p = .504; 95%CI [-.36, .17].

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[8] We further explored whether there was an interaction between condition and problematic self-control in conflict identification when controlling for trait self-control. There was no main effect of condition b = 1.44, t(112) = 1.79, p = .074, 95% CI [-.14, 3.03] or trait self-control, b = .00, t(112) = .14, p = .884, 95% CI [-.01, .02]. However there was a main effect of problematic self-control, b = .61, t(112) = 2.52, p = .012, 95% CI [.13, 1.08]. Importantly, there was still a significant interaction between condition and problematic self-control when controlling for trait self-control, b = -.35, t(112) = -2.05, p = .041, 95% CI [-.68, -.01].

Discussion

In the pilot study, we investigated how peoples' perception of food associations related to temptations and goals changes according to their current level of conflict identification. We also explored how these changes are associated with self-control success. Previously, self-control failure has been attributed to inhibitory problems or limited mental resources (Baumeister, 1994). In the present studies, we found that self-control difficulties are associated with a reduction in the recognition of self-control conflicts unless health goals are salient. This suggests that goal activation through a health prime acted as a reminder that helped with identifying self-control conflicts, thus, shielding one from competing desires (Shah et al., 2002).

Specifically, the results showed that a higher number of goal conflicts were identified in the goal activation compared to the control condition when one's long term goal was highly valued yet difficult to achieve. Consistent with these findings, conflict activation using the Stroop task resulted in attention deviation away from temptations (e.g., unhealthy food) and towards goal related stimuli (e.g., healthy food) in people with self-control difficulties (Kleiman et al., 2016). Importantly, our findings could also suggest that pre-defining an important goal increases the recognition of the obstacles that hinder its pursuit.

We suggest that goal activation facilitated spontaneous conflict identification, where more conflict between unhealthy and healthy food was identified. In these studies, the spontaneity of conflict is demonstrated as the participants were not explicitly nudged into seeing a conflict or instructed to see alternatives. Instead, they were told to respond according to their personal opinions to whether the food items complemented or conflicted each other. Furthermore, the words complementing or conflicting were not defined to the participants because we wanted to create a situation where food pairs were presented to complement one another from a taste perspective but not from a health perspective.

The results from study 1 indicate a similar pattern of findings as in the pilot study. While dieting status marginally moderated the effects of condition on conflict identification, however,

in this study, dieting status did not moderate this effect. Interestingly, the findings show that increasing the saliency of health goals was associated with more conflicting responses towards unhealthy and healthy food in people with problematic self-control as with dieters who showed a tendency of this effect in the pilot study. The findings correspond to evidence showing that one's current goals influence attentional processes, whereby, attention orientation is guided towards goal-relevant information and away from goal-irrelevant information (Vogt et al., 2013). This suggests that when goals are activated, people's attention is directed towards goal consistent representations and thus, inhibits the attention allocation towards goal inconsistent representations, thereby, facilitating conflict identification.

Consistently, when attention is directed to one's thoughts in response to appetitive information and these are perceived as mental events, the effect of hunger on the appeal of unhealthy food was reduced, thus, healthier food was selected (Papies et al., 2015). Similarly, nudges such as posters and signs containing health prompts increase healthy food purchases (Broers et al., 2017) and decrease unhealthy food choices (Houlihan, 2018). Our findings provide an understanding of how these nudges could facilitate goal consistent behaviour. Such that, increasing goal related thoughts could improve the recognition of goal conflicts in people with self-control difficulties.

Supportive evidence shows how activating goals helps individuals with self-control difficulties pursue their goals. For example, restrained eaters who were presented with a neutral cue defined as a dieting facilitator lost more weight over 6 months compared to those who were given the same cue but were not aware that it was a dieting facilitator (Stämpfli et al., 2020). Similar findings showed that pre-exposure to a diet compared to a temptation related food cue resulted in a reduction in food consumption in restrained eaters who were dieting (Buckland & Hetherington, 2012). Importantly, our results extend these findings by explaining how goal activation influences the identification of goal conflicts.

According to our findings, when people recognise goal conflicts, they perceive the indulgence to be more harmful to their goals. This means that people assign greater benefits to goal attainment and consequently, increase their motivation to seek goal consistent behaviours (Fishbach & Trope, 2005). In support of this, the present findings suggest that goal activation could have reduced the accessibility of temptations (unhealthy food) resulting in more positive evaluations of goals, and therefore, increased one's conflicting categorisations of unhealthy and healthy food.

In this study, we examined the effect of goal activation using a health prime on conflict identification. We measured conflict by assessing the participants' responses to unhealthy and healthy food pairs on the Categorisation task as complementing or conflicting one another. In the following study, we aim to replicate the findings using a larger sample size with the inclusion of a behavioural intention task on food choice to understand the effects of conflict identification on subsequent self-control dilemmas, beyond the perception of conflict. This task was designed as a simulation of a series of restaurant-like scenarios, in which, a healthy food item is presented in the middle of the screen and the participant is required to choose one of the two options to have with it, a healthy or an unhealthy food item. We hypothesise that in the goal activation compared to the control condition, the participants will identify more conflict and thus, choose healthier food options.

Study 2

Methods

Participants

According to G*Power calculations, the required sample size was (n = 352) to obtain a medium effect size (f^2 = .15) based on study 1. We recruited a total of 360 participants online via Prolific to allow for exclusions. The participants were reimbursed £1 for their participation. Those with food restrictions (n = 32) were excluded from the analysis. The sample consisted of

261 females, 65 males and 2 other, aged between 18 to 50 years (M = 31.79, SD = 8.41) with 61 dieters and an average BMI of (M = 27.2, SD = 7.42). The participants reported their exercise hours per week (M = 4.09, SD = 4.95) with moderate levels of health importance (M = 5.08, SD = 1.27) and difficulties (M = 4.48, SD = 1.58). The participants' scores on the Brief Self-Control Scale (BSCS) ranged from 15-59 (M = 36.7, SD = 8.70).

Design and Procedure

In this study, the design remained the same as in the previous studies with an addition of a behavioural intention task. Here, we included a measure of behavioural intentions following the Categorisation task to explore the role of conflict identification in influencing subsequent food choices. In particular, we examined whether changes in conflicting responses of temptations (unhealthy food) and goals (healthy food) were associated with differences in food choices. Intentions have been shown to strongly predict the performance of that related behaviour (Ajzen, 1985; Dholakia, 2010).

At the start of this task, the participants were told that we are interested in identifying the best-selling products. We then told them to choose the answer that represents their choices. In this task, the participants were provided with a series of 20 different scenarios of varied food choices presented in a random order. We designed the food choices to represent real life restaurant simulations. The food items were matched according to choices selected from restaurant menus in the UK. Specifically, in each scenario, the participants were told that a healthy complementary food was offered to them and they were required to indicate by clicking on one of the two options to whether they wanted to eat a healthy or an unhealthy food with it.

In each scenario, a statement was presented in the centre of the screen, "*You are in a restaurant and you are given this complimentary food*" along with an image to convey this healthy complimentary food item (e.g., mixed fruit berries). Below this, there were two images, either a healthy food (e.g., strawberries) and an unhealthy item (e.g., cheesecake). In these scenarios, the participants were required to report their intentions by selecting either a healthy or

an unhealthy item to eat with the complementary food. The position of the choices reflecting unhealthy and healthy food items was counterbalanced between participants. The food choices depicting healthy food were scored as 1 and unhealthy food as 2. This means that higher scores indicate unhealthier food choices.

All of the scenarios represented different food pairs that are typically eaten together. We used a variety of different food combinations, half of which contained sweet items and the other contained savoury items. The task consisted of 10 repeated food items (e.g., salad, burger) from the Categorisation task and 10 additional novel items (e.g., pancakes, honey). This will allow us to assess whether more conflict identification measured by an increase in conflicting classifications of unhealthy and healthy food pairs predicts healthier food choices for both repeated and novel stimuli. We also aimed to understand whether the effects of conflict identification persist for novel stimuli when controlling for prior exposure. The behavioural intention measure showed adequate reliability $\alpha = .602$.

Results

Randomisation

The t-test analyses demonstrated no differences between the conditions in the variables, age, gender, dieting status or frequency, weight fluctuation, exercise, BMI, trait-self-control scores, health importance or difficulties, $p > .092$. This suggests effective randomization between the conditions.

The Effects of Condition on Conflict Identification

Table 3. Observed Mean Differences With (SD's) Between the Conditions in the Categorisation of Food Pairs.

	Unhealthy-Healthy		Healthy-Healthy		Unhealthy-Unhealthy	
Condition	*M*	*SD*	*M*	*SD*	*M*	*SD*
Health Prime	3.73	.88	2.30	.74	2.12	.75

Control	3.48	.74	2.32	.64	2.02	.63

We conducted t-test analyses to investigate the differences between the conditions in the categorisation of the different food pairs. There were no differences between the conditions in the categorisation of healthy-healthy food pairs $t(326) = -.29$, $p = .770$, 95% CI [-.17, .12] and unhealthy-unhealthy food pairs, $t(326) = 1.28$, $p = .200$, 95% CI [-.05, .25]. However, the results revealed significant differences between the conditions in the categorisation of unhealthy-healthy food pairs, $t(326) = 2.75$, $p = .006$, 95% CI [.07, .42]. The findings, as shown in table 3, demonstrated that the participants in the health prime compared to the control condition showed more conflicting classifications of the unhealthy-healthy food pairs. Consistent with our hypothesis, the findings suggest that goal activation in the health prime condition facilitated more conflict identification.

Exploratory Analyses

We explored the association between health importance and difficulties to understand the role of individual differences in conflict identification. The variables health importance and difficulties were not significantly correlated ($r = -.08$, $p = .132$). However, this variable was used in the previous experiments and correlated with other problematic self-control measures [9]. Therefore, we combined these two measures into one variable (problematic self-control) to identify those who highly value their dieting goal and experience difficulties.

The Effects of Condition on the Behavioural Intentions of Food Choice

We conducted a 2 x 2 repeated measures ANOVA to investigate the effects of condition (goal activation, control) as a between subjects variable on the novelty of food (novel, repeated)

9 Problematic self-control was positively correlated with dieting status ($r = .370$, $p < .001$), BMI ($r = .34$, $p < .001$) and negatively with trait self-control ($r = -.30$, $p < .001$).

as a within subjects variable on the behavioural intentions of choosing unhealthy or healthy food. The results showed no main effects of the novelty of food items on the participants' behavioural intentions, $F(1, 326) = .85$, $p = .356$, $\eta 2\ p = .003$. This means that there were no differences between novel and repeated food items on food choice. Similarly, there was no interaction between condition and the novelty of food items on the behavioural intentions of food choice, $F(1, 326) = .56$, $p = .452$, $\eta 2\ p = .002$. Furthermore, there were no differences between the conditions in the behavioural intentions of food choice, $F(1, 326) = 2.96$, $p = .086$, $\eta 2\ p = .009$.

