The Impact of Individual’s Beliefs on Overcoming Temptations

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Dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy in the Department of Psychology and Neuroscience in the Graduate School of Duke University

2016
ABSTRACT

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Abstract

Research has long assumed that the process of self-control involves mechanisms for overcoming temptations. Such mechanisms, however, may not necessarily be consciously deployed, and relatively little is known about how individuals’ explicit beliefs about temptations may impact their response to them. With this in mind, five studies were conducted to examine the self-regulatory impact of individuals’ general beliefs about the necessity of avoiding temptations and the potential utility of having indulged in them. These studies considered how the impact of these beliefs may themselves depend on an individual’s ability to implement self-control. Study 1 tested the connection between an individual’s decision to avoid temptations and the two beliefs on overcoming temptations – beliefs in the necessity of avoidance and in the utility of indulgence. Studies 2 and 3 examined the relationship between self-control and the general belief that the utility of indulging in temptations affects self-control related behaviors. Study 4 explored how these beliefs may impact healthy dietary choices in the face of food temptations. Finally, Study 5 employed a different task paradigm to examine how various beliefs about temptations may mitigate the negative experiences of failures in self-control. Overall, the findings indicated that a general belief in the utility of avoiding temptations may positively impact goal pursuit, especially when self-control is low. Alternatively, a belief in the value of indulging in temptations may negatively
impact goal pursuit when individuals’ self-control is low. This belief, however, may mitigate the consequences of temptation indulgence for future self-control.
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1. Introduction

Research on self-control has long recognized that a primary reason why individuals constantly fail to attain their longer-term goals is rooted in how they handle their everyday encounters with temptations (Trope & Fishbach, 2000; Hoch & Loewenstein, 1991; Fujita, 2011). Even when individuals work hard to achieve their goals, unexpected temptations may often entice them and disrupt these pursuits. Even those with a strong desire to exercise more, to eat healthier, or to spend less time on social media, may fail because they do not properly anticipate and respond to common temptations they may encounter during these pursuits. Such distraction may occur even when individuals can readily acknowledge the detrimental consequences of these mundane enticements. Indeed, avoiding such temptations can require a substantial amount of self-control, often drawn from a limited capacity (Gailliot et al., 2007). Given the threat they may pose to longer-term goals, individuals may often conclude that temptations need to be avoided entirely, whenever possible.

Students preparing for finals, for instance, may choose to study in environments that are relatively free from known temptations rather than risk exposing themselves to these distractions. Such measures may be based on the students’ belief that avoiding any potential encounters with friends in a common area will be the most effective way to deal with potential temptations. However, if students believe that simply not encountering any potential temptations does not help them to fully overcome
temptations, including future ones, they may not make much effort to avoid them. To the extent that students ultimately give in to temptation in such a situation, it may reflect a mistaken belief about the necessity of avoiding distractions in advance, rather than a deficit in their capacity for self-control generally. Moreover, the students’ belief about the consequence of indulging in a temptation may also impact self-control. If students believe that even failures to implement self-control provide them with benefits – because they learn from their mishaps – then they may potentially respond more constructively to a failure to implement self-control in the future and thus be better prepared for any potential temptations that may be forthcoming.

Effective self-control in the face of temptations, then, may arguably be determined not only by the self-control strategies that pursuers utilize to overcome temptations to which they have been exposed, but also in terms of the beliefs held by these individuals regarding the utility of avoiding them in advance as well as their beliefs about the potential impact (both positive and negative) of indulging in them. To further illustrate, consider how such beliefs may impact the way a dieter responds to the potential temptation of chocolate cookies. Their self-control beliefs may determine how readily the dieter tries to avoid chocolate cookies as well as how they respond when they happen to indulge in this temptation. The belief that indulging in one bite of chocolate cookie will help to overcome further temptation may, in fact, temporarily
reduce the craving, yet it may not guarantee that the dieter is no longer tempted by the cookies.

While much research on self-control in relation to temptations has focused self-related strategies that may aid in overcoming temptations encountered during the goal pursuit (Fishbach & Converse, 2010; Trope & Fishbach, 2000; Trope & Liberman, 2010; Gollwitzer, 1999; Mischel, 1974; Muraven & Baumeister, 2000; Dweck & Leggett, 1988), less is known about the impact of pursuers’ beliefs about temptations themselves. Early work on the operation of implicit beliefs in entity and incremental theories has shed light on the influence of pursuers’ beliefs on effective self-control (Dweck & Leggett, 1988; Job, Dweck, & Walton, 2010). However, a clear answer needs to be provided for how pursuers’ temptation-related beliefs influence their usage of self-control against temptations.

Given the cumulative implicit belief research across different self-control domains (Dweck & Leggett, 1988; Kneeland, Nolen-Hoeksema, Dovidio, & Gruber, 2016b; Job, Dweck, & Walton, 2010), understanding and evaluating the impact of temptation-related beliefs may be essential to examining what constitutes the effective management of temptation. In this dissertation, I examine how pursuers’ beliefs as to how best to overcome temptations – in particular, their beliefs about the necessity of avoiding temptations and their beliefs about the impacts of indulging in them – may influence how effectively individuals overcome temptations and how well they respond
when they do indulge. The dissertation assumes that individuals can have differing beliefs regarding the importance of avoiding encounters with temptations, as well as differing beliefs regarding what can be learned from indulging in those temptations, regardless of the consequences, both positive and negative. Ultimately, their beliefs impact upon the effectiveness of their attempts to implement self-control, which ultimately lead to either the successful or unsuccessful pursuit of their goals.

The five studies in this dissertation seek to address whether individuals’ avoidance and indulgence beliefs about temptations ultimately impact how effectively they overcome temptations and whether the impact of these beliefs itself depends on individuals’ general capacity for self-control. Specifically, these studies examine two temptations-related beliefs: individuals’ beliefs about the necessity of avoiding temptations and their beliefs about the utility of indulging in them.

Before describing the results of these studies, I will place this examination within the context of the existing literature on temptations and self-control. Then, I will review work that focuses on the pursuers’ perspectives of implicit self-related belief work on ability, self-control, and emotional regulation. Next, I will refine existing definitions of temptations, as articulated in the literature. Finally, I will review existing research that considers how self-control strategies and pursuers’ beliefs may help individuals to overcome temptations, before detailing five studies designed to explore the benefits and
drawbacks of the two beliefs about the necessity of avoiding temptations and the utility of indulging in them.

1.1 The Significance of Implicit Beliefs

Researchers on self-control have come to understand the importance of the role of pursuers’ strategies for achieving goals (Fishbach & Converse, 2010; Gollwitzer, 1999; Mischel, 1974; Muraven & Baumeister, 2000), yet less attention has been paid to how individuals manage temptations based on their beliefs, and how these beliefs influence their ability to pursue their goals successfully. Since their encounters with temptations pervade everyday life, individuals can form various, highly individualized kinds of beliefs about how best to manage them. These individualized beliefs on temptations may yield a positive or a negative outcome in terms of goal pursuit. Dweck’s (1988) social-cognitive model of implicit theories was one of the first research models to focus on the significance of implicit beliefs in terms of individuals’ ability to achieve goals, with an emphasis on how the pursuer of goals exerts his or her self-control.

1.1.1 Implicit Beliefs about Ability

Implicit beliefs are typically defined as mental working schema that influence given phenomena (Makel, Snyder, Thomas, Malone, & Putallaz, 2015). These implicit beliefs have been most widely examined by entity and incremental theorists who believe in the fixedness and malleability of ability and other self-attributes (Dweck & Leggett, 1988). Dweck and Leggett (1988) argued that individuals could possess two types of
implicit beliefs about their ability in a given domain. Individuals can have either the entity belief, believing that the ability is fixed and unable to change, or the incremental belief, believing that the ability is malleable and can be improved over time (Dweck & Leggett, 1988). Which implicit belief one holds is a crucial factor in terms of achieving academic excellence, how to respond to perceived failures, and how to maintain motivation (Makel et al., 2015). Bandura and Dweck (1985) suggest that children with incremental beliefs are more likely to pursue new experimental goals that require greater efforts than are those who have entity beliefs. Furthermore, notions of self and ability can be extended outside the domain of the ‘self’ and applied to how one thinks about others or the environment (Bandura & Dweck, 1985).

Two systems of these fixed and incremental beliefs are connected to the various coping strategies that individuals put into play when they experience failure (Davis et al., 2011; Burnette, 2010). Since individuals with entity beliefs believe that their psychological characteristics are fixed, they are more prone to indulge in maladaptive self-control strategies to manage failures in terms of the pursuit of their goals, which means that they may easily disengage from the pursuit of those goals (Davis et al., 2011; Burnette, 2010). On the contrary, individuals with incremental beliefs believe that their ability can be cultivated and improved upon; thus they see the failure as an opportunity to learn. As a result, they tend to have better coping mechanisms and are more likely to be optimistic about their failures (Davis et al., 2011; Burnette, 2010).
1.1.2 Implicit Beliefs about Self-Control

Following Dweck’s (1988) work, self-control research has underscored the importance of implicit belief theories regarding self-control, and notes that individuals’ beliefs potentially affect goal-directed behaviors (Mukhopadhyay & Johar, 2005). Individuals’ beliefs regarding self-control being either fixed or malleable impacts upon how they use the resources they have available to control temptations, which ultimately changes the way they pursue their goals and affects achievement behavior. Research on self-control suggests that the implicit self-control beliefs are either malleable or fixed. This implies that the capacity of self-control can be treated like a muscle that can be trained and strengthened over time (Muraven & Baumeister, 2000b). Other research also suggests that individuals have a lay belief in their willpower for self-control being either limited or unlimited (Mukhopadhyay & Johar, 2005). Furthermore, one study by Mukhopadhyay and Johar (2005) confirmed that individuals who believe that self-control is malleable yet limited tend to set fewer New Year resolutions than individuals who consider self-control to be fixed. Related work has suggested that this implicit belief regarding self-control leads to different social judgements toward others (Freeman, Shmueli, & Muraven, 2013). Individuals who naturally believe that self-control is fixed judge others more harshly on their ability to implement self-control (Freeman et al., 2013).
Past research has also suggested that exertion of self-control is influenced by implicit beliefs regarding one’s capacity for willpower (Job, Dweck, & Walton, 2010). Indeed, differing lay beliefs regarding willpower have been found to buffer ego depletion, which is the state that occurs when individuals no longer have the resources or power to exert self-control in regards to a certain relevant task (Job, Dweck, & Walton, 2010). Another work by Schmeichel and Vohs (2009) similarly found that individuals’ positive belief about their self-view helps to counteract potential ego depletion. In this study, half of a group of participants were asked to write about values important to them as an exercise in self-affirmation, while the other half were asked to write about less important values. The result showed that participants who had a positive self-view showed less depletion and better performance in self-control tasks (Schmeichel & Vohs, 2009). The underlying reason why a positive belief in themselves could offset ego depletion lies in the idea that focusing on an important core value could broaden one’s mind and create an opportunity to focus on goals of a higher value (Bauer & Baumeister, 2011).

Research has also discovered that individuals’ beliefs in the strength of their willpower can boost the effectiveness of self-control implementation (Job, Dweck, & Walton, 2010). A person’s belief in the strength of their willpower and self-control as being either fixed or malleable will have a significant effect on how well a person can perform in self-control exercises. Job, Dweck and Walton (2010) found that individuals
who viewed willpower as a limited resource exhibited the effects of ego-depletion. On the other hand, those who believed in willpower as an unlimited resource did not exhibit these effects (Job, Dweck, & Walton, 2010).

1.1.3 Implicit Beliefs about Emotion Regulation

Under the broader context of regulating individuals’ behavior, a similarity can be found between how individuals regulate their emotions and self-control. As self-control involves an effort to override impulses and desires in order to achieve certain goals, regulating emotions also includes a similar mechanism in which one set of emotional responses overrides another (Tice & Bratslavsky, 2000). Furthermore, the processes involved in self-control are related to our capacity to persist in pursuing goals that can potentially result in negative emotions (Tice & Bratslavsky, 2000). Individuals experiencing negative emotions may be susceptible to resisting momentary temptations, and such emotions can also often lead to failures to implement self-control (Tice & Bratslavsky, 2000). Thus, understanding how individuals’ beliefs impact emotional regulation helps to elucidate how effectively temptation-related beliefs can control temptations.

Researchers have highlighted the significant role of implicit beliefs in the domain of emotional regulation. Similar to Dweck’s work of comparing entity and incremental beliefs (1988), research on emotion regulation argues that individuals’ capacities for emotion regulation are influenced by the beliefs they hold (Kneeland, Nolen-Hoeksema,
Dovidio, & Gruber, 2016b). As such, individuals, who believe that emotions are fixed, attribute failures to achieve their goals to their inability to control their emotions (Kneeland et al., 2016b). Such individuals make less effort to change their emotions because they believe them to be static (Kneeland et al., 2016b). On the other hand, individuals, who believe that emotions are malleable, attribute their failures to situational factors, causing them to actively cope with the failure by putting in more effort to achieve the goal (Kneeland et al., 2016b). Research has found that depending on their type of beliefs, individuals’ strategies to regulate emotions vary. In one study, participants were randomly assigned to experience experimental conditions in which they were influenced to have beliefs that emotions were either malleable or fixed (Kneeland et al., 2016b). After participants were induced to experience negative emotions, they were asked to use several emotion regulation strategies to deal with the induced emotions. The results indicated that participants who believed that emotions to be fixed chose significantly different quality of emotion regulation strategies compared to those who believed emotions to be malleable (Kneeland et al., 2016b). Another recent study confirmed that individuals who have an implicit belief in the malleability of emotions put in continuous efforts to actively engage in emotion regulation (Kneeland, Dovidio, Joormann, & Clark, 2016a). Other research in sport psychology has also demonstrated that athletes who hold the meta-emotion belief – the belief that a high intensity of anxiety and anger will help accomplishment – performed better than
athletes who do not hold such beliefs (Lane, Beedie, Devonport, & Stanley, 2011; Larsen, 2009).