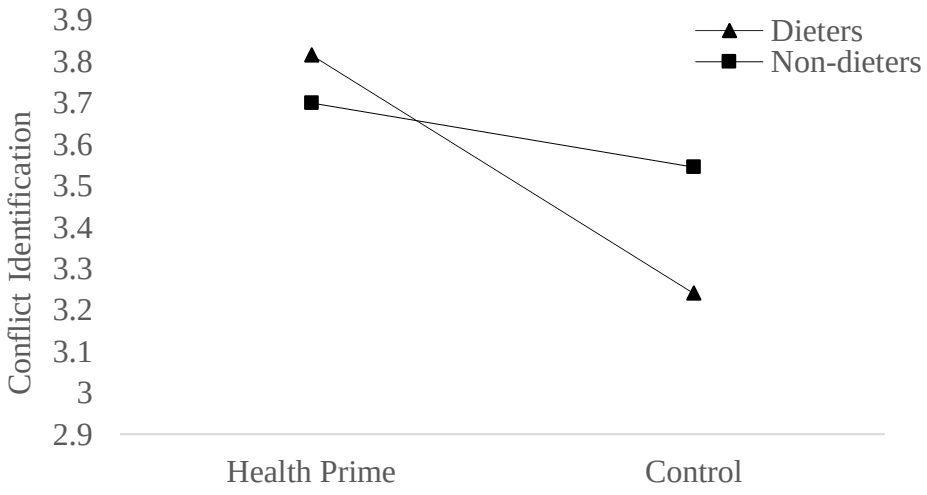

Figure 3. The Moderating Role of Dieting Status on the Relationship Between Condition and Conflict Identification.

A moderation analysis was conducted to investigate the effects of condition on conflict identification moderated by dieting status as in the previous experiments. There was no main effect of condition on conflict identification, $b = .22$, $t(324) = .77$, $p = .436$, 95% CI [-.34, .79] or dieting status, $b = .49$, $t(324) = 1.33$, $p = .182$, 95% CI [-.23, 1.22]. The findings, as shown in Figure 3, indicate a marginally significant interaction between condition and dieting status, $b = -.39$, $t(324) = -1.7$, $p = .087$, 95% CI [-.85, .05]. Interestingly, simple slope analyses reveal that there was a marginal effect of condition on conflict identification in non-dieters, $b = -.17$, $t(324) = -1.7$, $p = .084$, 95% CI [-.37, .02] and a significant effect in dieters, $b = -.57$, $t(324) = -2.7$, $p =$

.006, 95% CI [-.98, -.15]. These results are in line with a similar pattern of findings demonstrated in the pilot study. Such that, dieters showed a tendency to identify less conflict identification in the control compared to the health prime condition.

Further simple slope analyses suggest that there were marginally significant differences between dieters and non-dieters in the control condition, b = -.3, t(324) = -1.87, p = .062, 95% CI [-.62, .01] but not in the health prime condition, b = .09, t(324) = .57, p = .562, 95% CI [-.23 .42]. This suggests that dieters show a tendency to demonstrate fewer conflicting classifications of unhealthy-healthy food compared to non-dieters in the control condition.

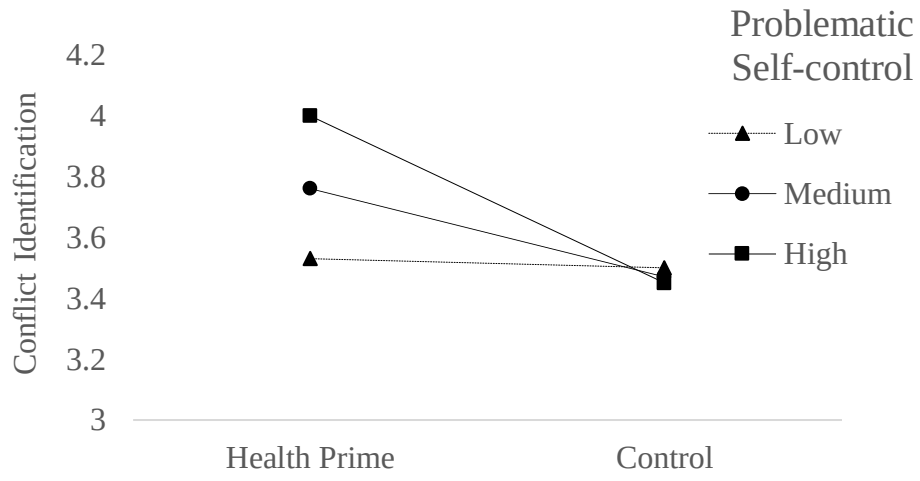

Figure 4. The Moderating Role of Problematic Self-Control on the Relationship Between Condition and Conflict Identification.

We conducted another moderation analysis to examine the effects of condition on conflict identification moderated by problematic self-control. The results showed a significant main effect of condition on conflict identification, b = 1.01, t(324) = 2.2, p = .026, 95% CI [.12, 1.8] and problematic self-control, b = .49, t(324) = 3.47, p < .001, 95% CI [.21, .76]. The results, as shown in Figure 4, showed a significant interaction between condition and problematic self-control, b = -.25, t(324) = -2.8, p = .005, 95% CI [-.44, -.07]. Simple slope analyses revealed that there was no effect of condition on conflict identification in lower levels of problematic self-

control, b = -.03, t(324) = -.27, p = .784, 95% CI [-.25, .19]. However, there were significant effects for both medium, b = -.29, t(324) = -3.16, p = .001, 95% CI [-.47, -.10] and higher levels of problematic self-control, b = -.55, t(324) = -3.8, p < .001, 95% CI [-.83, -.26]. The results replicate the findings in study 1. This means that people with more problematic self-control show more conflict identification in the health prime compared to the control condition.

Further simple slope analyses suggest that the differences between the levels of problematic self-control are significant in the health prime condition b = .23, t(324) = 3.7, p < .001, 95% CI [.10, .35] but not in the control b = -.02, t(324) = -.41, p = .68, 95% CI [-.16, .10].

The Effects of Condition on the Behavioural Intentions of Food Choice Moderated by Dieting Status

We assessed whether dieting status moderated the relationship between condition and food choice using moderation analyses. There were no main effects of condition on food choice, b = .01, t(324) = .16, p = .869, 95% CI [-.09, .11] or dieting status, b = -.01, t(324) = -.01, p = .984, 95% CI [-.13, .13]. There was no interaction between condition and dieting status on food choice, b = .02, t(324) = .38, p = .703, 95% CI [-.06, .09].

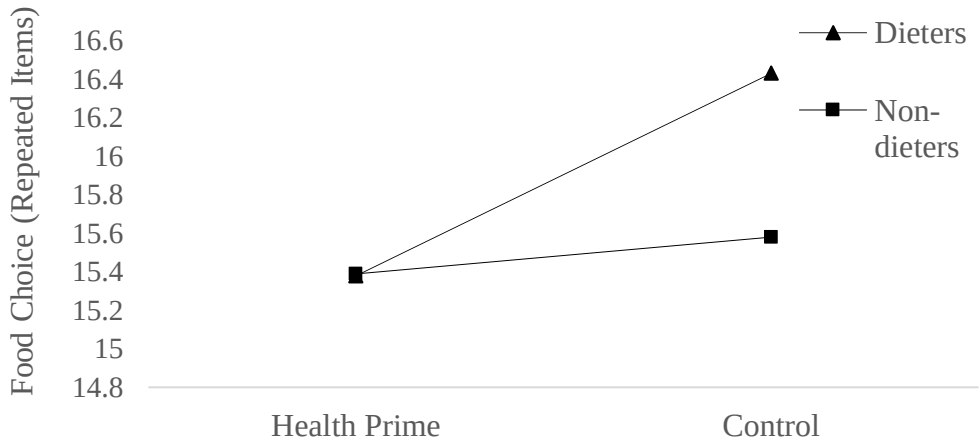

Figure 5. The Moderating Role of Dieting Status on the Relationship Between Condition and the Food Choice of Repeated Items. Higher Scores Indicate Unhealthier Food Choices.

We conducted a moderation analysis to investigate whether dieting status moderated the effects of condition on the food choice of repeated food items. There were no main effects of condition on food choice, b = -.06, t(324) = -1.04, p = .296, 95% CI [-.19, .05] or dieting status, b = -.08, t(324) = -1.05, p = .290, 95% CI [-.25, .07]. However, as shown in Figure 5, there was a marginal significant interaction between condition and dieting status on the food choice of repeated items, b = .08, t(324) = 1.67, p = .095, 95% CI [-.01, .18]. Importantly, simple slope analyses revealed significant effects of condition moderated by dieting status. There were no differences between dieters and non-dieters in food choice in the health prime condition, b = -.01, t(324) = -.02, p = .977, 95% CI [-.07, .07]. However, in the control condition, dieters chose more unhealthily compared to non-dieters, b = .08, t(324) = 2.3, p = .017, 95% CI [.01, .15]. This suggests these differences between dieters and non-dieters were diminished in the health prime, possibly as a result of goal activation, in which more conflict was identified.

Further simple slopes suggest that there were no effects of condition on food choice in non-dieters, b = .01, t(324) = .85, p = .395, 95% CI [-.02, .06]. However, the effects are significant in dieters, b = .46, t(324) = 2.25, p = .024, 95% CI [.01, .19]. In another moderation analysis, this effect was not present for novel food items p >.254 (Appendix D).

The Effects of Condition on the Behavioural Intentions of Food Choice Moderated by Problematic Self-control

We further explored whether problematic self-control moderated the relationship between condition and food choice using moderation analyses. Problematic self-control did not moderate the effects of condition on food choice p > .595. We also assessed the differences between the conditions in response to novel and repeated food items moderated by problematic self-control. There were no effects on novel p >.620 or repeated food items p >.190 (Appendix D).

The Effects of Condition on the Behavioural Intentions of Food Choice Moderated by Conflict Identification

Lastly, using a moderation analysis, we assessed whether conflict identification moderated the relationship between condition and food choice. This effect was not significant, p >.986 (Appendix D). We also explored the differences between the conditions in response to novel and repeated food items moderated by conflict identification. There were no effects of this moderation on novel p >.749 or repeated food items p >.744 (Appendix D).