1.2 Defining the Nature of Temptations

Research has emphasized how pursuers’ self-beliefs may shape the processes of self-control (Dweck & Leggett, 1988; Mukhopadhyay & Johar, 2005; Kneeland et al., 2016b). In addition, pursuers’ beliefs about everyday temptations may also affect self-control. Their beliefs may ultimately influence how they come to define temptations in general. Daily activities, such as drinking a cup of coffee, watching television shows, or calling a friend, represent typical forms of temptations that may be viewed as short-term goals. However, by merely framing a short-term goal as another type of temptation, this view sacrifices the unique feature of temptations as being qualitatively different from goals (Hofmann & Kotabe, 2015). For this reason, in discussing how to overcome temptations, it is crucial to understand what it is that makes temptations unique.

Temptations generally contain immediate visceral instinct that is driven by physical needs (Loewenstein, 1996). Any stimuli that satisfy visceral instinct needs can create impulses that make temptations more salient, and these drives undermine the pursuit of long-term goals (Nordgren & Chou, 2011). An impulse that is based on the basic visceral instinct is also dominant and persistent, making it difficult to overcome with self-control (Loewenstein, 1996). For example, individuals may not notice when they do not feel thirsty. However, when a can of soda is not available and they are
thirsty, such circumstances amplify the desire to quench their thirst with soda, and an individual may find it difficult to resist the desire. This can explain why obesity and drug addictions are so challenging to control, which is primarily due to their association with visceral factors of satiation and craving (Loewenstein, 1996).

The neurological perspective of understanding the visceral quality of temptations also answers the questions of why temptations is uniquely different from mere short-term goals. A number of studies also suggest that temptations involve the hedonic aspects of desire. Temptations are responses which are neurologically different from those rewards or incentives (Berridge, Robinson, & Aldridge, 2009). From the neurological perspective, the immediate visceral instinct distinguishes the concepts of ‘liking’ versus ‘wanting’ (Berridge et al., 2009). Although liking and wanting may arouse similar sensory pleasures in the brain, research shows that wanting – as the essence of temptation – is qualitatively different from liking because it captures the incentive motivation that is often found in rewards (Berridge et al., 2009). Drug addiction is an example of the incentive motivation of ‘wanting’ something, which is extremely hard to overcome and different from other types of temptations that offer positive experiences.

Positive experiences of temptations, although they may not be as strong as the visceral impact of temptations, are also a central part of the unique characteristics of temptations (Loewenstein, 1996). For instance, watching movies and hanging out with friends, the activities that can be considered trivial compared to more detrimental
temptations such as drugs, provide individuals with pleasurable experiences that may make them preferable to achieving long-term goals. Individuals with high self-control may regard the long-term process of achieving goals as rewarding and pleasurable, in much the same way as watching a television show. However, most individuals who do not have high self-control may find that achieving goals that require continuous activity and focus over a longer period of time without necessarily providing any pleasurable experiences can be daunting and problematic (Trope & Fishbach, 2000; Fishbach & Dhar, 2005; Fishbach, Shah, & Kruglanski, 2004).

The unique nature of temptations is also based on their motivational dependency. Temptations are truly problematic only when they conflict with the motivations of long-term goals (Fishbach & Converse, 2011; Fishbach & Shah, 2006; Leander, Shah, & Chartrand, 2009). To illustrate, drinking a beer, which is detrimental to the goal of improving an individual’s health, only causes a conflict only when the temptation of beer relates directly to the goal of health. If one has, say, the social goal of hanging out with friends, then beer may no longer be a temptation. Furthermore, if, for example, developing new interpersonal relationships is a person’s long-term goal, catching up with friends becomes a goal, not a temptation. It is essential to understand when a temptation becomes dependent on the specific long-term goal in order to comprehend the unique quality of temptations (Gillebaart & De Ridder, 2015). A recent study by Milyavskaya Inzlicht, Hope, and Koestner (2015) found that individuals who
experienced fewer motivational conflicts between their potential temptations and their long-term goals perceived temptations as less appealing. For instance, a chocolate cookie was a salient temptation if the goal was to diet. When the individual did not view the cookie as not conflicting with the goal of dieting, it became no longer a temptation, and a salad, for instance, became more enjoyable and attractive. Thus, a true temptation does not arise from a vacuum and their dependency on the long-term goals is what makes temptations irresistible.

1.3 Self-Control Strategies against Temptations

The current perspective of this dissertation assumes that overcoming temptations relies not only on a pursuer’s beliefs about self-control but also on the strategic actions implemented by the pursuer against temptations. To seek out an effective strategy for fighting temptations, pursuers must know the nature of the temptations with which they are dealing as well as the nature of the strategies themselves. As the majority of existing research on self-control views self-control against temptations as a person’s ability to inhibit short-term temptations (Hamburg & Pronk, 2015), individuals need to inhibit desires for temptations by implementing effective strategies. Research on self-control, thus, has considered various strategies that enable individuals to tackle obstacles that stand in the way of their successful goal pursuit. In particular, the research has shown that individuals can strategically downplay the perceived immediate value of temptations or can counteract these temptations while at the same time implementing
the means to achieve the longer-term goals (Trope & Fishbach, 2000; Fishbach & Trope, 2005). Research has also shown that salient characteristics of temptations could be inhibited or deactivated by using the cognitive-affective mechanism (Mischel, 1974). Furthermore, strategies that allow individuals to form a plan as to how to manage temptations using implementation intention would help these individuals to avoid those temptations (Gollwitzer, 1999).

1.3.1 Counteracting Temptations

Seeing an advertisement for the summer vacation period may remind an individual of his or her unfinished work, and may inspire that individual to complete it. The process whereby this momentary allurement becomes a device for motivation is called a ‘counteracting temptation’ (Fishbach, Friedman et al., 2003). Researchers have defined this process as asymmetrical activation because a goal is not meant to trigger temptations, whereas in a case such as this, the temptation itself triggers the individual to pursue their goal (Fishbach, Friedman et al., 2003). Counteractive theory recognizes the automatic regulation of asymmetrical relationships between temptations and goals. Such relationships can help individuals to overcome temptations by amplifying the value of the current goal (Fishbach, 2009). This counteractive process can be intensified by temptations because these remind individuals of their long-term goals (Trope & Fishbach, 2000; Fishbach & Trope, 2005). In addition, individuals with high self-control
who are successful in achieving their goals tend to automatically use this asymmetrical activation strategy to overcome temptations.

By using the counteractive mechanism of changing the relative value of goals and temptations, individuals self-impose rewards for activities that move them towards achieving goals, and penalties for giving in to temptations (Fishbach & Converse, 2010). Previous research has demonstrated that individuals with high self-control are able to increase the value or accessibility of their current pursuits in response to the threat posed by salient temptations, and that such counteraction may even occur automatically (Fishbach & Converse, 2010). In one study, participants with exercise goals were asked to choose either a healthy or an unhealthy chocolate bar on their way to the gym (Myrseth, Fishbach, & Trope, 2009). Although every individual chose the healthy bar because of his or her exercise goal, the study compared how individuals evaluated the two options (Myrseth et al., 2009). The result indicated that participants, prior to choosing the healthy option, positively evaluated the long-term goal of exercise, while reducing the value of the chocolate bar. In contrast, in the study in which participants had already chosen the healthy bar, they did not exhibit any evaluative opinions toward the chocolate bar because this temptation was no longer a threat (Myrseth et al., 2009).

Another way to counteract temptations is by ascribing a negative value to temptations and decreasing their attractiveness. One study found that individuals were able to counteract impulsivity by associating temptations with negativity (Fishbach &
Shah, 2006). As such, individuals who were motivated to overcome temptations and were good at regulating themselves could automatically make negative associations without deliberate efforts. Participants were given a joystick lever and directed to push away irrelevant temptations by showing an avoidance action or to pull towards relevant goals by showing an approach action (Fishbach & Shah, 2006). Reaction times of how quickly participants pushed or pulled the joystick were used to measure tendencies between temptation-related and goal-related words on the screen. The results indicated that participants were able to pull the lever toward them by demonstrating an approach orientation toward goal-relevant words. They were also able to push the lever away by expressing avoidance orientation to temptation-relevant words (Fishbach & Shah, 2006). The result revealed that individuals with high self-control were good at bestowing negative evaluations onto temptations (Fishbach & Shah, 2006). This also confirmed that individuals could learn how to counteract temptations by automatically associating temptations with negativity and by effectively regulating themselves without any conscious effort.

1.3.2 Cognitive-Affective Mechanisms for Defending against Temptations

The cognitive-affective processing model of self-control deals with temptations in order to guard individuals’ long-term goals. The mechanism by which individuals are able to delay immediate rewards in favor of long-term goals derives from Mischel’s work (1974) on the delay of gratification paradigm (Mischel & Ayduk, 2004). The
paradigm creates a situation in which an individual has to choose between delayed
gratification with a larger reward and immediate gratification with a smaller reward
(Mischel & Ayduk, 2004). This paradigm has been tested with children, who were
simply asked to wait for a larger reward. The larger reward often involved some
challenges, such as not eating a cookie until the researcher returned to the room. If the
children chose to eat the cookie immediately without waiting for the larger reward
(which in this case was more cookies) they could ring the bell to let the researcher know
(Mischel, 1974). Extensive research both within and beyond this study has established
that children who successfully delay gratification are also able to regulate themselves in
later years of their lives (Mischel & Ayduk, 2004). Furthermore, studies have shown that
the longer children were able to wait during such experiments, the higher the SAT
scores they were able achieve, while also demonstrating higher levels of interpersonal
and social competencies (Mischel, Shoda, & Peake, 1988).

The theory of the delay gratification is based on what is known as the hot and
cool system which proposes that a ‘cool’ cognitive system deals with complex
representations of the ‘know-system’, while the ‘hot’ emotional system accounts for the
emotional ‘go-system’ (Metcalfe & Mischel, 1999). The effective utilization of the
interaction between these two systems underlies the function that each system serves in
regulation (Metcalfe & Mischel, 1999; Mischel & Ayduk, 2004). Using the cool system,
which is based on “cognitive, complex, slow, and contemplative” aspects of stimuli
enhances an individual's rational and strategic decision-making (Mischel & Ayduk, 2004, p.85). On the other hand, the hot system deals with emotion based on the fight or flight response. It can “elicit virtually reflexive avoidance and approach reactions when activated by trigger stimuli” (Mischel & Ayduk, 2004, p.85). The interdependency between hot and cool systems can be effective in moving current attention away from immediate temptations (Metcalfe & Mischel, 1999). To elucidate, when children are faced with cookies as temptations, they activate the cool system by switching off the hot system (Mischel & Ayduk, 2004). In one study, two different distractors – internal and external – were given to children as a strategy to occupy them while waiting for a larger food reward (Mischel, 1974). Children who were given the internal distractor were asked to imagine themselves in a pleasant situation in which they were, for example, playing with their moms. A toy was given to a second group as an external distractor to play with during the wait time. A third group did not use any specific strategy to assist them in coping with the delay in receiving their reward. The result demonstrated that the groups that used either internal or external distractors were able to wait longer for a bigger reward than those who did not utilize any strategy (Mischel, 1974).

Another method to manipulate mental representation is based on focusing selective attention to irrelevant stimuli associated with the temptations. In order to ignore the attractiveness of the hot system, an individual can focus on the irrelevant information of an object that cools down the arousal of the visceral component of the hot
system in the face of temptations (Metcalfe & Mischel, 1999). For instance, Mischel and Baker (1975) involved children in a delayed gratification experiment using marshmallows and pretzels. One group of children was instructed to use the cool information-based system, while the other group was asked to think of the reward in a more consummatory way by using the hot system (Mischel & Baker, 1975). The results confirmed that the children who were able to think of marshmallows as white puffy clouds and pretzels as little wooden logs were able to delay longer than the children using the hot system. The children who thought of the snacks as crunchy, sweet, and chewy could not delay their rewards and rang the bell to eat them immediately (Mischel & Baker, 1975). Attention to irrelevant cues of the temptations made children use a more abstract mental representation of the cool system, helping them to successfully overcome the temptations (Mischel & Baker, 1975; Mischel, Shoda, et al., 1992).

**1.3.3 Planning for Temptations**

Establishing an action plan on how to overcome temptations is also an effective self-control strategy that pursuers can employ both consciously and unconsciously. Gollwitzer (1999) argues that specifying when, where, and how an individual would work towards achieving a goal and overcoming temptations could help to attain the actual goal. Implementation intention is based on individuals’ attempt to forward plan their behavior at a specific moment in a way that effectively influences future behaviors, such as announcing “If I encounter the situation X, I will avoid Y” (Gollwitzer, 1999).
Implementation intention is a sophisticated process that requires an individual to understand how certain opportunities or situational cues block goal pursuit (Gollwitzer & Oettingen, 2011). Forward planning, in particular, is useful as it inhibits the irrelevant cues associated with temptations for the purpose of achieving a target goal. Since implementation intention sets up when and where an individual wants to focus on their goal and offers specific if-then instructions to guard against temptations, longer-term goals can be achieved more constructively (Gollwitzer & Oettingen, 2011). For instance, even though watching a television show is a constant distraction when an individual is preparing for an exam, he or she could make this intention specific by saying, “if I finish reading this chapter, I will watch television for 30 minutes”. In this way, he or she can consciously delay the temptation and wait for the right time to watch the show.