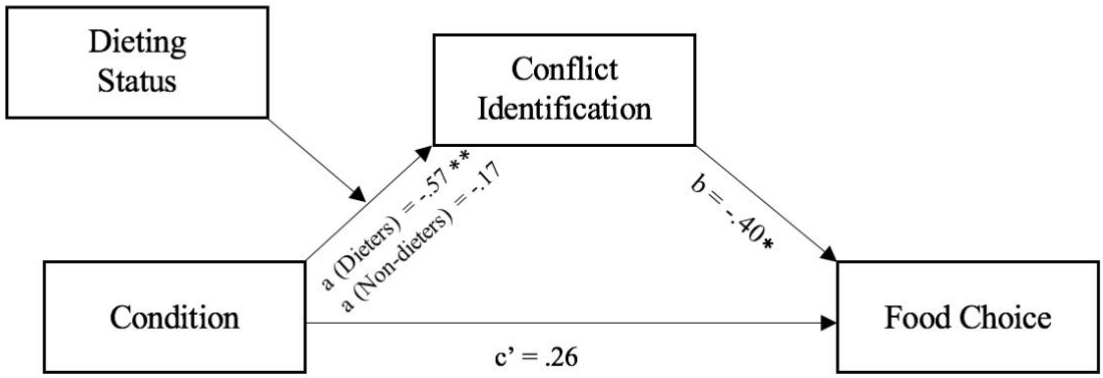

Figure 6. Goal Activation Facilitates Healthy Food Choices Moderated by Dieting Status via Conflict Identification. Higher Scores Indicate Unhealthier Food Choices. ***p < .001, **p < .01, *p < .05.

We further tested the direct and indirect effects of condition on food choice through conflict identification moderated by dieting status using PROCESS macro model number 7, (Figure 6; Hayes, 2017). Dieting status marginally moderated the effect of condition on conflict identification, B = -.39, se = .23, t = -1.7, p = .087. We tested simple slopes to investigate the effects of condition on conflict identification in dieters compared to non-dieters. Dieters in the goal activation condition showed more conflict identification (B = -.57, se = .2, t = -2.72 , p = .006) compared to the control condition (B = -.17, se =.10, t = -1.7 , p = .084). The overall moderated mediation model was not significant, Mediator Index = .16 (95% CI = -.03; .45). However, the conditional indirect effect of condition on food choice via conflict identification

was significant in dieters, *B* = .22, se = .13, (95% CI = .02; .53) and not significant in non-dieters, *B* = .06, se = .04, (95% CI = -.01; .17). This suggests that dieters chose more healthily in the goal activation condition.

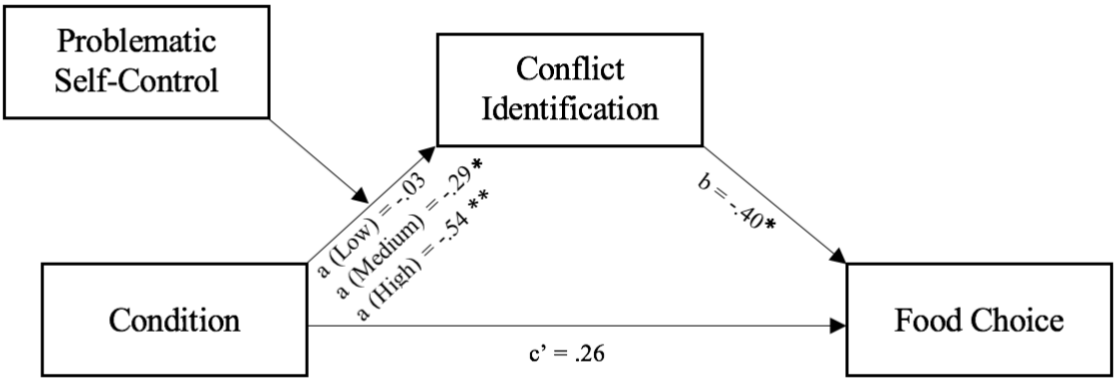

Figure 7. Goal Activation Facilitates Healthy Food Choices Moderated by Problematic Self-Control via Conflict Identification. Higher Scores Indicate Unhealthier Food Choices. ****p* < .001, ***p* < .01, **p* < .05.

Similarly, we also tested the direct and indirect effects of condition on food choice through conflict identification moderated by problematic self-control. Problematic self-control moderated the effect of condition on conflict identification, *B* = -.25, se = .09, *t* = -2.8, *p* = .005. We tested simple slopes to investigate the effects of condition on conflict identification in people with different levels of problematic self-control. There was no effect in people with low levels of problematic self-control (*B* = -.03, se = .11, *t* = -.27, *p* = .784), however, the effects were significant in both medium (*B* = -.29, se =.09, *t* = -3.2, *p* < .01) and high levels of problematic self-control (*B* = -.54, se =.14, *t* = -3.8, *p* < .001). The overall moderated mediation model was significant, Mediator Index = .10 (95% CI = .01; .22). The conditional indirect effect of condition on food choice via conflict identification was not significant in low problematic self-control, *B* = .01, se = .04, (95% CI = -.08; .11), however, the effect was significant in both medium, *B* = .11, se = .05, (95% CI = .02; .23) and high levels of problematic self-control, *B* = .22, se = .09, (95% CI = .05; .43). This suggests that goal activation increased conflict

identification in people with medium and high levels of problematic self-control, which was associated with healthier food choices in the food choice task.

General Discussion

In this research, across three experiments, we investigated whether goal activation improves conflict identification using a newly developed Categorisation task. The results indicate that dieters and people with problematic self-control show a tendency of facing difficulties in identifying conflict between temptations and goals. Importantly, when goals are activated, this reduction in conflict is decreased, shown by an increase in conflicting classifications of unhealthy and healthy food. In the pilot study and study 1, we did not find an effect of goal activation on conflict identification. However, in the pilot study, dieting status marginally moderated the relationship between condition and conflict identification. Specifically, dieters in the goal activation compared to the control condition showed a tendency to identify more conflict between unhealthy and healthy food. These findings suggest that goal activation may facilitate conflict identification in dieters. In contrast, non-dieters showed a tendency of an opposite effect. One reason for this could be that goal activation promotes functional licensing in non-dieters, whereby, the health prime could have served as a reason to justify their indulgence (de Witt Huberts et al., 2012).

In study 1, we found that people with problematic self-control which is reflected in dieting showed a tendency of enhanced conflict identification when health goals were salient compared to the control condition. Consistently, study 2, replicated the pattern of findings from the pilot study as well as study 1 in which, when nudged to think of health goals, problematic self-control was associated with enhanced conflict identification. There was a similar marginal effect in dieters. Additionally, the findings in study 2, demonstrated that goal activation resulted in more conflict identification. Importantly, in study 2, the findings demonstrated that dieters showed healthier food choices when goals were activated compared to the control condition in response to repeated food items that were shown in the Categorisation task as well as the Food

Choice task. This suggests that thinking about whether the food pairs complemented or conflicted one another could have activated a perception of conflict in response to specific food pairs and therefore, when presented with these food items, healthier food choices were made possibly as a result of increased conflict due to goal activation. This supports earlier findings which show that dieters chose healthier food choices when they were primed with goal-relevant words or images (Fishbach et al., 2003). Similarly, restrained eaters consumed fewer snacks when they were primed with dieting goals (Papies & Hamstra, 2010). Moreover, these findings are in line with previous research which demonstrate that increasing the awareness of one's long-term goals could improve conflict resolution (Gillebaart et al., 2020).

Interestingly, the results indicate that dieting and problematic self-control may be associated with reduced conflict identification. This supports previous evidence demonstrating that people with low self-control experience difficulties in identifying conflict (Stillman et al., 2017). The reduction in the identification of conflict may underlie the difficulties people face in pursuing their health goals. In particular, the findings indicate that dieters and people with problematic self-control show a tendency to identify more conflict between unhealthy and healthy food when thinking about the obstacles that hinder one's goal pursuit. This supports previous work which suggests that anticipating that obstacles to goal setting predicts successful goal attainment (Fishbach & Hofmann, 2015; Fishbach et al., 2010). Importantly, the findings from study 2, show that goal activation increases conflict identification which is associated with more goal consistent behavioural intentions in dieters. Consistent evidence shows that goal saliency activates and triggers goal-directed behaviour (Custers & Aarts, 2005). This could be explained in line with existing findings which suggest that when conflict is activated, people with low self-control divert their attention away from unhealthy food (e.g., chocolates) and towards healthy food (e.g., vegetables) (Kleiman et al., 2016). Taken together, it could be possible that conflict identification also improves conflict resolution in dieters shown by healthier food choices. This supports earlier findings which show that people with lower levels

of self-control show difficulties in resolving conflict when presented with temptations and goals (Gillebaart et al., 2016). This research highlights the importance of conflict identification in self-control.

In the presence of temptations and goals, people are faced with two competing desires which trigger a self-control conflict (Myrseth & Fishbach, 2009). It has been understood that choosing the temptation over the goal is a consequence of self-control failure (Baumeister, 1994; Muraven & Baumeister, 2000). Our findings highlight that in some situations, where goals are not salient, conflict between temptations and goals is not easily identified. Thus, under such circumstances, dieters and people with problematic self-control may succumb to temptations due to a lack of conflict recognition rather than self-control failure.

Implications, Limitations and Future Work

Our findings could have possible implications that could help in the development of self-control interventions to improve the perceptual processes that focus on enhancing conflict identification in response to temptations. However, it is crucial for future research to test whether this would be a successful intervention. This research should be extended in future work using more implicit designs such as an incorporation of a mouse-tracking measure to the Categorisation task to assess automatic responses towards the classification of unhealthy and healthy food and whether these are attenuated when goals are salient.

We should note that there were inconsistencies in the data which may be due to the first experiments being underpowered. Specifically, in the pilot study, there was a tendency for dieters to show more conflict identification when goals were activated, while in study 1, the effect of goal activation was moderated by problematic self-control. Nonetheless, problematic self-control is a characteristic of dieting and therefore, reflects a similar pattern of findings. In study 2, using a larger sample of participants, problematic self-control was associated with more conflict identification when goals were salient. There was a similar but marginal effect in dieting. Notably, across the experiments, the data demonstrated similar effects of goal activation

on conflict identification. Such that, dieters and people with problematic self-control show tendencies of reduced conflict identification when goals are not activated.

The results indicate that goal activation increases conflict identification as measured by more conflicting classifications of temptations and goals and healthier food choices in dieters. However, it is not clear how goal activation enhanced conflict identification. One possible explanation is that goal activation increases one's motivation through perceived self-efficacy of goal attainment and thus, enhanced conflict identification. An alternative explanation is that it bolsters the value of the long-term goal and decreases the value of the temptation causing more conflict identification. Future studies should explore these possible explanations by assessing self-efficacy as well as the value of goals and temptations to see whether conflict identification is associated with changes in these measures.

In our research, the experiments were conducted online and with food-related conflicts, therefore, we cannot be certain whether these findings are applicable to other self-control dilemmas. We recommend future research to investigate how conflict identification influences peoples' behaviour in real life settings and whether the effects in food-related domains would be similar in other self-control domains. Drawing on these findings, future research should explore whether such increases in a conflicting or complementing perception of temptations in response to different cues or situations would result in goal consistent choices.

In conclusion, our research into developing a new measure of conflict identification, namely, the Categorisation task has shown strong reliability. In these studies, we combined self-control and goal research to introduce a different approach in understanding why people face difficulties and often fail in self-control which goes beyond poor inhibitory control. By this perspective, we show how peoples' current mindset influences their perception of goal conflicts which is a fundamental process in self-control. Specifically, the findings indicate that a conflict perception is elicited when goals are salient, allowing for the accessibility of contradicting alternatives in those with problematic self-control as shown by more conflicting classifications

of temptations and goals and subsequently, healthier food choices. Together, this indicates that people with problematic self-control show fewer conflicting classifications of temptations and goals when goals are not salient. This may reflect the difficulties that they face in recognising the need to activate self-control, however, goal saliency increases conflict recognition.

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Appendices

Appendix A

Exploratory Analyses

In this study we investigated the relationship between different variables such as health concern and difficulties that are involved in one's self-control processes to understand the role of individual differences in conflict identification. As highlighted in table 2, the findings showed a correlation between dieting status and dieting frequency (r = .55, p <.001), health concern (r = .41, p < .001) and difficulties (r = .31, p < .01). This suggests that dieting is an indication of problematic self-control. Health difficulties were associated with weight fluctuation (r = .29, p < .001). Additionally, health concern and difficulties were positively correlated (r = .23, p = .029). Therefore, these two variables were computed into a unitary index; problematic self-control, to understand the association between being concerned about one's health goals while facing difficulties (goal concern and difficulties) and conflict identification.

Table 2. Correlation between dieting status, health concern and difficulties, problematic self-control, BMI and the classification of the different food pairs

Correlations

Variable	1	2	3	4	5	6
1. Dieting Status						
2. Health Concern	.369**					
3. Health Difficulties	.328**	.235*				
4. BMI	0.188	-0.062	0.209			
5. Healthy-healthy pairs	-.213*	-.214*	-0.119	-0.147		
6. Unhealthy-unhealthy pairs	-0.054	0.187	-0.056	0.018	0.064	
7. Unhealthy-healthy pairs	-0.061	-0.026	0.081	-0.04	.263*	0.156

* <.05, ** <.01, *** <.001

We performed further correlations to understand the association between individual differences and the categorisation of different food pairs. Higher levels of health concern were associated with more completing classifications of healthy-healthy food pairs (r = -.21, p = .047). However, there was no correlation between health concern and responses to unhealthy-unhealthy food pairs (r = .18, p = .085). Additionally, there were no correlations between

peoples' health difficulties and their classifications of the different food pairs, healthy-healthy (r = -.11, p = .275), unhealthy-unhealthy (r = -.05, p = .611) or unhealthy-healthy (r = .08, p = .461).

There were no associations between dieting frequency and responses to the different food pairs, healthy-healthy (r = -.06, p = .541), unhealthy-unhealthy (r = -.04, p = .664) or unhealthy-healthy (r = .01, p = .967). Similarly, there was no relationship between exercise and responses to the different food pairs, healthy-healthy (r = .09, p = .374), unhealthy-unhealthy (r = -.10, p = .338) or unhealthy-healthy (r = .13, p = .231). Furthermore, BMI was not associated with any differences in the classifications of food pairs, healthy-healthy (r = -.14, p = .178), unhealthy-unhealthy (r = .01, p = .868) or unhealthy-healthy (r = -.04, p = .714).

We also investigated whether there was a relationship between problematic self-control and food classification. The results show a marginally significant relationship between problematic self-control and responses to healthy-healthy food pairs (r = -.20, p = .056). This suggests that problematic self-control was associated with more complementing classifications of healthy-healthy food pairs. However, there were no correlations between problematic self-control and the other unhealthy-unhealthy (r = .07, p = .514) or unhealthy-healthy food pairs (r = .04, p = .715).

We explored whether these associations differed according to each condition. In the health prime condition, there were no correlations between problematic self-control and healthy-healthy food categorisations (r = -.19, p = .218), unhealthy-unhealthy (r = .13, p = .396) or unhealthy-healthy (r = .19, p = .212) as shown in table 2.1. In contrast, in the control condition, there were no correlations between problematic self-control and the healthy-healthy food pairs (r = -.2, p = .186), unhealthy-unhealthy food pairs (r = .01, p = .910) or the unhealthy-healthy food pairs (r = -.02, p = .865). Interestingly, though not significantly, more problematic self-control was associated with more conflicting responses to the unhealthy-healthy food pairs when in the

health prime condition compared to fewer conflicting responses to these food pairs in the control condition.

Table 2.1 Correlation between problematic self-control and dieting status and the classification of the different food pairs in each condition

Correlations

Condition	Health Prime	Control	Health Prime	Control	Health Prime	Control	Health Prime	Control
Variable	1		2		3		4	
1. Healthy-healthy pairs								
2. Unhealthy-unhealthy food pairs	0.013	0.118						
3. Unhealthy-healthy food pairs	0.263	0.259	0.178	0.146				
4. Dieting Status	-0.289	-0.15	0.133	-0.247	0.215	-0.298		
5. Problematic Self-control	-0.192	-0.206	0.133	0.018	0.194	-0.027	.383*	.505**

* <.05, ** <.01, *** <.001

Further, we investigated whether dieting status was associated with different food categorisations in each condition. There were similar correlational patterns between dieting status and the food pairs in each condition. In the health prime condition, there was a marginal correlation between dieting status and healthy-healthy food categorisations (r = -.2, p = .060), however, there were no correlations in response to the unhealthy-unhealthy food pairs (r = .13, p = .394) and unhealthy-healthy (r = .21, p = .165) as shown in table 2.1. In the control condition, there were no correlations between dieting status and healthy-healthy food pairs (r = -.15, p = .336) or unhealthy-unhealthy food pairs (r = -.24, p = .110). However, there was a marginally significant correlation between dieting status and unhealthy-healthy food pairs (r = -.29, p = .053). This means that more dieting status was associated with more completing classifications of unhealthy-healthy food pairs in the control condition. This indicates that dieters show a tendency to identify more conflict in response to the unhealthy-healthy food pairs in the health prime condition compared to the control condition.

Appendix B

Correlational analyses were performed to understand the characteristics and associations between the different self-control variables and processes. Dieting was positively associated with weight fluctuation (r = .3, p < .01) and health concern (r = .3, p < .01). Additionally, weight fluctuation was positively correlated with health difficulties (r = .3, p < .01). Health concern was negatively correlated with difficulties (r = -.3, p < .01) and positively with health importance (r = .7, p <.001). Interestingly, trait self-control was associated with more health concern (r = .3, p <.001), health importance (r = .3, p < .01), fewer difficulties (r = -.44, p < .001) and less BMI (r = -.2, p =.050). There was a correlation between exercise and health concern (r = .24, p < .01), health importance (r = .2, p =.027) and difficulties (r = -.2, p =.029).

Table 3.1 Correlation between the self-control variables

Correlations

Variable	1	2	3	4	5	6	7
1. Health Importance							
2. Health Difficulties	-.222*						
3. Trait Self-control	.287**	-.440**					
4. Problematic Self-control	.500**	.734**	-.191*				
5. Weight Fluctuation	0.054	.301**	-0.102	.305**			
6. Exercise	.207*	-.205*	.272**	-0.036	0.009		
7. Dieting Frequency	.237**	.245**	-0.063	.383**	.527**	0.023	
8. BMI	-0.06	.258**	-.183*	.185*	0.106	-0.105	0.133

* <.05, ** <.01, *** <.001

We explored further correlations to understand the relationship between the individual differences and food categorisations. More health commitment was associated with more complementing classifications of healthy-healthy food (r = -.22, p = .018) but not with unhealthy-unhealthy (r = -.05, p = .581) or unhealthy-healthy food pairs (r = -.18, p = .050). There were no correlations between difficulties in eating healthily and the healthy-healthy (r = .15, p = .090) or unhealthy-unhealthy food pairs (r = -.007, p = .939) as shown in table 3.2. However, there was a correlation between difficulties in eating healthily and unhealthy-healthy food pairs (r = .11, p = .015). Further, there was no relationship between dieting status and the different food pairs, healthy-healthy (r = -.03, p = .698), unhealthy-unhealthy (r = .01, p = .907) or unhealthy-healthy (r = -.06, p = .514). Similarly, there were no correlations between exercise and the categorisation responses of the food pairs, healthy-healthy (r = -.02, p = .789), unhealthy-unhealthy (r = -.007, p = .939) or unhealthy-healthy food pairs (r = -.09, p = .342). Moreover, problematic self-control was not correlated with responses to the different food pairs, healthy-healthy (r = .006, p = .946), unhealthy-unhealthy (r = -.07, p = .409) or unhealthy-healthy (r = .2, p = .064).

Table 3.2 Correlation between the self-control variables and food pairs

Correlations

Variable	1	2	3	4	5	6	7
1. Problematic Self-control							
2. Exercise	-0.036						
3. Unhealthy-unhealthy food pairs	-0.077	-0.007					
4. Healthy-healthy food pairs	0.006	-0.025	.348**				
5. Unhealthy-healthy food pairs	0.172	-0.09	.212*	.262**			
6. Dieting Status	.383**	0.023	0.011	-0.036	-0.061		
7. Health difficulties	.734**	-.205*	-0.007	0.157	.224*	.245**	
8. Health Commitment	-.244**	.262**	-0.052	-.219*	-.182*	-0.042	-.838**

* <.05, ** <.01, *** <.001

Furthermore, we investigated the correlations in each condition to examine whether the health prime influenced the relationship between the individual differences and the categorisation of the different food pairs. There were no differences between the conditions in the correlations between dieting status and the food pairs. Specifically, in the health prime, dieting status was not correlated with the categorisation of healthy-healthy (r = -.05, p = .694), unhealthy-unhealthy (r = -.08, p = .517) or unhealthy-healthy food pairs (r = .10, p = .452) as shown in table 3.3. Similarly, in the control condition, there were no correlations between dieting status and food categorisations of healthy-healthy (r = -.05, p = .685), unhealthy-unhealthy (r = -.03, p = .788) or unhealthy-healthy pairs (r = .08, p = .540).