Research has found that implementation intention leads individuals to have heightened accessibility to goal-related cues (Achtziger, Bayer, & Gollwitzer, 2010). One study demonstrated that implementation intention led to fewer misses and more hits in counting the letter ‘F’ in a text and also enhanced the ability to inhibit false alarms and to correctly reject similar cues (Webb & Sheeran, 2004). Moreover, another study revealed that individuals were able to recall specific cues in order to achieve a focal goal when linked with implementation intentions, even after a delay of two days (Achtziger et al., 2010). These findings have also suggested that individuals who form implementation intentions have a higher sensitivity to relevant cues to activate their if-
then plan and that they would, in turn, inhibit irrelevant cues. One study explained this mechanism by asking participants to identify five-letter words in a story (Parks-Stamm, Gollwitzer, & Oettingen, 2007). As such, participants had to push the ‘L’ or ‘M’ button when they found target words, such as ‘Laura’ or ‘mouse’ in their texts (Parks-Stamm et al., 2007). One group formed implementation intentions, for example, “if I see the five-letter word Laura, then I will push the button L” (Parks-Stamm et al., 2007). The findings indicated that the group who formed implementation intentions not only exhibited better performance at pushing the button but were also able to successfully inhibit similar target words that also had five letters (Parks-Stamm et al., 2007). Since implementation intentions aid individuals to focus on a goal by manipulating the shift in attention toward relevant cues, this strategy is beneficial for individuals who have trouble starting the process of working towards their goals (Gollwitzer & Oettingen, 2011).

Challenging situations arise when temptations get in the way of pursuing goals, and implementation intention can suppress the negative cues of temptations (Gollwitzer & Oettingen, 2011). A study was conducted by Gollwitzer and Schaal (1998) to ascertain the beneficial effect of using suppression-oriented implementation intention. Schaal (1993) asked participants to work on a repetitive task while they were exposed to highly attractive temptations. One group formed goal intentions by telling themselves not to focus on the temptations, and the other group was asked to form implementation
intentions by making themselves work harder when the temptations were available (Schaal, 1993). The final group also formed implementation intentions, but this time, they were told to simply ignore the temptations when they encountered them (Schaal, 1993). The results indicated that the group who did not have implementation intentions significantly underperformed compared to the other two groups (Schaal, 1993).

Inhibiting temptation does not require individuals to use all of their self-control resources if they can form implementation intentions. Since individuals do not need to make a deliberate effort in these cases, forming an implementation intention allows them to detect the opportunity which corresponds to the planned behavior in an automatic fashion, and thus does not consume any resources (Muraven & Baumeister, 2000a). Therefore, implementation intention is one of the most effective strategies for dealing with temptations. Moreover, consistent practice of forming implementation intentions would make this mechanism automatic and more powerful when used by individuals aiming to achieve certain set goals.

1.4 Implicit Beliefs about Temptations

While previous research has examined the role of pursuers’ implicit beliefs on self-control and various strategies of self-control pursuits, the present dissertation seeks to explore pursuers’ beliefs about temptations. Since no research has highlighted the significance of pursuers’ beliefs about temptations, it is worthwhile to explore how these various beliefs influence the effectiveness of self-control during goal pursuit. Individuals
form a variety of beliefs about temptations as they attempt to overcome those temptations. For example, individuals’ beliefs about certain types of temptations to which they are extremely vulnerable may engender different self-control outcomes. Individuals’ beliefs about the definition of temptations may change depending on situational factors. Moreover, individuals may hold a belief about how and when temptations wax and wane over time.

Among other possible types of beliefs, this dissertation seeks to highlight two essential ones about temptations. First, it shows that individuals can form the belief that the best way to deal with temptations is not to encounter them in the first place. This belief emphasizes the necessity of avoiding temptations. This assumes that this belief is most impactful on self-control in situations that allow individuals to plan ahead for their longer term goals. Second, it shows that individuals may believe in the benefit of experiencing temptations. This emphasizes the utility of indulging in temptations. Again, it assumes that this belief is most impactful on self-control in circumstances where encountering temptations is unavoidable.

The dissertation, firstly, assumes that the two beliefs of avoiding and indulging in temptations influence the self-control in a both deliberate and automatic manner. Second, the belief in the necessity of avoiding temptations can occur in the absence of the belief in the utility of indulging in temptations and vice versa. The belief in the necessity of avoiding temptations is not necessarily the polar opposite of the belief in the
utility of indulging in temptations. Individuals may hold either or both of these two types of beliefs over the course of managing temptations while implementing self-control. Despite individuals’ best efforts to avoid temptations, they may be inevitably confronted by them or even give in to them. In such circumstances without any alternatives but to indulge in those temptations, individuals’ beliefs about the utility of indulging in temptations can help them to recover from temporary setbacks.

1.4.1 Believing That Temptations Are Best Avoided

The effectiveness of the avoidance strategy, a belief that the preemptive approach to deal with potential temptations is most beneficial in overcoming temptations was primarily observed in individuals with high self-control. Research on avoidance suggests that individuals with high self-control have a strong belief in the avoidance strategy and are able to identify their potential temptations and predict the exact timing of getting vulnerable to these temptations. It can be done by acknowledging their moment of weakness (Hofmann, Baumeister, Förster, & Vohs, 2012; Ent, Baumeister, & Tice, 2015; Gollwitzer, 1999). Enhanced capability to anticipate the time or the objects that may potentially trigger hard-to-resist temptations would help individuals to completely steer clear of those temptations. For instance, if individuals are aware that watching television is hard to resist at nighttime, they could anticipate this and avoid exposing themselves to television at that time. When individuals know the places that
would potentially lead them to confront with temptations, they can avoid those places in advance.

Previous research on traditional self-control that considers inhibition and suppression in terms of overcoming temptations argues that the most effective way to deal with temptations is to have the belief of suppressing the impulse and desires (Fujita, 2011). Herman and Polivy (1975) argue that suppression can offer temporarily effective relief from indulging in temptations. However, other research also argues that merely believing that suppression relieves temptations causes a rebound effect, whereby a short-term success in implementing suppression often backfires. This would lead to a more heightened mental content that individuals try to suppress (Wegner, 1994). As such, the temptations that individuals are trying to suppress only become more apparent. This escalates the desire, leading to hinder successful self-control. Essentially, individuals who once believed in the effectiveness of the inhibition strategy may suffer from a rebound effect that potentially jeopardizes their ability to implement self-control in overcoming temptations.

Recently, research on self-control has started to investigate the impact of avoidance-related belief on the self-control process of individuals with high self-control. One study confirmed that those individuals believe in a preventative approach which anticipates potential tempting environments or stimuli (Hofmann, Baumeister, Förster, & Vohs, 2012). The results showed that individuals who had high self-control
demonstrated a proactive approach in dealing with temptations rather than using inhibition at a later stage in the self-control process. This avoidance approach ultimately indicated that these individuals eventually had a low level of desire for temptations and required little energy to resist those temptations (Hofmann, Baumeister, Förster, & Vohs, 2012; Hofmann & Kotabe).

A recent study also discovered that individuals attempted to avoid situations where there were too many temptations that might impair their goal pursuit. Participants were asked to complete a difficult anagram either in a distracting place, such as a noisy graduate lounge, or in a non-distracting place such as a quiet lab room (Ent, Baumeister, & Tice, 2015). Participants who reported that they frequently used avoidance strategies – with high trait self-control, in this case – chose less distracting places where they could concentrate on their anagram (Ent, Baumeister, & Tice, 2015). Other similar studies also suggested that individuals who prefer to use avoidance strategies are willing to wait for a task that has fewer temptations (Ent, Baumeister, & Tice, 2015).

### 1.4.2 Believing One Should Experience Temptations

When temptations become unavoidable and there is no choice but to encounter them, one can choose either to indulge or not to indulge. Individuals’ decision to temporarily succeed or fail at achieving their goal is solely based on their beliefs about indulgence. In the self-control literature, indulgence, defined as a failure of self-control
or a setback, is not usually regarded as part of the self-control process. Instead, past research has focused on indulgence only as a setback, defining it as a failure in self-control, caused by not having enough strength to self-regulate (Geisler & Kubiak, 2009). Research has shown that a momentary failure in the pursuit of a goal can generate a constant rumination of the failed experience, which can hinder the attempts that individuals make to get back on track with their goal pursuit (Geisler & Kubiak, 2009). Similarly, for individuals who have already satiated their temptation, their negative experience of self-control failure prevents them from putting more effort into temptation management (Geisler & Kubiak, 2009).

In contrast to the assumption that yielding to temptations may lead to a failure, recent research shows that when individuals believe there are positive aspects of indulging in temptations, they are better able to prepare for future temptations (De Boer, De Ridder, De Vet, Grubliauskiene, & Dewitte, 2014). Such individuals may make good use of the experience because the satisfaction associated with the indulgence reduces the allure of the temptations (Hull, 1943). This can be explained in terms of the principle of the satiation cycle, whereby once the temptation has been satiated, one no longer desires that temptation (Hofmann & Kotabe). In other words, once individuals indulge in the temptation, the desire or urge weakness, and they can effectively overcome similar temptations in the future.
Geyskens and his colleagues (2008) first discussed the matter of experiencing indulgence in regards to whether exposure to unhealthy temptations would influence an individual’s subsequent behavior in terms of their consumption of unhealthy foods. When individuals already have been exposed to unhealthy foods, such as cookies or donuts, the experience of this exposure prevents them from activating the desire for satiation. This ultimately leads to the successful diet management (De Boer et al., 2014). Now that individuals have already satiated the temptation of a chocolate cookie through pre-exposure to the tempting food, the cookie no longer has strong appeal. In addition, more recent work has demonstrated that if younger children were made to indulge in temptations and to exercise self-control simultaneously, that is comparable to being given a vaccine, and thus these children had got more effective in dealing with temptations (De Boer et al., 2014). Moreover, the research argues that removing or ignoring temptations may bring in an immediate success in achieving goals, but that it is not beneficial for a longer-term success (De Boer et al., 2014). The study used the traditional delay of gratification experiment to measure how pre-exposure under aforementioned context affected subsequent consumptions after the delay (De Boer et al., 2014). During the pre-exposure stage of five days, all participants were exposed to cookies as temptations, and they had to struggle not to eat the cookies. On the fifth day of the experiment, children were exposed to different types of temptations, such as candies. They were measured based on how much they reduced their consumption
compared to the group without a pre-exposure session (De Boer et al., 2014). The result clearly demonstrated that children with pre-exposure had a significantly lower consumption of candies than did the control group.

In contrast, other research highlights potential negative consequences of indulging in temptations, showing that such indulgence can be potentially dangerous for individuals who struggle to overcome temptations. The research argues that once individuals are satiated by their temptations, their desire does not diminish or decrease (Hofmann & Kotabe, 2015). Individuals who continue to indulge may experience the same amount of satiation each time they do so, and their desire to indulge in the same temptation becomes much stronger and does not dissipate (Hofmann & Kotabe, 2015). In this case, indulgence hinders the individuals’ ability to overcome temptations and traps them in a vicious cycle of indulgence. Research highlights the principle of motivation plasticity, which is captured in Freud’s catharsis theory. This is related to the idea that the more one desires and satiates desire, the more he or she will seek further temptations (Hofmann & Kotabe, 2015). For example, research has shown that some individuals tend to believe that venting their anger helps to control their emotions better. However, the study has proved that such beliefs are not accurate. Following the theory that ‘getting begets wanting’, venting aggression is similar to rewarding indulgence, yet this reward reinforces stronger aggression that drives the intense desire,
ultimately falling into the trap of a vicious cycle of indulgence (Bushman, Baumeister, & Phillips, 2001; Hofmann & Kotabe, 2015).

1.5 The Present Studies

The present studies focus on individuals’ implicit beliefs about temptations, their act to avoid them, and their reaction to indulgence. The impacts of implicit beliefs about temptations on avoidance and indulgence fits conceptually with other existing research on implicit beliefs, and as of yet, no research has attempted to investigate how these implicit beliefs affect self-control behavior.

Beliefs about avoidance and indulgence are used to cope with failures when individuals misregulate their behavior regarding temptations. According to Baumeister, Heatherton, and Tice (1994), there are two reasons why self-control fails. If individuals do not have enough strength or do not put in enough effort to control their impulses, they succumb to temptations. Alternatively, individuals may have enough strength to implement self-control, yet they use ineffective strategies to do so (Baumeister, Heatherton, & Tice, 1994; Tice & Bratslavsky, 2000). The two beliefs about avoidance and indulgence can serve as a form of guidance to prevent individuals from using ineffective self-control strategies. Beliefs about indulgence can also buffer failures of self-control and aid individuals to re-try to implement self-control. For example, if an individual who is prone to indulgence is trying to lose weight, simply avoiding or suppressing the desire for satiation will not help to maintain the diet. Only when an individual endorses
a belief about avoidance, will this occur, such as by avoiding stores that sell sweets. If one has initially failed to inhibit the desire to eat the cookie, this initial small lapse may lead to a larger failure of binge eating (Baumeister et al., 1994; Tice & Bratslavsky, 2000). Yet, if one endorses the belief about indulgence again, the ‘what-the-hell-effect’ that leads to the further consumption of tempting foods can be prevented (Polivy & Herman, 1985; Tice & Bratslavsky, 2000). As such, the initial small lapse of eating a chocolate cookie may prevent one from indulging in potential temptations in the future.

In this dissertation, beliefs about the necessity of avoiding temptations are defined as how to best overcome temptations by avoiding any potential encounters with them. Further, beliefs about the utility of indulging in temptations are defined as a positive view on the experience of giving into temptations when encounters with temptations are inevitable. Within the present studies, beliefs about the necessity of avoiding temptations and the utility of indulging in them are named as the avoidance belief and the indulgence belief.

The five studies within this dissertation aim to explore how two types of beliefs about the necessity of avoiding temptations and the utility of indulging in temptations interplay with self-control and the achievement of target goals. Preliminary data suggest that individuals with a belief in preemptive avoidance are attuned to environmental cues and try to avoid potential temptations as much as possible, whether these are certain areas or people. The five studies explore how individuals implement avoidance
in the face of their target goal, depending on whether they have high or low self-control, and how this affects their behavior in terms of achieving that goal.