We investigated whether condition influenced the categorisation of unhealthy and healthy food pairs through the moderating role of dieting status as in the pilot study. The results show no main effect of condition, b = -.05, t(113) = -.12, p = .900, 95% CI [-.96, .84] or dieting status, b = .38, t(113) = .63, p = .526, 95% CI [-.8, 1.5]. Similarly, there was no interaction between condition and diet, b = -.13, t(113) = -.37, p = .709, 95% CI [-.85, .58].

Table 3.3 Correlation between the self-control variables and food pairs in each condition

Correlations

Condition	Health Prime	Control	Health Prime	Control	Health Prime	Control	Health Prime	Control
Variable	1		2		3		4	
1. Problematic Self-control								
2. Unhealthy-unhealthy food pairs	-0.05	-0.053						
3. Healthy-healthy pairs	0.047	0.028	0.202	.421**				
4. Unhealthy-healthy food pairs	.294*	-0.105	0.147	.396**	0.158	.494**		
5. Dieting Status	0.157	0.189	-0.088	-0.035	-0.054	-0.053	0.103	0.08

* <.05, ** <.01, *** <.001

We also investigated whether problematic self-control was associated with different responses in the categorisation of food in each condition. In the health prime condition, there was no correlation between problematic self-control and the responses to the healthy-healthy (r = .05, p = .732) or unhealthy-unhealthy food pairs (r = -.05, p = .715). However, there was a

correlation between problematic self-control and the categorisation of the unhealthy-healthy food pairs (r = .3, p = .028) as shown in table 3.3. In the control condition, however, there were no correlations between problematic self-control and the food categorisations, healthy-healthy (r = .028, p = .831), unhealthy-unhealthy food pairs (r = -.05, p = .688) or unhealthy-healthy (r = -.11, p = .422). Importantly, there is an indication that those with problematic self-control showed more conflicting categorisations in response to the unhealthy-healthy food pairs in the health prime condition compared to those in the control condition who showed a tendency of more complementing categorisations. Therefore, we will explore whether problematic self-control moderates the relationship between condition and the categorisation of unhealthy and healthy food pairs, namely, conflict identification.

Appendix C

The Relationship between Individual Differences and the Categorisation of Food and Food Choice

We performed correlational analyses to explore the relationship between the individual differences and the categorisation of food pairs. There were no correlations between trait self-control and the classification of unhealthy-healthy food pairs, (r = -.01, p = .897) or healthy-healthy food pairs, (r = -.05, p = .363). Interestingly, higher levels of trait self-control were associated with more conflicting classifications of unhealthy-unhealthy food pairs, (r = .15, p = .007).

We conducted further correlations to explore the association between individual differences and food choice. Trait self-control was negatively correlated with the behavioural intentions of food choice, (r = -.13, p = .018). This suggests that higher levels of self-control are associated with healthier food choices. In particular, there was a significant correlation between trait self-control and the food choice of novel food items, (r = -.15, p = .007). However, there was no correlation between trait self-control and the food choice of repeated food items, (r = -.07, p = .188).

The difficulties in eating healthily were correlated with differences in food choice. Specifically, higher scores on the difficulties in eating healthily were associated with unhealthier food choices, (r = .13, p = .020). There was a correlation between these difficulties and food choice of novel food items (r = .14, p = .013) but not repeated food items (r = .08, p = .140). Similar findings suggest that higher scores on the importance of eating healthily are associated with healthier food choices, (r = .14, p = .009). There was a correlation between the importance of eating healthily and the food choice of novel food items, (r = -.12, p = .033). Similarly there was a correlation between the importance of eating healthily and the food choice of repeated food items, (r = -.12, p = .026).

In line with our hypotheses, the findings suggest that more self-control as shown by higher scores on trait-self-control, the importance of eating healthily and fewer the difficulties in the pursuit of healthy eating are associated with healthier food choices of novel food items.

Table 4.1 Correlation between the self-control variables, the categorisation of the food pairs and food choices

Correlation Variable	1	2	3	4	5	6	7	8	9
1. Trait Self-control									
2. Health Difficulties	-.500**								
3. Health Importance	.164**	-0.083							
4. Novel Food Choice	-.150**	.137*	-.118*						
5. Repeated Food Choice	-0.073	0.082	-.123*	.411**					
6. Food Choice	-.130*	.129*	-.143**	.824**	.855**				
7. Unhealthy-healthy Food Pairs	-0.007	.169**	0.013	-0.073	-.191**	-.161**			
8. Healthy-healthy Food Pairs	-0.05	.130*	-.211**	.145**	.138*	.168**	.346**		
9. Unhealthy-unhealthy Food Pairs	.148**	-0.087	0.004	-.212**	-.146**	-.212**	.209**	.331**	

10. Food Choice									
Reaction Time	-0.065	-0.003	-0.007	-0.001	-0.015	-0.01	-.119*	-0.081	-0.002

* <.05, ** <.01, *** <.001

The Relationship between the Categorisation of Food and Food Choice

Correlational analyses were performed to understand the effects of the categorisation of food and food choice. The results showed a negative correlation between the categorisation of unhealthy-healthy food pairs and food choice, (r = -.16, p = .004). This suggests that more conflicting classifications of unhealthy-healthy food were associated with healthier food choices. This correlation was significant for repeated food items, (r = -.19, p <.001) but not novel food items, (r = -.07, p = .185). Interestingly, more conflicting classifications of unhealthy-healthy food are associated with faster reactions of food choice, (r = -.12, p = .031). This suggests that when people identify more conflict they are faster at resolving conflicts.

Additionally, the categorisation of the different food pairs, unhealthy-unhealthy and heal-healthy, were associated with differences in food choice. Specifically, more conflicting classifications of unhealthy-unhealthy food pairs were associated with healthier food choices, (r = -.2, p < .001) for both novel, (r = -.2, p < .001) and repeated food items (r = -.14, p = .008). Similarly, more complementing classifications of healthy-healthy food pairs were associated with healthier food choices, (r = .17, p = .002) for both novel, (r = .14, p = .008) and repeated food items (r = .13, p = .012). These findings suggest that more conflict identification shown by more conflicting classifications of unhealthy-unhealthy food and healthy-healthy food was associated with healthier food choices.

Appendix D

The Effects of Condition on the Behavioural Intentions of Food Choice Moderated by Dieting Status

We also explored the differences between the conditions in response to novel and repeated food items moderated by dieting status. For novel food items, there were no main

effects of condition on food choice, b = .08, t(324) = 1.42, p = .155, 95% CI [-.03, .20] or dieting status, b = .08, t(324) = 1.11, p = .266, 95% CI [-.06, .23]. Additionally, there was no interaction between condition and dieting status on food choice, b = -.05, t(324) = -1.14, p = .253, 95% CI [-.14, .03].

The Effects of Condition on The Behavioural Intentions of Food Choice Moderated by Problematic Self-Control

We further explored whether problematic self-control moderated the relationship between condition and food choice using moderation analyses. There were no main effects of condition on food choice, b = -.01, t(324) = -.17, p = .860, 95% CI [-.17, .14] or problematic self-control, b = -.01, t(324) = -.39, p = .693, 95% CI [-.06, .04]. Furthermore, there was no interaction between condition and problematic self-control on food choice, b = .01, t(324) = .53, p = .594, 95% CI [-.02, .04].

In addition, we assessed the differences between the conditions in response to novel and repeated food items moderated by problematic self-control. For novel food items, there were no main effects of condition on food choice, b = .06, t(324) = .71, p = .477, 95% CI [-.11, .25] or problematic self-control, b = .02, t(324) = .70, p = .484, 95% CI [-.03, .07]. There was no interaction between condition and problematic self-control on food choice, b = -.01, t(324) = -.49, p = .619, 95% CI [-.04, .02].

For repeated food items, there were no main effects of condition on food choice, b = -.09, t(324) = -.94, p = .349, 95% CI [-.29, .10] or problematic self-control, b = -.04, t(324) = -1.27, p = .202, 95% CI [-.10, .02]. Furthermore, there was no interaction between condition and problematic self-control on food choice, b = .02, t(324) = 1.3, p = .189, 95% CI [-.01, .06].

The Effects of Condition on the Behavioural Intentions of Food Choice Moderated by Conflict Identification

Lastly, using a moderation analysis, we assessed whether conflict identification moderated the relationship between condition and food choice. There were no main effects of

condition on food choice, b = .02, t(324) = .30, p = .758, 95% CI [-.12, .16] or conflict identification, b = -.02, t(324) = -.87, p = .382, 95% CI [-.08, .03]. Furthermore, there was no interaction between condition and conflict identification on food choice, b = -.01, t(324) = -.02, p = .985, 95% CI [-.03, .03].

We also explored the differences between the conditions in response to novel and repeated food items moderated by conflict identification. For novel food items, there were no main effects of condition on food choice, b = -.01, t(324) = -.11, p = .908, 95% CI [-.17, .15] or conflict identification, b = -.02, t(324) = -.69, p = .490, 95% CI [-.09, .04]. Additionally, there was no interaction between condition and conflict identification on food choice, b = .01, t(324) = .32, p = .748, 95% CI [-.03, .05]. For repeated food items, there were no main effects of condition on food choice, b = .05, t(324) = .60, p = .544, 95% CI [-.12, .23] or conflict identification, b = -.02, t(324) = -.77, p = .440, 95% CI [-.10, .04]. Furthermore, there was a no interaction between condition and conflict identification on food choice, b = -.01, t(324) = -.32, p = .743, 95% CI [-.05, .04].

Chapter 5
General Discussion

Summary

Conventionally, it was understood that willpower is a limited resource which depletes overtime causing self-control failure (Baumeister, 1994). Over the past decades, extensive research has studied self-control with different views and debates on the definition of self-control. Some define self-control as an effortful ability to inhibit and suppress impulses arising from temptations that activate an automatic desire (Hofmann et al., 2009; Metcalfe & Mischel, 1999). Others view self-control as an automatic and effortless process in which one motive is pursued over another (Fujita, 2011; Gillebaart et al., 2016). More recently, theorists define self-control as the ability to resolve conflict between immediate temptations and long-term goals (Gillebaart et al., 2020; Milyavskaya et al., 2017).