Those who fail to act upon potential temptations or momentary temptations may still believe that indulgence in temptations has positive impacts on self-control. Even though the benefit of indulging in temptations appears contradictory to the successful self-control pursuit, individuals often turn their experiences of indulging in temptations into a learning experience about how to implement self-control in the future. The five studies herein examine how much individuals believe in the positive or negative consequences of indulgence, and how these beliefs affect their behavior with regard to achieving their target goals as well as their ability to implement self-control.

The five studies address the following hypotheses:

Hypothesis 1: Individuals’ beliefs about how temptations should be overcome will impact upon how effectively individuals deal with temptations.

Hypothesis 2a: Individuals’ beliefs about the necessity of avoiding temptations will influence effective goal pursuit across different levels of self-control.

Hypothesis 2b: Individuals’ beliefs about the utility of indulging in temptations will moderate their reactions to indulging in them.
2. Study 1

2.1 Overview

The aim of Study 1 is to examine how the two different types of beliefs influence individuals’ goal-related performances in the face of a temptation-laden environment. As previous studies have discussed the importance that individuals with high self-control place on avoidance strategies (Imhoff, Schmidt, & Gerstenberg, 2013), this study similarly aimed to highlight how individuals with high self-control who hold avoidance beliefs proactively choose to avoid a temptation-laden environment. In addition, I sought to emphasize how the indulgence belief could play a role in helping individuals to manage temptations during a performance-related task in a temptation-filled environment if they did not choose to avoid those temptations. Accordingly, I tested whether choices made by individuals to avoid temptations influenced subsequent performance and behaviors moderated by their self-control and three beliefs about temptations with regards to avoidance, resistance, and indulgence.

2.2 Method

2.2.1 Participants

A sample of 206 participants were recruited through the Amazon Mechanical Turk (MTurk) worker system (49% female, $M_{age} = 35.7$). The participants who agreed to participate in the study were paid thirty-five cents. The payment deposits were made through participants’ Amazon accounts via the MTurk worker system.
2.2.2 Procedure

The study was listed on the Amazon MTurk website where workers could read a summary of the study. Workers who were interested in participation, were guided to follow a link to complete an online questionnaire through Qualtrics.

2.2.2.1 Belief about temptations

The questionnaire measured participants’ degrees of belief about temptations. The method of measurement used questionnaire items that examined participants’ general beliefs about the necessity of avoiding temptations, as well as their beliefs about the utility of resisting and indulging in them. Using a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree), participants rated to which extent they agreed with the statement of each domain. The avoidance-related questions were about the belief that avoiding temptations is the most effective way to overcome temptations. The resistance-related questions involved the idea that desires should be inhibited and that temptations are most effectively overcome by inhibition. The indulgence-related questions were related to the positive experience of giving into temptations. A full list of the questions is included in Appendix A.

2.2.2.2 Verbal test task

Participants then completed a verbal test task that was adapted from the Graduate Record Examinations (GRE) test. Since previous work has used logic problems from the GRE test to measure participants’ executive functioning in order to measure
participants’ standardized performance (Schmeichel et al., 2003), verbal problem sets were adopted from the GRE test pool. In this task, participants were told that the goal of the experiment was to understand the relationship between their performance in the logic problems and their verbal skills. Participants were told that the experiment had been designed to develop a new test and that it was currently being evaluated across a large population to minimize suspicions regarding the true purpose of the study. Participants were given an option to complete the test as either a standard version or a stylized version. Both stylized and standard versions of the test were adopted from a previous study by Ent and his colleagues (2015), which aimed to measure whether participants preferred a distracting or a less distracting environment within which to undertake the verbal test task. Sample screenshots of the standard and stylized version of the test were offered and the versions were both fully described, and examples were provided, before the participants had to choose between the versions. The screen used for the standard version of the test showed a simple design in black and white, while the screen used for the stylized version had images of Picasso artworks on either side (See Appendix C). After they had chosen and completed the verbal skill test, followed by a filler task, participants then moved on to the second phase of the study. Half of the participants, regardless of what they had chosen previously, were randomly assigned to complete a verbal skill test that was either the stylized or the standard version. The other half of the participants again had a chance to choose which version of the test they
wanted to do, choosing once more between the stylized and standard versions. After completing the total two sets of verbal skill tasks, participants were asked to fill out additional questions which measured aspects of their personalities, including the Self-Control Questionnaire (Tangney, Baumeister, & Boone, 2004), and the Capacity for Self-Control Scale (Hoyle & Davisson, 2016). After collecting demographic information and checking for any suspicions or problems they might have encountered, the participants were debriefed about the nature and the purpose of the study.

### 2.2.3 Results and Discussion

First, the dependent variable of the total verbal score was calculated by summing their correct answers from the task. Three different beliefs about temptations, such as avoidance, resistance, and indulgence, were calculated by averaging the ratings of each item. The self-control scale of Tangney, Baumeister, and Boone (2004) was used as the independent variable to capture the general capacity of the self-control. The self-control scale was then calculated by averaging the ratings of all items. The gender of the participants did not significantly impact the results of the study and thus was not included in the subsequent regression analyses. In order to examine whether participants’ choice to avoid a temptation-laden environment moderates their performance, a logistic regression was conducted. Separate logistic regressions were performed to examine the effects of the verbal score of the first trial and the effects that each three different beliefs in avoidance, resistance, indulgence, and self-control had on
the likelihood that participants would choose the stylized version of the test. No significant effects were observed with regard to the verbal score, belief measurements, or levels of self-control. Second, the total score observed in the first trial of the verbal test task was regressed over a separate set of following independent variables – self-control, one of the three types of beliefs, and their two-way interaction. However, there was no significant effect associated with the verbal score. These results are possibly due to the general difficulty of the verbal task, for the participants involved. The participants were members of the general population aged between 18 and 55 from MTurk workers. The verbal task was adopted from the GRE test which was specifically designed for a US college student population. Thus, the participants of MTurk workers may have found the verbal task more difficult than average college students. Moreover, the sample of this study contained a few non-native English speakers (18%) that may have been less appropriate for taking GRE test. The negatively skewed verbal score of the task also implies that participants generally found it difficult to perform the verbal task.

Accordingly, post hoc analyses were performed in order to rule out any potential impact of poor performance, a negative skew on the verbal scores.

The post hoc exploratory analyses were done while ruling out the potential negative skewed samples. Specifically, the test results of participants who performed above the median on the verbal test were separately examined with regards to the impact of the different versions of the test, their levels of self-control, and three different
types of beliefs about temptations. A post hoc logistic regression was performed to ascertain the effects of the verbal score from the first trial on the likelihood that participants would choose either the stylized or the standard version of the test. The logistic regression model was statistically significant, $\chi^2(1) = 8.509, p < .05$. The model explained 10.9% (Nagelkerke $R^2$) of the variance in the stylized version of the test and correctly classified this in 62.4% of the cases. The efficiency of the verbal score was statistically significant, as demonstrated in Table 1. Here, an increased test score was associated with a reduction in the likelihood of choosing the stylized version of the test. This finding suggested that individuals who score higher in the verbal test are more likely to choose the standard version.

**Table 1: Logistic Regression on Predicting Likelihood of Choosing Stylized Version Based on Verbal Score.**

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>SE</th>
<th>Wald</th>
<th>df</th>
<th>p</th>
<th>Odds Ratio</th>
<th>95% CI for Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verbal score</td>
<td>-.731</td>
<td>.269</td>
<td>7.373</td>
<td>1</td>
<td>.007</td>
<td>.482</td>
<td>.284 - .816</td>
</tr>
<tr>
<td>Constant</td>
<td>.519</td>
<td>.723</td>
<td>4.413</td>
<td>1</td>
<td>.036</td>
<td>4.568</td>
<td></td>
</tr>
</tbody>
</table>

In addition, another post hoc analysis of the total verbal score of participants who performed above the median on the verbal test was regressed over participants’ beliefs regarding indulgence, their choice of which version of the test to undertake (standard or stylized), and the two-way interaction of these variables. The two-way interaction of the belief in indulgence and test type was not significant, $B = -.147$, $F(1, 89) = .652, p = 0.652$. Despite this result, the trend of the data, at least, indicates that
participants who choose a stylized version of the test showed lower performance scores when they had higher indulgence beliefs compared to those who had lower indulgence beliefs. Overall, the trend of the data suggests that individuals who have a stronger belief in indulgence may be more influenced by temptations, leading to poor behavioral performance.
3. Study 2

3.1 Overview

While Study 1 sought to examine how beliefs about temptations impact individuals’ anticipation and avoidance of possible temptations, the purpose of Study 2 was to investigate how temptation-related beliefs impact individuals’ reactions when exposed to temptations. Depending on whether individuals have a choice to avoid the potential temptations to which they are about to be exposed, or whether they have given in to the temptations without any choice, individuals’ reactions to overcome those temptations may differ. To measure this, I used a spelling error detection task that included temptations and examined how participants’ performance varied as a function of three different types of temptation-related beliefs.

3.2 Method

3.2.1 Participants

A sample of 218 participants were recruited through the Duke University Psychology undergraduate pool (58% female), and completed the study in exchange for a course credit.

3.2.2 Procedure

Participants completed the study on their personal computers via an online questionnaire through Qualtrics.
3.2.2.1 Belief about temptations

First, participants completed a questionnaire that measured their degree of belief about temptations, which was similar to Study 1. The measurement consisted of items relating to participants’ general beliefs about the necessity of avoiding temptations as well as their beliefs about the utility of resisting and indulging in them. Using a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree), participants rated the extent to which they agreed with the statement for each domain. The full list of scale questions is included in Appendix A.

3.2.2.2 Spelling error detection task

Participants performed a spelling error detection task that was designed to be similar to the letter crossing task described in Baumeister, Bratslavsky, Muraven, and Tice (1998). This spelling error detection task was designed to be a tedious task which required some amount of self-control. Participants were given two versions of the task. The first version included a paragraph of a story that described a funny, though potentially distracting joke. The humor in this story was meant to potentially undermine participants’ performance in finding the spelling errors. The other version included a paragraph of a newspaper article that described an Indonesian politician and offered no such distracting humor. Both versions had the same number of spelling errors and were offered to the participants in random order. After completing a filler task, the participants were given another spelling error detection task. Next, participants were
asked to fill out additional personality measurements, which included the Self-Control Questionnaire (Tangney, Baumeister, & Boone, 2004), the Capacity for Self-Control Scale (Hoyle & Davisson, 2016), and the Self-Compassion Scale (SCS-SF) (Raes et al., 2011). After collecting demographic information and checking for any suspicions or problems the participants might have encountered, the participants were debriefed about the nature and the purpose of the study.

### 3.2.3 Results and Discussion

In total, 64 participants were unable to mark the spelling errors on the screen due to a malfunction of the web browser; consequently, these participants are excluded from the data analyses. With a final sample of 154 participants, the impact of three types of beliefs about temptations is explored using regression analyses.

First, the dependent variable of the total score of finding spelling error task was calculated by summing their correct answers from the task. Similar to Study 1, three different beliefs about temptations were calculated by averaging the ratings of each item. The self-control scale of Tangney, Baumeister, and Boone (2004) was used as the independent variable to capture the general capacity of the self-control and was then calculated by averaging the ratings of all items. The gender of the participants did not significantly impact the results of the study and thus was not included in the subsequent regression analyses.
Hypothesis 2a predicted that the individuals’ beliefs about the necessity of avoiding temptations would predict the effectiveness of goal pursuit amongst individuals with different levels of self-control. In addition, Hypothesis 2b predicted that individuals’ beliefs about the utility of indulging in temptations would moderate their reaction to indulging in them. These predictions were not supported in this study, as there were no significant main or interactions effects. Outputs displaying these non-significant result are included in Appendix J. A number of potential methodological issues may have contributed to the lack of significant effects in this study. The first relates to the effectiveness of the temptation manipulation itself. The present design assumed that the funny versus tedious passage of the task would provide participants with a tempting or non-tempting (control) condition of the spelling error detection task. However, the passage with a funny joke may not have interfered with participants’ performance. The performance results of the spelling error detection tasks suggested that the participants’ score of the tempting condition was higher than their score of the non-tempting (control) condition ($M_{\text{temptation1}} = 15.33$ vs. $M_{\text{control1}} = 11.14$, $M_{\text{temptation2}} = 14.1$ vs. $M_{\text{control2}} = 13.32$). This implies that the two different conditions did not create the intended form of manipulation. Instead of the task being boring and uninteresting, the joke in the task may have encouraged participants to persist by fully engaging them (Isen & Reeve, 2005). Second, the participants were Duke undergraduate students, a definite high competence group that is generally difficult to engage in a temptation
manipulated condition. The average number of spelling errors that participants found in the temptation conditions was 14.8 out of 20 possible spelling errors, implying that the participants’ average score was relative high. Third, the higher average score of finding spelling error task across different conditions implies that the task itself may have been enjoyable to participants. The research suggests that when individuals view tasks as being more enjoyable and intrinsically rewarding, they tend to demonstrate a higher level of performance (Harackiewicz & Elliot, 1993).
4. Study 3

4.1 Overview

Study 3 was designed to extend and refine the results of the first two studies with the use of a new temptation manipulation and behavioral task. This study also included a refined temptation belief scale that focused more precisely on participants’ beliefs about the necessity of avoiding temptations and the utility of indulging in them. Whereas Studies 1 and 2 had additionally included questions relating to participants’ beliefs about the utility of resisting temptations, the results of a factor analysis of the temptation-related items suggested that items relating to beliefs about resistance did not constitute a significant independent factor similar to the factors found for items assessing beliefs in avoidance and indulgence (See Appendix I). Indeed, the results of the factor analysis indicated that avoidance and indulgence beliefs were observed consistently across the five studies. This may simply reflect complex possible beliefs that could potentially arise regarding the manner in which temptations should be resisted. Since there are many different types of strategies that one could use to resist temptations, individuals’ beliefs about what constitutes resistance can vary in nature. Secondly, items within the test regarding beliefs in the utility of resisting temptations seemed inherently related to participants’ general effectiveness at self-control; that is, the better the participants’ general self-control, the stronger are their potential beliefs in the utility of resisting temptations. Correlations between the individual difference
measurements of the first two studies including the pilot study, confirmed that the belief in resistance was highly correlated with the self-control measurement (See Appendix H). Resistance items in the test were highly correlated with the general measures of self-control, \( r = .435, p < .01 \) for Study 1 and \( r = .208, p < .01 \) for Study 2. Thus, the two types of belief – avoidance and indulgence – seemed to be novel measurements with great effects on beliefs about temptations. In addition, the wording of the first version of the test concerning measuring beliefs about temptations was revised. A comparison of Cronbach’s alpha scores for beliefs about temptations from the first two studies and the revised version of Study 3 are presented in Table 2. With the newer version of beliefs about temptations guiding measurement included within it, Study 3 aimed to observe whether both avoidance and indulgence beliefs influence individuals’ subsequent performance regarding goal achievement as well as influencing effective self-control.

**Table 2: Standardized Reliability of Avoidance, Resistance, and Indulgence**

<table>
<thead>
<tr>
<th></th>
<th>Study 1 Cronbach’s ( \alpha )</th>
<th>Study 2 Cronbach’s ( \alpha )</th>
<th>Study 3 Cronbach’s ( \alpha )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avoidance</td>
<td>.684</td>
<td>.736</td>
<td>.731</td>
</tr>
<tr>
<td>Resistance</td>
<td>.554</td>
<td>.269</td>
<td>-</td>
</tr>
<tr>
<td>Indulgence</td>
<td>.799</td>
<td>.785</td>
<td>.789</td>
</tr>
</tbody>
</table>

**4.2 Method**

**4.2.1 Participants**

A sample of 240 participants were recruited through the MTurk worker system (41.3% female, \( M_{\text{age}} = 34.31 \)). The participants who agreed to participate in the study were
paid thirty-five cents. The payment deposits were made through participants’ Amazon accounts via the MTurk worker system.

4.2.2 Procedure

The study was listed on the Amazon MTurk website where workers could view a summary of the study. Workers who were interested in participating, were guided to follow a link to complete an online questionnaire through Qualtrics.

4.2.2.1 Beliefs about temptations

First, participants completed a questionnaire that measured the degree of their beliefs regarding temptations. The revised measurement consisted of items relating to participants’ general beliefs about the necessity of avoiding temptations as well as their beliefs about the utility of indulging in them. Using a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree), participants rated how much they agreed with the statement of each belief. The avoidance-related questions concerned the notion that avoiding temptations is the most effective way to overcome temptations. The indulgence-related questions were concerned with the positive experience of giving in to temptations.

4.2.2.2 Hidden object game task

Participants completed a hidden object game task. They were given a set of two pictures containing objects that seemed to have been randomly arranged. In one picture, the target objects were larger and easier to locate but worth fewer points. In the other
picture, the target objects were smaller, making them more difficult to locate, but were worth more points. An example of the hidden object game task is shown in Appendix E. The goal was to collect as many points as possible. The same types of objects were dispersed in both pictures and only the numbers of each object were different across the pictures. Pictures with both high-value and low-value hidden objects were provided simultaneously. After completing a filler task, the participants were given another hidden object game task. After completing the two sets of hidden object tasks, participants were asked how they felt about the task. Next, participants were asked to fill out additional questions to measure aspects of their personalities, which included the Self-Control Questionnaire (Tangney, Baumeister, & Boone, 2004), the Capacity for Self-Control Scale (Hoyle & Davisson, 2016), and the Belief in Lay Theories of Self-Control Scale (Freeman, Shmueli, Muraven, 2013). After collecting demographic information and checking for any suspicions or problems that the participants might have encountered, the participants were debriefed about the nature and the purpose of the study.

4.2.3 Results and Discussion

The main dependent variables, namely the total number of objects found in the high versus low value pictures, were calculated separately based on the total number of correct answers given by participants. Participants’ level of attention to primary ‘goal’ of the task — finding as many objects of ‘high-score’ points as possible — was assumed to be reflected in participants’ performance in finding objects in the high value picture. In
contrast, their level of attention to the ‘temptations’ of the task — finding as many objects of ‘low-score’ points as possible — was assumed to be reflected in their performance on the low value picture. The higher the level of attention the participants pay to the temptation of the task, the higher indulgence they show to the temptations. Similar to Studies 1 and 2, two different beliefs about temptations were calculated by averaging the ratings of each item. The self-control scale of Tangney, Baumeister, and Boone (2004) was used as the independent variable to capture the general capacity of the self-control and was then calculated by averaging the ratings of all items. The gender of the participants did not significantly impact the results of the study; thus, this was not included in the regression analyses. The total number of objects of the first set that participants found in the low-value picture was regressed over their belief in indulgence, their self-control, and the two-way interaction of these variables. The overall regression model was marginally significant, \( F(3, 234) = 2.188, p = 0.09 \). Furthermore, the results indicated a significant two-way interaction of beliefs about indulgence with self-control, \( B = -0.293, F(1, 234) = 4.231, p < 0.05 \).

First, the simple slope test revealed a positive association between the level of self-control and the number of objects participants found in the low-value version (the level of indulgence) when participants have low indulgence beliefs, \( B = 0.087, p = 0.15 \). This suggests that the belief in the value of indulging in temptations may have a greater impact on temptation indulgence for those whose self-control is generally low. On the
contrary, the opposite trend was observed for the participants with high self-control. The belief in the value of indulging in temptations had a minimal impact on the number of objects participants found in the low-value picture (the level of temptation indulgence) for those with high self-control, $B=-.29, p=0.51$. Although the simple slope analyses were not significant, the direction of the slope suggests that an indulgence belief would have a greater impact on temptation indulgence, in particular, for those who have low self-control. Furthermore, no significant effects were apparent in terms of the avoidance belief.

Figure 1: Interaction between Indulgence Belief and Self-Control on Performance Score of Low-Value Version

Study 3 had a number of potential limitations in its design that were addressed in Study 4. For example, because no significant difference was observed in participants’ overall points total, participants’ overall motivation to maximize their points was
unclear. This could have additionally undermined their motivation to work with the picture that was more difficult but which had higher scores. Moreover, the overall relationship between indulgence belief and self-control was only marginally significant and the beliefs about avoidance might not have been perceived as entirely relevant. In Study 3, temptations were offered within a picture and participants could choose either to indulge in the easier version, containing objects of low value, or to avoid the temptations and to focus on the more difficult high-value picture. However, individuals’ avoidance beliefs may typically impact in a situation that allows for planning in advance before being confronted with temptations. Thus, in order to truly test the impact of avoidance, a real setting to avoid potential tempting places was required. Therefore, Study 4 assessed whether individuals’ avoidance beliefs impact their subsequent behavior in a way that is beneficial to their goals.
5. Study 4

5.1 Overview

In Study 4, in addition to examining individuals’ beliefs about indulgence and avoidance, I sought to further investigate how these two beliefs moderate self-control and the goal-directed behaviors of outcomes, particularly when individuals face a challenge that requires them to make more effort. Study 4 was designed to extend the findings of Study 3 regarding the indulgence belief and to address the potential design limitations of Study 3 by having participants choose both a restaurant and a type of food for a hypothetical lunch meeting. In Study 4, I created a hypothetical scenario involving everyday choices relating to potential food temptations. In addition to the findings of Study 1 and Study 3 regarding the negative impact of indulgence belief on self-control, I expected that a belief in avoidance would positively impact behavior by promoting healthier restaurant and food choices. Furthermore, I supposed that beliefs in both avoidance and indulgence would help to promote effective outcomes of self-control when a challenge to make more effort was necessary.

5.2 Method

5.2.1 Participants

A sample of 203 participants (41.3% female, $M_{age} = 33.9$) completed the study through Amazon MTurk in exchange for a cash payment using their Mturk accounts.
5.2.2 Procedure

The study was listed on the Amazon MTurk website where workers could read a summary of the research. Workers who were interested in participating, were asked to follow a link to complete an online questionnaire through Qualtrics.

5.2.2.1 Belief about temptations

First, participants completed a questionnaire that measured their degree of belief in temptations. The measurement consisted of items relating to participants’ general beliefs about the necessity of avoiding temptations as well as their beliefs about the utility of indulging in them. The measurement used was identical to the refined version of the temptation measurement scale used in Study 3.

5.2.2.2 Restaurant choice task

The participants completed a restaurant choice task. They were asked to imagine that they were on a diet, since this method has been proven to work well in previous pilot studies. The participants were told that they had to choose a restaurant for a lunch appointment with friends. Four options of different restaurants were provided, with high versus low ratings of healthiness and high versus low distance in miles from participants’ current location (see Appendix F). The participants were simply asked to rate how likely they would be to choose each of these restaurants for their lunch, from ‘extremely unlikely’ (1) to ‘extremely likely’ (7).
5.2.2.3 Food menu choice task

After a filler task, participants completed the food menu task. In this task, participants were also asked to imagine that they were on a diet. Participants were given a menu that had a picture of four different salads and sandwiches. They were told that their lunch group had already decided the restaurant and that they would only have to order a dish for their lunch. For the task, the salads were presented as a way to express their diet goal and the sandwiches were given as temptations (see the Appendix F). The participants were asked to rate how likely they would be to order the eight food items for their lunch, from ‘extremely unlikely’ (1) to ‘extremely likely’ (7).

The food items that participants chose varied in calories. When they chose sandwiches with high calories, the participants indicated that they were less tempted to choose the healthy option (the low-salient temptation condition). In contrast, when they chose sandwiches with low calories, this indicated that they were more tempted to choose this option for their lunch (the high-salient temptation condition). Food choices with two temptation manipulation conditions were randomly distributed to participants. Next, participants were asked to answer additional questions aimed at measuring aspects of their personalities, which included the Self-Control Questionnaire (Tangney, Baumeister, & Boone, 2004), the Capacity for Self-Control Scale (Hoyle & Davisson, 2016), and the Belief in Lay Theories of Self-Control (Freeman, Shmueli, Muraven, 2013). After collecting demographic information and checking for any
suspicions or problems that participants might have encountered, the participants were
debriefed about the nature and the purpose of the study.

5.2.3 Results and Discussion

The main dependent variables – the likelihood of choosing healthy restaurants
and the likelihood of choosing healthy food items – were calculated based on the
difference between the likelihood of choosing healthy restaurants or foods and the
likelihood of choosing unhealthy restaurants or foods. There were two manipulations in
Study 4. First, a distance manipulation was included that directed participants to
consider the travel involved when choosing a healthy restaurant. The high versus low
distance manipulation of the restaurant choice task was included so that restaurants
were either 2 or 8 miles away from the participants’ current locations. Secondly, the
calorie manipulation was included in order to manipulate high versus low salient
temptations in the food menu choice task. Sandwiches with higher calories (than those
of salads) indicated a low salient temptations manipulation, whereas sandwiches with
lower calories (than those of salads) indicated a high salient temptations manipulation.

Similar to Study 3, two different beliefs about temptations were calculated by
averaging the ratings of each item. The self-control scale of Tangney, Baumeister, and
Boone (2004) was used as the independent variable to capture the general capacity of the
self-control and was then calculated by averaging the ratings of all items. The gender of
the participants did not significantly impact the results of the study and this information was therefore not included in the regression analyses.

In order to examine the impact of avoidance beliefs on restaurant choice, the participants’ likelihood of choosing the healthier restaurant was regressed over their belief in avoidance, their self-control, the distance manipulation of restaurants, and all possible interactions. Results indicated a significant two-way interaction of self-control and the belief in avoidance, $B = -.242, F (1,186) = 12.95, p < .001$, a non-significant two-way interaction of the belief in avoidance and distance, $B = .094, F (1,186) = 1.75, p = .18$, and a non-significant two-way interaction of self-control and distance, $B = .033, F (1,186) = .268, p = .60$, which were qualified by the significant three-way interaction of distance, the belief on avoidance, and self-control, $B = -.205, F (1,186) = 17.60, p < .001$. As indicated by the three-way interaction illustrated in Figure 3, the effect of belief in avoidance on choice of restaurant was significantly moderated by participants’ general level of self-control. The simple slope analysis revealed a positive effect of the likelihood of choosing the healthy restaurants when low self-control participants hold a high (versus low) belief in avoidance, $B = 0.349, p < .05$, confirming hypothesis 2a. This suggests that the belief in the value of avoiding temptations among those with low self-control may have a greater impact on choosing healthy restaurants despite a longer distance to drive. On the other hand, the simple slope trend demonstrated that avoidance beliefs had no significant impact on the likelihood of choosing a healthy restaurant for participants with relatively
high self-control, $B = -0.543, p = .83$. These participants tended to pick a healthy restaurant regardless of their belief in avoidance. Overall, the benefit of avoidance beliefs on subsequent choices on healthy restaurants showed a stronger impact on individuals with low self-control than those with high self-control. This implies that individuals with high self-control are naturally equipped with a relatively stronger capacity of resisting temptations in general. Hence, the impact of avoidance belief did not render any significant differences in high self-control individuals’ healthy behavioral choices.