Despite growing evidence showing that conflict between temptations and long-term goals is a core component of self-control, there have been different accounts on how conflict is conceptualised and how it influences self-control. While there have been recent accounts to suggest that successful self-control is associated with an increase in the experience of conflict (Becker et al., 2019), others argue that the avoidance of such conflict facilitates successful self-control (Duckworth et al., 2016; Gillebaart et al., 2016). However, there has been relatively little research on how the perception of conflict influences self-control. Such that, it is not yet clear what activates self-control. Therefore, we build on the theory of conflict identification which suggests that one must first identify conflict in order to activate self-control (Myrseth & Fishbach, 2009). Specifically, in this thesis, using a number of methodological approaches and measures, we investigate the role of conflict identification and how it is influenced by individual and situational factors.

In this thesis, across a series of studies, there was some evidence to support the hypothesis that conflict identification is required to activate self-control. The results show that in situational conditions in which the saliency of long-term goals is reduced (i.e., unhealthy eating norms and the absence of goal cues), people with self-control difficulties struggle to identify

conflict, which subsequently impairs their self-control. While some evidence suggests that there is a relationship between individual differences and situational contexts in conflict identification, there were inconsistencies in the findings that I will discuss in more detail below.

In this final Chapter, I will first discuss the findings and their relation to the literature. Following this, I will discuss the implications and address the limitations of the current research. Finally, I will conclude this Chapter by suggesting recommendations and avenues for future research.

Aims of the Research

The aim of the current research was to investigate how and when self-control is activated to understand the underlying mechanisms of self-control. We defined conflict identification as the ability to recognise a discrepancy between immediate temptations and long-term goals (Myrseth & Fishbach, 2009). That is, the ability to resist temptations relies first on the identification of conflict. Importantly, we aimed to investigate the factors that determine conflict identification. In particular, we aimed to explore whether conflict identification differs according to individual differences and situational contexts and how this influences self-control. We also aimed to link this research to the existing self-control literature to improve the understanding of conflict identification. To this end, we investigated whether difficulties in the identification of conflict impair one's self-control.

In Chapters 2 and 3, we investigated three research questions: 1) do people perceive tempting unhealthy food more healthily (i.e., less problematic) when in-group members like and eat it (i.e., situational contexts)? 2) is this perception influenced by individual differences such as dieters and people with problematic self-control? and 3) does this perception influence one's behavioural intentions.

Furthermore, in Chapter 4, we aimed to develop and test a new measure of conflict identification. Specifically, we examined how goal activation influences the perception of conflict between unhealthy and healthy food pairs. In particular, whether one sees these food pairs as complementing or conflicting one another and how this is influenced by individual

differences. We also investigated whether the perception of conflict influences subsequent food choices.

Overview of the Findings

In Chapter 2, we first developed a paradigm to induce unhealthy eating norms by categorising the participants to a bogus group of similar others based on their shared demographics to create group membership (i.e., in-group) and establish an identification with the group's norm. Such that, social norms influence peoples' behaviour more strongly when they identify with the referent group (Liu et al., 2019). Therefore, the participants were told that they would be presented with data on their in-groups' food preferences and eating behaviour. In the first study, we examined whether unhealthy eating norms projecting the food preferences and eating behaviour of one's in-group influence the appeal and health perception of unhealthy tempting food. We found that when presented with unhealthy eating norms, the participants rated unhealthy food more healthily. However, the unhealthy eating norms did not influence the appeal ratings. Previous research suggests that people conform more to others' preferences compared to their actions (Tu & Fishbach, 2015). This suggests that it was likely that the social norm induction may not have been strong enough to influence the appeal of food. Therefore, in the second study, we explored whether this effect differs when exposed to in-groups' food preferences compared to their eating behaviour. The findings showed that social norms conveying in-groups' food preferences but not their eating behaviour influenced the appeal and health perception of unhealthy food. Accordingly, the findings suggest that people like unhealthy food more and see it more healthily when their in-group members like it. This may indicate a licensing effect, in which, people license their desire to indulge by seeing unhealthy food more healthily. In contrast, if the effect would have occurred when the participants saw statements of their in-group members eating the food, it would have indicated that people use social norms as a proxy for judging the healthiness or safety of food. In the third study, we wanted to look more closely into this potential licensing mechanism to explore the motivation to indulge in the temptation. Thus, we changed the appeal question to the desire for unhealthy food. We also

explored the effects of social influence on other self-control measures such as the responsibility for this desire and the health perception as well as purchase intentions. This was tested to understand the mechanisms and consequences of conflict identification. We did not find any effects of the social influence manipulation on these self-control measures in first instance. However, we found that unhealthy food is perceived more healthily only when people desire that food. Interestingly, this could suggest that people use unhealthy eating norms to support their desires and justify their choices.

In sum, we explored the factors that determine conflict identification. In addition, we investigated how conflict identification influences self-control. Across these three studies, the findings show that when a person is presented with unhealthy eating norms, unhealthy food is perceived more healthily. This suggests that unhealthy food is not perceived to be in conflict with one's long-term goals. Furthermore, we find that this effect is enhanced when a person desires unhealthy food.

In Chapter 3, we further explored how unhealthy eating norms influence conflict identification. In the first study, we aimed to replicate the effects shown in Chapter 2 using unhealthy food without the inclusion of healthy food to induce strong unhealthy eating norms. We did not find a main effect of social norms on the outcome variables but it was moderated by individual differences. Specifically, the findings demonstrated that in the presence of unhealthy eating norms, people with higher compared to lower levels of health commitment as measured by the importance and ease in pursuing one's health goals, showed a reduction in the desire for unhealthy food as well as fewer intentions to purchase unhealthy food. This suggests that social norms may have caused contrast effects in people with higher levels of health commitment. This means that social norms could have evoked a perception of dissimilarity to the group among health committed individuals, whereby, they differentiated themselves from the group's norm. According to these findings, we conducted a second study to investigate the effects of social norms on peoples' appeal and health perception of tempting unhealthy food using a more subtle

social influence manipulation to induce a false consensus. In particular, we aimed to manipulate the participants' beliefs about their in-groups' food preferences to subtly induce a healthy or an unhealthy eating norm. We did not find a main effect of the social influence manipulation on the appeal or health perception of food but it was moderated by individual differences. That is, in the presence of unhealthy eating norms, people with more health commitment demonstrated an unhealthier perception of unhealthy food. The findings suggest a similar effect of a perception of dissimilarity as shown in the first study, whereby, we assume that unhealthy eating norms may have triggered a perception of dissimilarity to the group in health committed individuals. Thus, people with higher levels of health commitment perceived unhealthy food more unhealthily.

Summing up, in Chapters 2 and 3, we employed various methods to induce unhealthy eating norms as well as different measures of conflict identification to investigate the underlying mechanisms of self-control. The findings suggest that health commitment could be a protective factor against the influence of social norms. In particular, in the first study of Chapter 3, we found that health committed individuals showed a decrease in the desire and intentions to purchase unhealthy food in the presence of unhealthy eating norms. Similarly, in the second study in this Chapter, individuals with higher levels of health commitment showed an unhealthier perception of unhealthy food.

In Chapter 4, we investigated the role of goal activation on conflict identification to understand how goal saliency facilitates self-control processes. We developed a new Categorisation task as a measure of conflict identification to examine peoples' classifications of temptations and goals (i.e., unhealthy and healthy food pairs) as a perception of conflicting or complementing one another. In the pilot study, the findings showed that when health goals were activated, dieters demonstrated a tendency to identify more conflict between temptations and long term goals. In the second study, we aimed to replicate and extend these findings. Similarly, we found that people with problematic self-control (i.e., more importance and difficulties in eating healthily) showed more conflicting classifications of unhealthy and healthy food pairs

when health goals were activated. In the third study, we included a behavioural intention task to examine peoples' food choices to understand the effects of goal activation and the classifications of food pairs on subsequent food choices. The findings showed that goal activation enhanced conflict identification. When goals were activated, people identified more conflict between unhealthy and healthy food pairs shown by more conflicting classifications. Interestingly, this effect was moderated by problematic self-control and marginally by dieting status. This suggests that people who highly value their health goals, yet experience difficulties in its pursuit, may succumb to temptations due to a lack of conflict identification rather than deficits in inhibitory control. Furthermore, goal activation facilitated healthier food choices in people with problematic self-control through enhanced conflict identification in the categorisation of food pairs.

Summing up, across the studies, the evidence supports the main hypothesis of this thesis which shows that conflict identification is a pre-requisite for the activation of self-control processes. A detailed summary of the aims and findings of each chapter is presented in table 1. In the following sections, we will discuss the findings in view of existing literature.

Table 1. Summary of the Findings

Chapters	**Aims**	**Self-Control (Conflict Identification) Measure, Moderators and Behavioural Measures of SC**	**Findings**
Chapter 2	1) Investigate the influence of social norms on peoples' conflict identification (i.e., health perception)	Studies 1 & 2: The appeal and health perception of unhealthy food.	Study 1: Unhealthy food was perceived more healthily in the unhealthy eating norm (i.e., a condition that

	and whether this perception influences their behavioural intentions in food-related self-control dilemmas. 2) Explore whether the effects of social norms on conflict identification are moderated by the desire for unhealthy food and the responsibility for this desire as well as individual differences.	Study 3: The desire, health perception, responsibility for desire and purchase intentions of unhealthy and healthy food.	showed the participants their in-groups' food preferences and eating behaviour) compared to the control condition. Study 2: Unhealthy food was rated as more appealing and perceived more healthily in the unhealthy eating norm (in-groups' food preferences) compared to the control condition. Study 3: The desire for unhealthy food was associated with a healthier perception of unhealthy food in the unhealthy eating norm compared to the control condition. Additionally, a healthier perception

			of unhealthy food was associated with an increase in wanting to purchase unhealthy food.
Chapter 3	1) Examine the effects of social norms on the health perception of food and how this influences the intentions to purchase unhealthy food. 2) Investigate whether this perception is moderated by the desire for unhealthy food and individual differences.	Study 1: The desire, health perception, responsibility for desire and purchase intentions of unhealthy food. Study 2: The appeal and health perception of unhealthy and healthy food.	Study 1: In the presence of unhealthy eating norms, health commitment was associated with less desire and fewer purchase intentions of unhealthy food. Study 2: Higher levels of health commitment were associated with an unhealthier perception of unhealthy food.
Chapter 4	Examine the effects of goal activation on the perception of conflict. We also explored the relationship between goal activation, the	Pilot, studies 1 & 2: The categorisation of unhealthy and healthy food as complementing or conflicting one another (i.e., the perception of food pairs).	Pilot study: When health goals are activated, dieters show a tendency to identify more conflict between temptations and long-term goals.

	perception of conflict and food choice.	Study 3: The categorisation of food pairs and food choice in a behavioural intention task.	Study 2: People with impaired self-control identify more conflict when health goals are made salient. Study 3: Conflict identification is facilitated when goals are made salient compared to when they are not. In the goal activation condition, dieters and people with problematic self-control show an increase in conflicting classifications of unhealthy and healthy food. Specifically, when health goals are activated, dieters and people with problematic self-control show healthier food choices through an

			increase in conflict identification compared to the control condition.