In addition, when the participants did not face any challenge, their tendency to select a healthy restaurant was positively predicted by the effect of their belief in avoidance and their level of self-control. The simple slope analysis revealed that there was no significantly different pattern for both high and low belief in avoidance in the low distance condition, $B = -0.171, p = .83$ and $B = -0.115, p = .96$. Hence, regardless of the level of avoidance belief, participants were more likely to choose healthier restaurant options when they had high levels of self-control.
Figure 2: Interaction of Avoidance Belief and Self-Control on Likelihood of Choosing Healthy Restaurant in High Effort Condition

Figure 3: Interaction of Avoidance Belief and Self-Control on Likelihood of Choosing Healthy Restaurant in Low Effort Condition
In order to examine the impact of the indulgence belief on choosing healthy food items, the total rating of the likelihood of choosing healthier food items was regressed over participants’ belief in indulgence, their self-control, the calories manipulation of food temptations, and all possible interactions. Results indicated significant two-way interactions of self-control and calories manipulation, $B = .512, F(1,186) = 5.95, p < .05$, and the belief in indulgence and calories manipulation, $B = -.448, F(1,186) = 4.69, p < .05$, a non-significant two-way interaction of self-control and the belief in indulgence, $B = -.005, F(1,186) = .001, p = .97$, and a non-significant three-way interaction of calorie manipulation, the belief in indulgence and self-control, $B = -.085, F(1,186) = .205, p = .651$. Figure 5 presents the patterns of two-way interaction of the indulgence belief and calorie manipulation. A higher belief in indulgence meant that participants were less likely to choose healthy food items (more indulgence) in the low-salient temptation condition (higher calories) compared to the participants in the high-salient temptation condition (lower calories), $B = -.887, p = .06$. However, the reverse pattern was found for those who had a lower belief in indulgence. The participants with low indulgence beliefs in the low-salient temptation condition were more likely to choose healthy foods compared to those with low indulgence in the high-salient temptation condition, $B = 1.033, p < 0.05$.

These results imply that participants with low indulgence beliefs were vulnerable to strong temptations and thus less likely to choose the healthier options when strong temptations were on the menu. However, participants with high
indulgence beliefs were more likely to choose healthier options when they were confronted with strong temptations in the menu options. This direction of the relationship was unexpected. Although this trend is only observed in Study 4, I assume that it might have been moderated by individuals’ self-control. However, since the three-way interaction was not significant, $B = -.085, F (1,186) = .205, p = .65$, there is not enough evidence to fully support the idea. Only judging from the trend of the data, individuals with high levels of self-control are the ones who may benefit most from indulgence beliefs in the face of strong temptations.

Figure 4: Interaction of Indulgence Belief and Temptation Calories Manipulation on Likelihood of Choosing Healthy food
In sum, individuals who believe in avoidance, regardless of their level of self-control, can proactively avoid temptations. Furthermore, when individuals experience a greater challenge and require more effort to overcome temptations, belief in avoidance aids those who have low self-control, leading them to choose healthier restaurants. When individuals have a weaker belief in indulgence, they are more vulnerable to temptations compared to those with stronger belief in indulgence.
6. Study 5

6.1 Overview

Study 5 was designed to extend the findings of Study 4 regarding the belief about indulgence by using a new paradigm of a word search puzzle task. The results in Study 4 showed that beliefs in indulgence may result in a positive effect on self-control while overcoming strong temptations. By extending the initial observation of the relationship between indulgence beliefs and temptation manipulation on choosing restaurants and healthier food items in Study 4, additional questions were included after the task to measure individuals’ experiences of the results of the task. As such, I expected that beliefs in indulgence would assist individuals to value their experiences more, especially when they failed to successfully overcome temptations.

6.2 Method

6.2.1 Participants

A sample of 212 participants (47.6% female, M<sub>age</sub> =32.9) completed the study through Amazon MTurk in exchange for a cash MTurk payment.

6.2.2 Procedure

The study was listed on the Amazon MTurk website where workers had access to a summary of the study. Workers who were interested in participating, were guided to follow a link to complete an online questionnaire through Qualtrics.
6.2.2.1 Belief about temptations

First, participants completed a questionnaire that measured their degree of belief in temptations. The measurement consisted of items relating to participants’ general beliefs about the necessity of avoiding temptations as well as their beliefs about the utility of indulging in them. The measurement was identical to the refined version of the temptation measurement described in Study 3 and Study 4.

6.2.2.2 Word search puzzle task

Participants completed a word search puzzle task. In this task, participants were asked to score as many points as possible by finding the words that were presented in either a vertical or a horizontal direction. The list of words was derived from the most commonly known animals and fruits that have four letters or more. The vertical solutions were worth 8 points across different conditions. The horizontal solutions were worth either 1 point or 2 points depending on the condition, and participants were randomly assigned to either a high-salient temptation condition (2 versus 8 points) or a low-salient temptation condition (1 versus 8 points). To increase participants’ incentive for collecting as many points as possible and for focusing on vertical solutions (which were worth considerably more than horizontal solutions), participants were told that if their overall score for this initial word search puzzle was greater than 75% of participants who had already completed the survey, they would not be required to complete a second word puzzle. They would thus finish more quickly while still
receiving the same payment. After completing the word search task, participants were asked how they felt about the task. The questions were intended to measure how participants felt about the puzzle task and whether it would be a valuable experience that might help them to do better next time. Participants also completed the Self-Control Questionnaire (Tangney, Baumeister, & Boone, 2004), the Capacity for Self-Control Scale (Hoyle & Davisson, 2016), the Belief in Lay Theories of Self-Control Scale (Freeman, Shmueli, & Muraven, 2013), and the demographic questions. Finally, all participants were told that they would not, in fact, have to complete the second puzzle manipulation before being debriefed about the nature of the study.

6.2.3 Results and Discussion

The main dependent variable regarding participants’ experiences of undertaking the task was calculated based on the total mean of the ratings from the final question of the puzzle task, where participants were asked about the experience of undertaking the task itself. The same calculation used for Study 4 was applied to individual difference variables. The overall performance score was calculated based on the different ratios of vertical and horizontal words. Higher performance indicated that the participants’ goal of scoring as many points as possible was achieved, whereas lower performance indicated that they did not reach their goal. The participants’ gender did not significantly impact the results of the study, so the gender variable was not included in regression analyses. The overall rating of participants’ experiences when undertaking
the word search puzzle task was regressed over the participants’ belief in indulgence, their total performance score on the puzzle task, and the interaction of these two terms. The result indicated a significant two-way interaction of indulgence belief and performance score, $B = -1.11$, $F(1,207) =11.7$, $p < 0.01$. The significant interaction effect, as illustrated in Figure 6, indicated that the ratings of positive experience after the puzzle task were impacted by both their level of indulgence belief and their level of performance. The simple slope analysis revealed a significant positive association between their ratings of positive experience and their level of indulgence belief when participants had lower performance scores, $B = 1.855$, $p < .001$. Basically, participants’ beliefs in indulgence may have mitigated potentially negative experiences that could have been associated with performing poorly on the puzzle task.

These findings indicated that when individuals with high indulgence beliefs end up failing at their subsequent task, their indulgence belief helps to mitigate the negative feelings about this failure, and thus showing higher ratings of positivity in their experience of the task. On the contrary, for the individuals with low indulgence beliefs, their positive experience of the task was directly based on the outcome of a subsequent task. Lastly, the strength of temptation manipulation had no effect on individuals’ belief in avoidance and indulgence. Additional exploratory analyses also confirmed that there were no additional significant results regarding individuals’ beliefs in avoidance,
indulgence, strength of temptation manipulation, and the impact on self-control of their overall performance score.

Figure 5: Interaction between Indulgence Belief and Performance on Experience
7. General Discussion

The present studies examine how individuals’ beliefs about their responses to potential temptations impact self-control and the effective pursuit of goals. Extending previous research on the impact of implicit beliefs about self-control, the present studies sought to determine when individuals’ beliefs about temptations might influence their self-control during the course of daily goal pursuits. These studies found, first, that beliefs about the necessity of avoiding temptations may significantly impact how individuals go about pursuing their longer-term goals. Second, these studies found evidence that beliefs about the utility of indulging in temptations may potentially impact what individuals might gain from the experience of giving in and indulging in their temptations. This belief may help individuals to recover from momentary failures of self-control, providing them with another chance to resist temptations through their learned experience.

Overall, the five studies provided evidence that individuals’ beliefs regarding temptation avoidance and indulgence impact the way they engage in self-control. The results of Studies 1 and 3 suggest that the detrimental effect of believing in the utility of indulging in temptations is even more pronounced for individuals with generally low self-control, resulting in greater temptation indulgence and lower performance scores in these studies. The results of Study 4 suggest self-control may benefit from believing in the necessity of avoiding temptations in advance, when possible. Specifically,
individuals with low self-control who believed in the necessity of avoiding temptations were more likely to choose a healthy restaurant, particularly when they had to make more effort by driving extra miles to get to the restaurant. The results of Study 5 provided evidence for how a belief in the potential benefits of indulging in temptation may aid subsequent self-control. When individuals failed at their performance task in this study, their belief in the utility of indulging in temptations helped them to recover from the initial failure, turning the mishap into a valuable experience.

Overall, the five studies provide the first evidence of the important influence of beliefs about avoidance and indulgence on effective self-control. Although other possible types of beliefs about temptations may play a role in determining the effective management of temptations, the overall findings of the present studies confirm both the avoidance and indulgence beliefs as effective tools.

The present findings also suggest that individuals’ success at overcoming temptation may depend on how their fundamental beliefs about avoiding and indulging them interact with their general capacity for dealing with them. Indeed, the present set of studies find evidence that individuals who hold strong beliefs about the utility of indulging in temptations are particularly vulnerable to giving into them when their general capacity for self-control is low. These studies also find evidence that a strong belief in the necessity of avoiding temptations is particularly beneficial for those individuals with relatively low self-control. In contrast, both the avoidance belief and
the indulgence belief were demonstrated to be less damaging and more beneficial to individuals with relatively high self-control. Study 4 suggested that a stronger belief in indulging in temptations led to healthier choices when temptations are relatively stronger. However, due to the lack of evidence to investigate the impact of behavioral outcome that may be moderated by the indulgence belief in the face of strong temptations, the cause of this direct influence is less clear.

While it is less clear how an indulgence belief yields better performance for individuals with high self-control, the results of Study 5 do suggest possible longer-term benefits of recognizing the positive consequences of indulging in temptations and learning from the experience. Though succumbing to temptations is typically viewed as a failure of self-control (Baumeister, 2002), it may nevertheless provide a valuable learning experience. Indeed, when self-control is viewed as a long-term journey of dealing with the constant struggle of overcoming temptations, indulgence may be one of many ways to learn more about temptations and how best to manage them. For example, when participants indicated that their experience of the puzzle task was valuable, their positive experience was only more pronounced when they held a strong belief about the utility of indulging in temptations. This implies that individuals’ beliefs in indulgence promote a positive experience by mitigating any inevitable negative emotional impact of momentary failures in self-control. Because the positive experience fosters better management of self-control, it increases intrinsic motivation during goal
pursuit and promotes forward-looking thinking (Isen & Reeve, 2005). The studies’ findings in regards to how individuals with high indulgence beliefs can learn from their temporary failures while maintaining their positive view about their mistakes pave the way for future research on how to maintain their regulation against temptations.

7.1 Limitations and Future Directions

The current research has several limitations that should be addressed in future research. First, there are a number of limitations that involve the ineffective manipulation of the study designs. For instance, although the GRE-inspired performance task used in Study 1 was modelled after one used in previous studies to assess overall executive functioning in experiments (Schmeichel et al., 2003), it might have not equally appropriate for the diverse sample of Mturk workers used in this study. Since MTurk populations are generally more diverse in education and age, their overall competency on this test may vary from that of general college student samples. Consistent with this possibility, only the participants who performed above and below the median on the verbal test yielded a significant result in post hoc analyses. Study 2 also highlighted the potential difficulty of creating temptations within an online setting that are enticing to participants while remaining counterproductive to the task at hand. The study aimed to examine whether the funny versus the tedious passage provided participants with a tempting or non-tempting spelling error detection task. Subsequent analyses of the results, however, indicated that the humor in the passage might not have
interfered with participants’ performance, as intended. Instead of distracting participants from the task at hand, the humor might have encouraged them to persist on an otherwise boring task (Isen & Reeve, 2005). And because the study involved Duke students, their overall higher competency with the task might have hindered the effectiveness of any distractor. Study 3 used a novel paradigm of the hidden objects game task to measure participants’ overall performance. However, a weak manipulation of attentions — high value picture (attention to goals) versus low value picture (attention to temptations) — might have limited the empirical support this study intended to provide.

This research shows the direction in which future studies should go. First, the present work needs to be expanded to consider other potentially important temptations-related beliefs. For instance, other types of beliefs about temptations could be paid more attention. Drugs and alcohol share a common characteristic that involves a visceral instinct (Hofmann, Baumeister, Förster, & Vohs, 2012), and as such these types of temptations are qualitatively different from temptations in other domains. Indulging in temptations relating to food, social distractions, and engagement with forms of media may come at a different cost to other sorts of temptations, depending on situational factors. Secondly, various qualities of temptations, such as their immediacy or familiarity, may generate different types of beliefs regardless of individuals’ interactions with these temptations. Different views that consider when individuals are more or less
vulnerable to temptations or to the attractiveness of temptations could be explored to provide future directions in self-control research. Moreover, the varying degrees of indulgence necessary to acquire enough experience for oneself can form a diverse set of temptation-related beliefs. The two beliefs examined in the present studies are assumed to be most impactful when individuals are faced with situations where they can plan ahead or where their avoidance of temptations is inevitable. However, it is also possible that these types of beliefs can be most impactful during the course of any self-control process, since self-control can be a continuous process. Lastly, individuals may form a belief about what specific strategies they would use to resist temptations, other than their beliefs in avoidance and indulgence. Gollwitzer’s (1999) work on self-control strategies, including ‘forming a plan’, suggests that individuals are capable of developing explicit beliefs about what strategies would work best in order to resist temptations. Individuals who form a plan have a strategy that is already implicitly developed. Such strategy is used to overcome future temptations, as well as to pursue a certain goal. Moreover, their belief in the effectiveness of various different strategies used to resist temptations may have automatically formed a part of their beliefs. These beliefs could be researched further.

Additional possibilities to consider for future research involve exploring additional factors that could moderate the effect of individuals’ beliefs about the necessity of avoiding temptations as well as the utility of indulging in temptations.
Research on emotion regulation suggests that incremental and entity beliefs can selectively affect different types of emotion-regulation strategies more than others (Kneeland et al., 2016b). Such research has also shown that certain beliefs about temptations vary among individuals. Besides belief in temptations, factors such as self-compassion, self-forgiveness, self-efficacy, or promotion versus prevention regulatory focuses, may be potential factors that moderate the process of overcoming temptations. For instance, individuals with higher self-compassion or self-forgiveness may endorse a belief about the utility of indulging in temptations more strongly. This offers additional evidence that self-compassion helps to provide better coping strategies especially when individuals fail to achieve their goals (Neff, Hsieh, & Dejitterat, 2005). One study also suggests that individuals with promotion regulatory focus have a higher intensity of desire when they encounter temptations (Dholakia, Gopinath, Bagozzi, & Natarajan, 2006). The fundamental cause of this finding may relate to the fact that individuals with promotion regulatory focus have a weaker belief about the necessity of avoiding temptations.

The present set of studies relied on self-reported assessments of two temptation-related beliefs that are in line with self-reported assessments of other beliefs in self-control research. Nevertheless, as implicit belief research suggests, these beliefs work and their accurate assessment of the beliefs may not be reflected in their self-report.
Thus, future studies should employ situational manipulations similar to what has been
developed in manipulating other implicit beliefs.

Though explicitly articulated, implicit beliefs about temptations, like other
implicit beliefs, may have implications for automatic responses that could also be
examined more closely in future research. Recent research on emotion regulation reveals
that these implicit beliefs, which are automatically activated, are accurately captured
through response-latency procedures such as the Implicit Association Task (Greenwald
et al., 2002; Kneeland, Dovidio, Joormann, & Clark, 2016a). The proactive behavior of
avoiding temptations often occurs before the temptations become salient, and past
studies have established that this avoidance skillset is automatic. In one study,
individuals showed automatic avoidance by pushing away a joystick lever in order to
counteract stimuli from temptations (Fishbach & Shah, 2006). Another study also
demonstrated that individuals with high self-control are naturally equipped with
automatic avoidance skills against temptations (Imhoff, Schmidt, & Gerstenberg, 2013).
Accordingly, individuals’ beliefs about the necessity of avoiding temptations may be
activated automatically. Moreover, it is currently unclear whether the positive effects of
the indulgence belief can also occur automatically. Additional future research on these
possibilities should rule out confounding factors, and should measure the direct impact
of individuals’ beliefs about temptations on the pursuit of their goals.
To conclude, the five studies conducted contribute to the literature on self-control on the following two fronts. First, the studies extend existing research on implicit beliefs by examining individuals’ beliefs on how to best overcome temptations in the novel area of temptation management. This is the first attempt to link individuals’ temptation-related beliefs to significant factors, leading to the effective implementation of self-control. Second, the studies emphasize the significant connections between the two central beliefs of avoidance and indulgence and self-control, adding to the existing literature on self-control and inhibition, and helping to identify a comprehensive process for the effective implementation of self-control in the face of temptations.
Appendices

Appendix A: Beliefs about Temptations

First version of beliefs about temptations (7-point scale ranging from strongly disagree to strongly agree.)

Avoidance
- Self-control often involves people’s behavior to avoid temptations by anticipating where they can be exposed to them.
- The more I expose myself to temptations, the more I am putting my self-control at risk.
- The best way to deal with temptations is to preemptively steer clear of objects, places, and people that can potentially distract your goal pursuit.
- Avoiding temptations prevents me from learning how to overcome them.
- I would rather avoid potential distractions than resist those which are right in front of me.

Resistance
- To me, self-control is the ability to focus on my goal and to devalue temptations whenever I confront them.
- I believe that holding back the urges of temptations does not help to improve my self-control.
- The best way to overcome temptations is to ignore them whenever I encounter.
- The more I ignore temptations that are in front, the harder it will be get for me to ignore them in the future.
- I am very good at not paying attention to distractions and focusing on my important goal.

Indulgence
- Since I indulged in temptations in the past, I am better at overcoming them now.
- Indulging in a temptation will make the temptation even harder to resist the next time I encounter.
- Temptations become less appealing when I already indulge them in the past.
- Since I previously experienced temptations, it is harder for me to overcome them now.
- Temptations get less attractive once I indulge them.
- I believe that experiencing temptations does not give any benefits or harms.
Second version of beliefs about temptations (7-point scale ranging from strongly disagree to strongly agree.)

Avoidance
- Self-control often involves avoiding temptations by anticipating where that could be exposed to them.
- The more I expose myself to temptations, the more I am putting my self-control at risk.
- The best way to deal with temptations is to preemptively steer clear of objects, places, and people that can potentially distract your goal pursuit.
- Avoiding temptations prevents me from learning how to overcome them. (R)
- I would rather avoid potential distractions than resist those that are in front of me.

Indulgence
- I believe that holding back the urges of temptations does not help to improve my self-control.
- The more I ignore temptations that are in front, the harder it will get for me to ignore them in the future.
- Since I have indulged in temptations in the past, I am better at overcoming them now.
- Indulging in a temptation will make the temptation even harder to resist the next time I encounter. (R)
- Temptations no longer appeal when I already satiated them in the past.
- Once I give into temptations, they become less attractive.
Appendix B: Individual Difference Measurements

Self-Control Questionnaire (Tangney, Baumeister, & Boone, 2004) (5-point scale ranging from not at all to very much.)

- I am good at resisting temptation.
- I have a hard time breaking bad habits.
- I am lazy.
- I say inappropriate things.
- I do certain things that are bad for me, if they are fun.
- I refuse things that are bad for me.
- I wish I had more self-discipline.
- People would say that I have iron self-discipline.
- Pleasure and fun sometimes keep me from getting work done.
- I have trouble concentrating.
- I am able to work effectively toward long-term goals.
- Sometimes I can’t stop myself from doing something, even if I know it is wrong.
- I often act without thinking through all the alternatives.

Capacity for Self-Control Scale (Hoyle & Davisson, 2016) (5-point scale ranging from hardly ever to nearly always.)

- I am able to resist temptations.
- I waste a lot of time before getting down to work. (R)
- I have trouble resisting my cravings. (R)
- I delay as long as possible before starting something I expect to be unpleasant. (R)
- I am able to keep doing what I think I should do, even when other people would stop.
- I can deny myself something I want but don’t need.
- I waste time on things that don’t really matter, rather than working on things that do. (R)
- When I commit to doing something difficult, I see it through to the end.
- My bad habits cause problems for me. (R)
- I just can’t seem to get going, even when I have much to do. (R)
- Not much can stop me from honoring a commitment to better myself.
- When I want something that is bad for me, I go after it anyway. (R)
- Even when the list of things to do is long, it is easy for me to get started.
- I find it hard to continue doing something I don’t want to do. (R)
- I am able to control how I react to impulses.
• I get started on new projects right away.
• After I have started a challenging task, I find it easy to stick with it.
• If I want to do something I know I shouldn’t, I won’t do it.
• I do nothing despite having plenty to do. (R)
• I find it easy to keep with good behavior.

Belief in Lay Theories of Self-Control (Freeman, Shmueli, Muraven, 2013) (5-point scale ranging from hardly ever to nearly always.)

• I believe that people are limited in their ability to control themselves.
• I believe that people cannot hold themselves back beyond a point.
• Everyone has a certain amount of self-control, and one can't do much to change this amount.
• People can get incentives and disincentives, but they can’t really change their basic self-control.
• I can learn new ways to increase your self-control but I can’t really change my basic self-control ability.
• A person’s ability to resist temptation is a fixed quality.

Self-Compassion Scale - short form (SCS-SF) (Raes et al., 2011) (5-point scale ranging from hardly ever to nearly always.)

• When I fail at something important to me I become consumed by feelings of inadequacy.
• I try to be understanding and patient towards those aspects of my personality I don’t like.
• When something painful happens I try to take a balanced view of the situation.
• When I’m feeling down, I tend to feel like most other people are probably happier than I am.
• I try to see my failings as part of the human condition.
• When I’m going through a very hard time, I give myself the caring and tenderness I need.
• When something upsets me I try to keep my emotions in balance.
• When I fail at something that’s important to me, I tend to feel alone in my failure.
• When I’m feeling down I tend to obsess and fixate on everything that’s wrong.
• When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people.
• I’m disapproving and judgmental about my own flaws and inadequacies.
• I’m intolerant and impatient towards those aspects of my personality I don’t like.
Appendix C: Study 1

You have an option to choose the test from either a standard version (A) or a stylized version (B) that you would like to complete. The content of the questions are exactly the same and only the design of the screen is different. Here are the example screen shots of two different versions of the test:

The standard version (A) - questions without any pictures

Choose the answer key corresponding to the word with a meaning most nearly opposite to the meaning of word in capital letters.

Example: OBSEURATE

- amenable
- station
- seat
- susto
- advanced

The stylized version (B) - questions with pictures on the screen

Choose the answer key corresponding to the word with a meaning most nearly opposite to the meaning of word in capital letters.

Example: OBSEURATE

- amenable
- station
- seat
- susto
- advanced

Which version would you like to complete the test? Please choose your option below.

The standard version (A) □ The stylized version (B) □
Choose the answer key corresponding to the word with a meaning most nearly opposite to the meaning of word in capital letters.

INORDINATE
- matte
- exostative
- venal
- mundane
- preternatural

MODERN
- moribund
- averted
- salutary
- hidebound
- burgeoning
Appendix D: Study 2

1. Temptation condition

Find as many spelling mistakes as possible. Mark the spelling mistakes by clicking the each word in green.

Student: I don’t understand why my grade was so low. How did I do on my research paper? Teacher: Actually, you didn’t turn in a research paper. You turned in a random assemblage of sentences. In fact, the sentences you apparently kidnapped in the dead of night and forced into this violent and arbitrary plan of yours clearly seemed to be placed on the pages against their will. Reading your paper was like watching unfamiliar uncomfortable people interacting at a cocktail party that no one wanted to attend in the first place. You didn’t submit a research paper. You submitted a hostage situation.

My fellow teacher called for help—she needed someone who know about animals. As a science teacher, I filed the bill. "Oh," she added, "brung a net." Expecting to find some kind of beast as I entered her classroom, I was greeted instead by the sight of excited kids watching a hummingbird fly around. Rather than use the net, I suggested they hang red paper by an open door. The bird would be drawn to it, I explained, and eventually fly out. Later, the teacher called me back. The trick worked. "Now," she said, "we have two hummingbirds flying around the room."
2. Control condition

For instance, Dr Poh, citing documents from the Colonial Office, disclosed that Mr Lee, who was leading the then opposition People's Action Party (PAP) in the 1950s, had worked hand-in-glove with Singapore's then chief minister Lim Yew Hock to arrest leftist leaders in his own party. They included Mr Lim Chin Siong, who was among those who split from the PAP to form rival political party Barisan Sosialis in 1961. The book begins with the little-publicized fact that Dr Poh is a maternal grandson of one of Singapore's early Chinese business leaders Mr Tan Kah Kee.

But herein lies a deep paradox which, with widespread poverty and rampant social discrimination, should have, in fact, been fertile ground for its success. In the recent past, many commentators have noted the long-term declining support base of Left parties in India. The Left Front's national vote share in 2014 was the lowest ever (4.8 per cent), down from the high of 10.6 per cent in 1989. The strength of the Left contingent in Parliament has also plummeted significantly. However, what is less well analyzed is the shrinking support based and deteriorating organization strength of the Left Front in India.
Appendix E: Study 3

As part of this survey, you will complete the 'finding objects' task. You will see various objects that are scattered in the pictures below. You have to find and count the number of target objects from the pictures. Your goal is to score as much as you can. However, not all answers are scored same.

When you accurately count each set of objects in the low-value version, you will receive 2 points.
When you accurately count each set of objects in the high-value version, you will receive 8 points.

Please indicate how many sets of objects are hidden in the picture by selecting the number from the drop-down list.

<table>
<thead>
<tr>
<th>Object</th>
<th>Low-value version</th>
<th>High-value version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cherry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kettle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ice cream</td>
<td></td>
<td></td>
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<tr>
<td>Chicken</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Battery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toothbrush</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Owl</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

85
Appendix F: Study 4

Imagine you are currently on a diet and trying to choose healthy options for food. You have a dinner appointment with your friend on Saturday and need to drive. You have four options to choose. The overall nutritional information for each restaurant is reflected in the HealthStar rating from 1 to 5 (1 being the worst), and the driving distances are also presented below.

Using the scale provided, please indicate to what extent you would choose each restaurant for your dinner?

<table>
<thead>
<tr>
<th>Restaurant</th>
<th>Very unlikely</th>
<th>Unlikely</th>
<th>Somewhat unlikely</th>
<th>Neutral</th>
<th>Somewhat likely</th>
<th>Likely</th>
<th>Very likely</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restaurant A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restaurant B</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Restaurant C</td>
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<tr>
<td>Restaurant D</td>
<td></td>
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</tbody>
</table>

Imagine that you are dieting and thus trying to restrict your calorie intake. Your lunch group has already decided the restaurant and here is the menu below. How likely would you order the following items for your lunch?