The Effects of Social Norms on Conflict Identification

In Chapter 2, we first found that seeing the food preferences of one's in-group as well as their eating behaviour resulted in healthier ratings of unhealthy food but did not influence the appeal ratings. Interestingly, in the second study, we found that seeing the eating behaviour of in-group members did not influence the participants' appeal or health perception. However, when the participants saw their in-groups' food preferences they showed more appeal ratings and perceived unhealthy food more healthily. Although these findings are in line with recent research showing that people report a healthier perception of unhealthy food when they are presented with others' food preferences (Templeton et al., 2016), our findings provide a different perspective into why people are influenced by social norms that extends the theory of norm internalisation (Edelson et al., 2011). Given that this effect was only evident when the participants saw others' preferences, we believe that people may use unhealthy eating norms to justify their desire for unhealthy food by making the food appear healthier and less problematic for their health goals.

We further explored this licensing effect in a third study using other self-control measures such as the desire for unhealthy food, the responsibility for this desire and the health perception of unhealthy food. This was tested to understand the mechanisms of conflict identification to look more closely into wating the temptation. We also explored the participants' purchase intentions as a consequence of conflict identification. There were no main effects of social norms on any of the self-control measures; the desire, responsibility, health perception or purchase intentions of unhealthy food. However, we found that the desire for unhealthy food moderated the effects of social norms on the perceived healthiness of unhealthy food. This

means that in the presence of unhealthy eating norms, higher compared to lower ratings in the desire for unhealthy food were associated with a healthier perception of unhealthy food. Thus, we assume that this change in health perception could be a consequence of wanting to license the desire for this food. This means that an increase in the perceived healthiness of unhealthy food could be a result of an increase in the motivation of desiring (i.e., wanting) unhealthy food. Such that, one may choose not to see conflict because the indulgence is licensed by desire (Fishbach & Dhar, 2005). Consistent findings show that people often search for information to support and justify their choices and behaviour in the moment (Mullen & Monin, 2016; Prinsen et al., 2018).

Importantly, we also find that health perception moderated the influence of social norms on the purchase intentions of unhealthy food. The results suggest that healthier ratings of unhealthy food were associated with an increase in the intentions to purchase unhealthy food. This suggests that people want to purchase unhealthy food when it is perceived more healthily. Some evidence suggests that people license their desires when they experience a goal conflict (de Witt Huberts et al., 2012). This indicates that they experience more conflict because of a stronger pull of temptations. On the other hand, according to our findings, we argue that an increase in the perceived healthiness of unhealthy food is associated with a reduced perception of the detrimental costs of the temptation (i.e., less conflict is identified). In line with this reasoning, previous findings suggest that when conflict is not identified, self-control processes are not activated to refrain from temptations (Myrseth & Fishbach, 2009). Instead, licensing occurs because an individual wants and desires the temptation and thus, supports this indulgence. This suggests that biases in health perception as a consequence of social influence are potentially limited to situations that induce liking of food. That is, desiring unhealthy food in the moment, impairs one's health perception.

Summing up, the findings provide a more detailed understanding of the transmission of social norms beyond social modelling. Such that, unhealthy eating norms impair the health perception of desired unhealthy food. The findings also highlight a new approach in

understanding the problems that contribute to unsuccessful self-control. However, there were some inconsistencies in the findings. Therefore, these studies should be replicated using larger sample sizes to test the consistency of the findings.

The Relationship between Individual Differences and Social Norms in Conflict Identification

In Chapter 3, we found unexpected effects of social norms on the perceived healthiness of unhealthy food. The findings showed that health committed individuals reported less desire and fewer purchase intentions of unhealthy food in the presence of unhealthy eating norms and perceived unhealthy food more unhealthily. We explain these findings using the theory of dissociation, whereby, social norms could have caused health committed individuals to go against the norm by differentiating themselves from the group's norm. This indicates that social norms could have evoked a perception of dissimilarity between the individual and the group, causing this contrast. Consistent evidence shows that people deviate from the groups' norm when the group is perceived to be dissimilar (Berger & Heath, 2007; McFerran et al., 2009).

We also propose another possible explanation, in which, when exposed to social norms, health committed individuals may have experienced more motivation to pursue one's personal and/or groups' collective goal. In line with this reasoning, it is also possible that social norms may have activated a healthy identity in health committed people, in which, they identified more conflict. Such that, research shows that when people are primed with health goals as an identity, they select healthier food choices (Dominick & Cole, 2020).

Importantly, the findings could provide a different approach in the understanding of how successful self-controllers avoid conflict (Duckworth et al., 2016). According to our research, the findings suggest that successful self-controllers may avoid goal conflicts as a consequence of enhanced conflict identification, whereby, they anticipate conflict before they encounter it.

In sum, the findings demonstrate that in health committed individuals, social norms may have caused reactions that were opposite to the norm. This indicates that health commitment

may be a protective factor against social influence. However, it is crucial that we test these interpretations in future research.

The Effects of Goal Activation on Conflict Identification

In Chapter 4, we aimed to examine how peoples' perception of food associations related to temptations and goals is influenced by their current level of conflict identification. To this end, we developed a measure of conflict identification that investigated how people perceive unhealthy and healthy food pairs (they can be seen paired together in a UK context) as conflicting or complementing one another. We proposed that a more conflicting compared to a completing perception would signal more conflict identification. We found that goal activation facilitated spontaneous conflict identification, in which more conflict between unhealthy and healthy food was identified. Across the studies, the spontaneity of conflict was shown as we did not explicitly nudge the participants into seeing a conflict. Importantly, people with problematic self-control showed an increase in conflicting classifications of food pairs when their goals were activated, consequently, healthier food choices were made. These findings improve the understanding of the factors that contribute to problems in goal pursuit. Consistent evidence shows that dieters divert their attention away from temptations when goals are activated (Kleiman et al., 2016). This suggests that goal activation enhances the identification of conflict. Previous evidence also showed that people with problematic self-control consumed more food in the absence of a dieting prime, however, when primed with diet-related stimuli, their food intake was reduced (Papies & Hamstra, 2010). Therefore, our findings could suggest that people choose to consume food that is not in line with their health goals because they face difficulties in the recognition of conflict.

While the findings suggest that goal activation facilitates conflict identification, it is not clear what influences these changes in the perception of conflict. For instance, it could be that one's motivation to achieve their long-term goals increases when goals are salient. It has been found that when people assign greater benefits to their long-term goals, they are more successful

in goal attainment (Fishbach & Trope, 2005). Alternatively, one could experience more self-efficacy in the ability to pursue their goals, and therefore, identifies more conflict when goals are activated. Furthermore, these changes in conflict identification could be due to an increase in the perceived value of goals and the devaluation of temptations. Specifically, the saliency of goals could have boosted the value of healthy food and devalued unhealthy food. Past research shows that positive evaluations of goals compared to negative evaluations of temptations facilitated more goal directed behaviour (van der Laan et al., 2017). Thus, future research should explore whether changes in motivation, perceived self-efficacy or the evaluation of goals influence conflict identification.

Although it is not exactly clear what caused goals to influence conflict identification, this research extends previous work suggesting that goal activation enhances conflict identification. In particular, when people with difficulties in self-control are reminded of their health goals, they identify more conflict between temptations and long-term goals and importantly, choose more healthily as a consequence. This provides initial evidence to further understand why people experience difficulties in pursuing their long-term goals. This suggests that they face difficulties in the identification of conflict in the absence of directly activated health goals.

Taken together, the evidence presented in this research demonstrates the factors that influence self-control. The findings show how problems in conflict identification contribute to impaired self-control. In this next section, I will present explanations against potential arguments that challenge the interpretation of the findings.

In this thesis, we aimed to explore whether social norms influence conflict identification through changes in desire, responsibility and perceived healthiness of food and whether these changes translate to behaviour. In addition, we investigated whether goal activation increased conflict identification and whether this facilitated the intentions to choose healthier food options. One could argue that the measure of behavioural intentions does not capture actual behaviour. We provide two possible explanations that argue against this critique. First, research suggests

that behavioural intentions are a strong predictor of behaviour (Wood et al., 2016). Second, the findings in Chapter 2 show significant effects of social norms moderated by desire and perceived healthiness of unhealthy food on peoples' purchase intentions. Similarly, in Chapter 3, health commitment was associated with fewer purchase intentions in the presence of unhealthy eating norms. Lastly, in Chapter 4, we found that when goals were activated, dieters and people with problematic self-control showed an increase in the intentions to choose healthier food options. Thus, given that these behavioural intentions were associated with changes in a number of self-control processes and varied according to individual differences in the presence of social norms and when goals were made salient, raises our confidence in the validity of this measure.

Another issue we address is that we did not have a measure on how credible the participant's perceived these norms to be. One could argue that the participants may not have believed these norms. However, our findings speak against this, showing that social norms influenced desire, health perception and also purchase intentions. Importantly, we found how social norms influenced the relationship between these self-control measures and individual differences. Therefore, we believe that the social influence manipulation was successful in inducing credible social norms.