**LUNCH MENU**

- **Hand Tossed Salads** (400 calories)
  - Watermelon Feta Salad
  - Modern Greek Salad
  - Spicy Thai Salad
  - Green Goddess Cobb Salad

- **Panini & Sandwiches** (1600 calories)
  - Frontega Chicken Panini
  - Steak & White Cheddar Panini
  - Bacon, Egg & Cheese on Ciabatta
  - Sierra Turkey Sandwich

<table>
<thead>
<tr>
<th>Item</th>
<th>Extremely Unlikely</th>
<th>Unlikely</th>
<th>Somewhat Unlikely</th>
<th>Neutral</th>
<th>Somewhat Likely</th>
<th>Likely</th>
<th>Extremely Likely</th>
</tr>
</thead>
<tbody>
<tr>
<td>Watermelon Feta Salad</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modern Greek Salad</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spicy Thai Salad</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Green Goddess Cobb Salad</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frontega Chicken Panini</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steak &amp; White Cheddar Panini</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Bacon, Egg &amp; Cheese on Ciabatta</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sierra Turkey Sandwich</td>
<td></td>
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</tbody>
</table>
Appendix G: Study 5

Now, you will be completing two word search puzzles. You will work on each puzzle that consists of a letter grid containing words of four letters or more for three minutes. The words may be hidden horizontally (from left to right) or vertically (from top to bottom) as illustrated in the figure below. You will receive points for the words you find in the puzzle, but not all solutions are worth the same amount of points.

For each horizontal word, you find you will receive 2 points. For each vertical word you find, you will receive 8 points.

Your goal is to get as many points as possible. If your overall point total on the first word search puzzle is greater than 75% of the participants who have already completed this survey, you will not be required to complete the second word search puzzle.

2 points

8 points

Please try to score as many points as possible. If your overall point total on the first word search puzzle is greater than 75% of the participants who have already completed this survey, you will not be required to complete the second word search puzzle.

For each horizontal word, you find you will receive 2 points. For each vertical word you find, you will receive 8 points.
Appendix H: Correlation between beliefs about temptations and individual difference measurements

Pilot study
Correlations among measurements for Belief in Avoidance, Belief in Resistance, Belief in Indulgence, Self-Compassion (SCS-SF) (Raes et al., 2011), Heartland Self-Forgiveness Scale (HFS) (Thompson & Synder, 2003), General Self-Efficacy Scale (GSE) (Schwarzer & Jerusalem, 1995), Neuroticism (from Eysenck Personality Questionnaire, Short Form) (EPQR-S) (Eysenck et al., 1985), View of Temptations (Masicampo), Composite Regulatory Focus Scale (CRFS) (Haws et al. 2010).

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Avoidance</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Resistance</td>
<td>.544**</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>3. Indulgence</td>
<td>-.138</td>
<td>.169</td>
<td>-</td>
</tr>
<tr>
<td>4. Self-Compassion</td>
<td>-.150</td>
<td>.177</td>
<td>.328**</td>
</tr>
<tr>
<td>5. Self-Forgiveness</td>
<td>-.073</td>
<td>.055</td>
<td>.125</td>
</tr>
<tr>
<td>6. Self-Efficacy</td>
<td>.243*</td>
<td>.288**</td>
<td>.111</td>
</tr>
<tr>
<td>7. Neuroticism</td>
<td>-.139</td>
<td>.093</td>
<td>.186</td>
</tr>
<tr>
<td>8. View of Temptation</td>
<td>.385**</td>
<td>.235*</td>
<td>-.232*</td>
</tr>
<tr>
<td>9. Focus Promotion</td>
<td>.158</td>
<td>.300**</td>
<td>.098</td>
</tr>
<tr>
<td>10. Focus Prevention</td>
<td>.438**</td>
<td>.287**</td>
<td>-.154</td>
</tr>
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</table>

Note. *=p<.05 **=p<.01

Study 1
Correlations among measurements for belief in avoidance, belief in resistance, belief in indulgence, Capacity for Self-Control Scale (CSCS), Self-Control, Self-Compassion Scale.

<table>
<thead>
<tr>
<th></th>
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<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<td>1. Avoidance</td>
<td>-</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>2. Resistance</td>
<td>.014</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Indulgence</td>
<td>.057</td>
<td>.410**</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. CSCS</td>
<td>-.042</td>
<td>-.341**</td>
<td>-.106</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>5. Self-Control</td>
<td>-.096</td>
<td>-.366**</td>
<td>-.055</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

Note. *=p<.05 **=p<.01

Study 2
Correlations among measurements for belief in avoidance, belief in resistance, belief in indulgence, Capacity for Self-Control Scale (CSCS), Self-Control
<table>
<thead>
<tr>
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<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Avoidance</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Resistance</td>
<td>-.195*</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Indulgence</td>
<td>-.057</td>
<td>.299*</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. CSCS</td>
<td>-.122</td>
<td>-.043</td>
<td>.129</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Self-Control</td>
<td>-.019</td>
<td>-.035</td>
<td>.084</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Compassion</td>
<td>-.063</td>
<td>-.021</td>
<td>.195*</td>
<td>-</td>
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<td></td>
</tr>
</tbody>
</table>

Note. *=p<.05 **=p<.01

**Study 3**

Correlations among measurements for belief in avoidance, belief in indulgence, Capacity for Self-Control Scale (CSCS), Self-Control, Belief in Lay Theories of Self-Control

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Avoidance</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Indulgence</td>
<td>-.147**</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. CSCS</td>
<td>.042</td>
<td>-.035</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Self-Control</td>
<td>.025</td>
<td>-.055</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Fixed mindset</td>
<td>-.088*</td>
<td>.441**</td>
<td>-</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. *=p<.05 **=p<.01

**Study 4**

Correlations among measurements for belief in avoidance, belief in indulgence, Capacity for Self-Control Scale (CSCS), Self-Control, Belief in Lay Theories of Self-Control

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Avoidance</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Indulgence</td>
<td>-.103</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. CSCS</td>
<td>-.103</td>
<td>-.059</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Self-Control</td>
<td>-.163*</td>
<td>-.002</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Fixed mindset</td>
<td>.063</td>
<td>.465**</td>
<td>-</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. *=p<.05 **=p<.01

**Study 5**

Correlations among measurements for belief in avoidance, belief in indulgence, Capacity for Self-Control Scale (CSCS), Self-Control, Belief in Lay Theories of Self-Control

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Avoidance</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

89
<table>
<thead>
<tr>
<th></th>
<th>2. Indulgence</th>
<th>3. CSCS</th>
<th>4. Self-Control</th>
<th>5. Fixed mindset</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-.150*</td>
<td>-.012</td>
<td>-.024</td>
<td>.008</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-.011</td>
<td>-.031</td>
<td>.509**</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. *=p<.05 **=p<.01
### Appendix I: Factor Loading of Beliefs about Temptations

Factor loadings and communalities based on a principal components analysis with varimax rotation for 15 items from first version of beliefs about temptations (Study 1 & Study 2)

<table>
<thead>
<tr>
<th>Component 1</th>
<th>Component 2</th>
<th>Component 3</th>
<th>Component 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-control often involves people’s behavior to avoid temptations by anticipating where they can be exposed to them.</td>
<td>.672</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The more I expose myself to temptations, the more I am putting my self-control at risk.</td>
<td></td>
<td>.684</td>
<td></td>
</tr>
<tr>
<td>The best way to deal with temptations is to preemptively steer clear of objects, places, and people that can potentially distract your goal pursuit.</td>
<td></td>
<td></td>
<td>.734</td>
</tr>
<tr>
<td>Avoiding temptations prevents me from learning how to overcome them.</td>
<td></td>
<td></td>
<td>.753</td>
</tr>
<tr>
<td>I would rather avoid potential distractions than resist those which are right in front of me.</td>
<td></td>
<td>.636</td>
<td></td>
</tr>
<tr>
<td>To me, self-control is the ability to focus on my goal and to devalue temptations whenever I confront them.</td>
<td></td>
<td></td>
<td>.620</td>
</tr>
<tr>
<td>I believe that holding back the urges of temptations does not help to improve my self-control.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The best way to overcome temptations is to ignore them whenever I encounter.</td>
<td></td>
<td></td>
<td>.464</td>
</tr>
<tr>
<td>The more I ignore temptations that are in front, the harder it will be get for me to ignore them in the future.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am very good at not paying attention to distractions and focusing on my important goal.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Since I indulged in temptations in the past, I am better at overcoming them now.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Indulging in a temptation will make the temptation even harder to resist the next time I encounter.

Temptations become less appealing when I already indulge them in the past.

Since I previously experienced temptations, it is harder for me to overcome them now.

Temptations get less attractive once I indulge them.

Note. Factor loading <.3 are suppressed. Component 1: Avoidance, Component 2: Indulgence
Factor loadings and communalities based on a principal components analysis with varimax rotation for 10 items from second version of beliefs about temptations (Study 3 & Study 4 & Study 5)

<table>
<thead>
<tr>
<th>Item</th>
<th>Component 1</th>
<th>Component 2</th>
<th>Component 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-control often involves avoiding temptations by anticipating where that could be exposed to them.</td>
<td>.718</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The more I expose myself to temptations, the more I am putting my self-control at risk.</td>
<td>.827</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The best way to deal with temptations is to preemptively steer clear of objects, places, and people that can potentially distract your goal pursuit.</td>
<td>.807</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Avoiding temptations prevents me from learning how to overcome them.</td>
<td></td>
<td></td>
<td>.692</td>
</tr>
<tr>
<td>I would rather avoid potential distractions than resist those that are in front of me.</td>
<td>.632</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I believe that holding back the urges of temptations does not help to improve my self-control.</td>
<td></td>
<td>.358</td>
<td>.727</td>
</tr>
<tr>
<td>The more I ignore temptations that are in front, the harder it will get for me to ignore them in the future.</td>
<td></td>
<td>.403</td>
<td>.690</td>
</tr>
<tr>
<td>Since I have indulged in temptations in the past, I am better at overcoming them now.</td>
<td></td>
<td></td>
<td>.729</td>
</tr>
<tr>
<td>Indulging in a temptation will make the temptation even harder to resist the next time I encounter.</td>
<td>.528</td>
<td></td>
<td>.392</td>
</tr>
<tr>
<td>Temptations no longer appeal when I already satiated them in the past.</td>
<td></td>
<td></td>
<td>.831</td>
</tr>
<tr>
<td>Once I give into temptations, they become less attractive.</td>
<td></td>
<td></td>
<td>.776</td>
</tr>
</tbody>
</table>

Note. Factor loading <.3 are suppressed. Component 1: Avoidance, Component 2: Indulgence
### Appendix J: Study 2 output

Summary of multiple regression analysis for variables predicting performance improvement on spelling detection error task (not significant)

<table>
<thead>
<tr>
<th>Variable</th>
<th>B coefficient</th>
<th>SE_B</th>
<th>β coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-control</td>
<td>.026</td>
<td>.011</td>
<td>.190*</td>
</tr>
<tr>
<td>Indulgence</td>
<td>-.002</td>
<td>.011</td>
<td>-.016</td>
</tr>
<tr>
<td>Avoidance</td>
<td>-.004</td>
<td>.011</td>
<td>-.032</td>
</tr>
</tbody>
</table>

Summary of multiple regression analysis for variables predicting performance of the first control condition on spelling detection error task

<table>
<thead>
<tr>
<th>Variable</th>
<th>B coefficient</th>
<th>SE_B</th>
<th>β coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-control</td>
<td>.900</td>
<td>.343</td>
<td>.210</td>
</tr>
<tr>
<td>Indulgence</td>
<td>-.142</td>
<td>.345</td>
<td>-.033</td>
</tr>
<tr>
<td>Avoidance</td>
<td>.258</td>
<td>.343</td>
<td>.060</td>
</tr>
</tbody>
</table>

Note. * p < .05

Summary of multiple regression analysis for variables predicting performance of the first temptation condition on spelling detection error task

<table>
<thead>
<tr>
<th>Variable</th>
<th>B coefficient</th>
<th>SE_B</th>
<th>β coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-control</td>
<td>1.10</td>
<td>.425</td>
<td>.210</td>
</tr>
<tr>
<td>Indulgence</td>
<td>-.238</td>
<td>.426</td>
<td>-.045</td>
</tr>
<tr>
<td>Avoidance</td>
<td>.185</td>
<td>.425</td>
<td>.035</td>
</tr>
</tbody>
</table>

Note. * p < .05

Summary of multiple regression analysis for variables predicting performance of the second control condition on spelling detection error task

<table>
<thead>
<tr>
<th>Variable</th>
<th>B coefficient</th>
<th>SE_B</th>
<th>β coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-control</td>
<td>.900</td>
<td>.343</td>
<td>.210</td>
</tr>
<tr>
<td>Indulgence</td>
<td>-.142</td>
<td>.345</td>
<td>-.033</td>
</tr>
<tr>
<td>Avoidance</td>
<td>.258</td>
<td>.343</td>
<td>.060</td>
</tr>
</tbody>
</table>

Note. * p < .05

Summary of multiple regression analysis for variables predicting performance of the second temptation condition on spelling detection error task

<table>
<thead>
<tr>
<th>Variable</th>
<th>B coefficient</th>
<th>SE_B</th>
<th>β coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-control</td>
<td>1.10</td>
<td>.425</td>
<td>.210</td>
</tr>
<tr>
<td>Indulgence</td>
<td>-.238</td>
<td>.426</td>
<td>-.045</td>
</tr>
<tr>
<td>Avoidance</td>
<td>.185</td>
<td>.425</td>
<td>.035</td>
</tr>
</tbody>
</table>

Note. * p < .05
References


Gollwitzer, P. M., & Brandstätter, V. (1997). Implementation intentions and effective goal...
doi:10.1037/0022-3514.73.1.186


doi:10.1207/s15327957pspr0202_5


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Biography

Su Hean Park was born in Seoul, South Korea, on August 8, 1981. She attended Korea University in Seoul, South Korea and received a B.A. in Psychology and Education in February 2006. She earned a M.S. in Social and Cultural Psychology from London School of Economics and Political Science in London, UK in October 2008.

During her graduate career, Su Hean received an Interdisciplinary Behavioral Research Center (IBRC) Research Grand Award, a Claire Hamilton Graduate Studies Conference Travel Award, and a Graduate Travel Award from Society for Personality and Social Psychology. She is currently a member of the Society for Personality and Social Psychology and American Psychological Association.