Lastly, we address another potential concern of whether the question of health perception measures conflict identification. In Chapters 2 and 3 we tested the health perception of food as a measure of conflict identification. Specifically, we measured whether people perceived food items as healthy or unhealthy for several reasons instead of directly asking the participants whether they are seeing a conflict or using more complicated measures. First, this question does not nudge people to think and thus perceive a conflict and might therefore come closer to real life conditions where people will often not consciously consider and ponder on the relations of items and actions with their goals. Second, considering an item as healthier or unhealthier taps into the conceptualization of conflict that we apply here, that is, a judgment of how far an item supports or harms a health goal. Therefore, this measure seemed ideal to address our questions,

also because previous research has used it successfully (Sah et al., 2021; Templeton et al., 2016). It is however important to see that this is different from conceptualizations that refer to an affective conflict (e.g., being 'torn' between two options) such as other authors have suggested (Becker et al., 2019; Gillebaart et al., 2016). Furthermore, in our studies, we provide evidence that suggests how these measures do in fact capture conflict identification. The findings in Chapter 2 showed how social norms biased peoples' health perception. This suggests that the perception of conflict was distorted shown by a less problematic perception of tempting unhealthy food. In the presence of social norms, healthier ratings of unhealthy food increased peoples' intentions to purchase unhealthy food. This means that conflict as measured by health perception was reduced and thus, people wanted to pursue unhealthy food because of a lack of conflict identification (i.e., healthier perception). Moreover, in Chapter 3, we see that health committed people identified more conflict (i.e., unhealthier perception) in the presence of unhealthy eating norms. This in line with previous findings showing that successful self-controllers are better at resolving conflicts (Gillebaart et al., 2020). This further supports and confirms the validity of our measure of conflict identification.

In a related vein, one could also question whether a complementing or conflicting perception of food pairs is a valid measure of conflict identification. We do not claim that this measures how much a person feels tempted to pursue unhealthy food, instead, we propose that this perception measures a person's ability to identify conflict. Our findings suggest that goals facilitate healthier food choices through a more conflicting perception of unhealthy and healthy food pairs in people with problematic self-control. This is supported by research showing that anticipating the obstacles to goal setting (i.e., conflict identification) predicts successful goal attainment (Fishbach et al., 2010). Indeed, our findings suggest that people with self-control difficulties show problems in identifying conflict. Previous research shows that chronic dieters' long term goal of dieting is inhibited when exposed to temptations (Stroebe et al., 2008). This indicates a lack of conflict identification. Similarly, according to our findings, people identify

more conflict when goals are made salient. Consistent evidence shows that when dieters are exposed to goal-related environmental cues they demonstrate more goal directed behaviour (Papies, 2016). This means that problems to resist temptations could be associated with a lack of conflict recognition. Therefore, since goal activation influences this perception which is also associated with individual differences and thus behavioural intentions, we believe this to be a valid measure of conflict identification.

Limitations, Implications and Future Work

Certainly, there are limitations in this research. Firstly, the results are partially inconsistent across the experiments investigating the effects of social norms on self-control processes. Specifically, the first and second experiments in Chapter 2 showed that social norms increased the perceived healthiness of unhealthy food. While, in the following experiments, there were no main effects of social norms on the health perception of food. However, in the third experiment in Chapter 2, the effects of social norms on the perceived healthiness of unhealthy food were moderated by the desire for unhealthy food. In addition, health perception moderated the effects of social norms on the purchase intentions of unhealthy food. In the first experiment in Chapter 3, we find that the effects of social norms on the desire for unhealthy food and purchase intentions were moderated by health commitment. Similarly, in the second experiment in Chapter 3, the findings demonstrated that health commitment moderated the effects of social norms on the health perception of unhealthy food.

The inconsistencies in the findings could be due to the differences in the methodologies between the experiments. In particular, in some of the experiments, healthy food stimuli were included. This inclusion or exclusion could have influenced both the dynamics of peoples' self-control and their perception of their in-groups' eating habits. For instance, seeing healthy food items could have functioned as a potential health prime, thus, a reminder of the importance of healthy eating (Fishbach et al., 2003). In addition, the inclusion of healthy food could have reinforced the participants' perception of their in-group to be lacking in their healthy eating

efforts, more so than the exclusion of healthy food. Moreover, the addition of other measures of self-control such as the desire, responsibility and purchase intentions of unhealthy food could have also influenced peoples' perception of the temptations. In addition, using various ways to manipulate the induction of social norms (e.g., explicit statements of in-groups' food preferences with the inclusion or exclusion of healthy food and an implicit false consensus task) could account for these inconsistent findings. Furthermore, the variation in the sample across the studies could have also contributed to these inconsistencies. For example, there was variance in the participants' BMI in some studies, for instance there were participants with low (i.e., healthy) or high BMI (i.e., overweight/ obese) as well as the average BMI across the studies which could have caused these inconsistent findings.

Secondly, we cannot be certain of the cause of these changes in conflict identification. Such that, it is not clear whether changes in conflict identification are due to changes in desire or commitment. For instance, a person may not see conflict because he/she desires the tempting unhealthy food and therefore, licenses this indulgence. This licensing may have been reflected as a healthier perception of unhealthy food which was associated with more intentions to purchase unhealthy food in Chapter 2. In contrast, when exposed to unhealthy eating norms, health committed individuals showed more conflict identification shown by less desire and an unhealthier perception of unhealthy food in Chapter 3. This means that a person may see conflict (i.e., an unhealthier perception), and thus, desires unhealthy food less. Alternatively, the design of the study in which participants were required to think about their beliefs in comparison to others' could have evoked a greater perception in health committed individuals of their in-group to be lacking in their efforts towards their health goals. This may have magnified their motivation to pursue their personal health goals. It is possible that when people are committed to their health goals, they might see conflict because others' lack of efforts (i.e., unhealthy eating norms) reinforces their motivation and self-efficacy to pursue their own personal goal. The findings could possibly suggest that peoples' motivation is influenced in social contexts through

the magnification of their efforts. That is, health committed individuals may have experienced more motivation and thus, did not desire the temptations. Conversely, a person with lower levels of health commitment, may have used unhealthy eating norms to license his/her indulgence, which could be associated with increased desire and reduced motivation and self-efficacy. However, this explanation should be investigated in future research.

Another explanation could be that health committed individuals experienced more motivation through an increase in the perceived value of healthy eating. Such that, this heightened their motivation to improve the group's norm and pursue the goal collectively. Indeed, people mentally share their goals with others (Oettingen & Schwörer, 2013). It could be that when people who are highly committed to their goals perceive others to be lacking in their efforts, their motivation to pursue the collective goal increases (Fishbach, 2014; Koo & Fishbach, 2008). This means that health committed individuals may have increased their efforts to compensate and rectify their in-groups' goal disengagement. Consistent research also suggests that people are more motivated to work harder to present their in-group more positively (Steinmetz et al., 2020). Taken together, the effects of social norms on one's health perception could be associated with changes in licensing, motivation or perceived self-efficacy.

Lastly, the findings cannot be generalised to real-life settings as most of the experiments were conducted online. This could explain the weakness of the findings. Such that, given the nature of the online experiments, whereby, the participants were not in the presence of others may account for the weak findings. Therefore, future research should explore whether the effects of social norms would be stronger in real life settings for some or possibly attenuated for others (e.g., health committed individuals) through a perception of contrast. Such that, anticipating an interaction with group members could further influence one's behaviour. Similarly, we tested these effects in food-related scenarios and cannot extend these findings to other self-control dilemmas. Future research should investigate whether these effects would replicate in real-life scenarios and also in other self-control domains such as smoking, alcohol consumption and

overspending. In addition, research could also investigate whether conflict identification in these domains is moderated by desire, the perception of the detrimental effects of indulgence (e.g., health and financial costs) and other variables such as goal importance and difficulty. For example, research should investigate how changes in one's perceptual responses towards other temptations, namely, conflict identification, influence the strength of the temptation to indulge, the perceived costs of indulgence and how it underlies subsequent behaviours. Given these limitations, we recommend future replications to test the consistency of these findings. Research should also explore the underlying cause of conflict identification by measuring changes in perceived self-efficacy, motivation levels and licensing tendencies.

Although the findings have some limitations, the findings show that self-control is much more complex than previously understood. This research introduces a different approach in understanding why people face difficulties and often fail in self-control which goes beyond poor inhibitory control. Such that, the inability to identify conflict may underlie the difficulties people face in pursuing their health goals. The results suggest that social norms distort peoples' conflict identification. This supports previous work which shows that social norms influence one's liking and health perception of temptations (Templeton et al., 2016). Importantly, the findings extend previous research, demonstrating that health commitment could be a protective factor against the influence of social norms shown by more conflict identification. In line with consistent evidence, people who are more successful in self-control are better at resolving conflict (Gillebaart et al., 2020). We extend these findings by showing that as well as an enhanced ability to resolve conflict, health committed people (i.e., successful self-controllers) also demonstrate effective conflict identification. In contrast, dieters and people with problematic self-control show difficulties in identifying conflict. However, conflict identification is increased when health goals are activated.

The current findings have significant theoretical contributions. Indeed, this research on conflict identification integrating individual differences and situational factors has highlighted a

new perspective in understanding impaired self-control. Using a range of methodological approaches, this thesis showed that problems to identify conflict in food-related dilemmas impair self-control and most importantly, it highlighted how this effect differs according to individual and situational differences. These findings support self-control accounts on conflict identification that suggest that the identification of conflict is required to activate self-control. This thesis makes a significant contribution to the existing knowledge on self-control and provides an understanding of how self-control is activated. Furthermore, the research into developing a new measurement of conflict identification has shown good reliability. The findings also shed light on the difficulties that contribute to impaired self-control and highlight the interaction between individual and situational factors in conflict identification. Future research should integrate these factors in the study of self-control.

The findings also have important practical implications which could assist in the development of clinical interventions aimed at supporting dieters and people with problematic self-control to recognise the health value of temptations and to identify more conflict between unhealthy and healthy food. This could help people in recognising the detrimental costs of temptations. Research should also investigate whether increasing peoples' conflict identification can reinforce healthier eating habits. Importantly, marketing campaigns could help people pursue their long-term goals by increasing the saliency of eating healthily using labels as reminders of the health benefits as well as reminders of the health value of unhealthy food. However, it is necessary to test the efficacy of such implications in future work.

Conclusion

The current research explored the role of conflict identification in food-related self-control dilemmas using various methods and manipulations such as social norms and goal activation to understand the mechanisms involved in self-control. The findings suggest that social norms influence peoples' conflict identification, specifically, their health perception of unhealthy food. These effects are moderated by peoples' health commitment and desire for unhealthy food. Importantly, health perception moderates the effects of social norms on peoples'

intentions to purchase unhealthy food. We also find that when goals are salient, people identify more conflict between unhealthy and healthy food, and subsequently, choose more healthily. The findings further show that dieters and people with problematic self-control demonstrate improved conflict identification when goals are salient compared to when they are not. In conclusion, it is evident that conflict identification is a fundamental component of self-control. This has implications for theories and potential interventions.

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