The Impact of Individual Differences in Distance-Construal Associations on Self-Control

THESIS

Presented in Partial Fulfillment of the Requirements for the Degree Master of Arts in the Graduate School of The Ohio State University

By

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Graduate Program in Psychology

The Ohio State University

2011

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Abstract

Self-control success is determined in part by one’s construal, or subjective mental representation, of the situation. Such construal levels are cued by psychological distance, or the distance between the observer’s direct experience and the situation being construed. Past research indicates that higher level construals, which are associated with psychological distance, promote self-control success while lower level construals, which are associated with psychological proximity, undermine self-control success. Higher levels of construal are thought to promote self-control success because they allow one to act in accordance with abstract, global goals that may be masked by the contextualized details of a lower level of construal. The present work examines the strength of association between psychological distance and construal level. It is hypothesized that psychological distance and construal level will be associated and that individual differences in the strength of these associations as well as ability to break out of them will predict self-control success. Specifically, it was expected that identification of target objects would be speeded when there was a congruency between distance and construal (distality with high level construal and proximity with low level construal) as compared to an incongruency between distance and construal (distality with low level construal and proximity with high level construal). It was also expected that those whose association between distance and construal is weak should have greater self-control success due to an ability to construe a proximal temptation at a high level. Two experiments test these
hypotheses. While the results of Study 2 provide further support for the association between distance and construal, the hypothesis that those with a weaker association will have better self-control than those with a rigid association was not supported. Implications for models of self-control as well as implications for research on individual differences in construal levels are discussed.
Acknowledgments

I would like to thank my advisor, Kentaro Fujita, for immeasurable patience and support throughout the research process, as well as for his intellectual guidance and inspiration.

I would also like to thank the OSU graduate students who have provided support along the way, both within and beyond the bounds of academia. I am especially grateful to the members of Fujita lab (Joe Roberts, Karen, MacGregor, Jo Sasota, and Paul Stillman).
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Chapter 1: Introduction

It is hardly a controversial statement to contend that self-control is a critical component to living a good life and reaching one’s goal. Self-control has been extolled as a virtue since the time of Aristotle and its importance can hardly be overstated in goal-pursuit. Self-control is conceptualized as a choice between a larger, later reward and a smaller, sooner reward (Ainslie, 1975; Fishbach, Friedman, & Kruglanski, 2003; Mischel & Baker, 1975; Rachlin & Green, 1972; Trope & Fishbach, 2004). When an individual forgoes the immediate, salient rewards in favor of the larger, more primary long-term goals, they are said to have succeeded in self-control whereas when an individual forgoes their primary, long-term goals in favor of immediate, salient rewards, they are said to have failed at self-control. Examples of self-control conflicts abound in everyday life and include going to a party with friends (a near-term goal) versus studying for an important exam (a long-term goal), spending money now versus saving for retirement, and enjoying a cigarette versus improving health by quitting smoking. Dieting is another self-control conflict that involves a choice between a smaller, immediate reward (eating something delicious) and a larger, longer-term goal (being slim and healthy). Failures in self-control at the individual level add up to serious consequences at the national level. With obesity
at epidemic rates, the American health care system is buckling under the costs of obesity related diseases and longitudinal studies have found that if obesity rates continue to grow as they have been, the US will see a leveling off, or even a reversal, of life expectancy (Olshansky, Passaro, & Hershow, 2005). Obesity has also been shown to cut active life expectancy by nearly 2 years (Reynolds & McIlvane, 2009). With such serious and widespread consequences for self-control failures, particularly in the domain of dieting, self-control must be better understood, so that it may be improved.

Social-Psychological Models of Self-Control

Social psychology has proposed several models for understanding self-control. Many of these highlight the difference between automatic and effortful cognitions as responsible for self-control failure and success (Hofmann, Friese, & Strack, 2009; Strack & Deutsch, 2004). A temptation automatically and effortlessly triggers thoughts and behaviors, or impulses, to acquire that temptation, increasing the chances of self-control failure. For example, reading about delicious foods led dieters to spontaneously and effortlessly activate hedonic thoughts about eating (Papies, Stroebe, & Aarts, 2007). Self-control success, according to these models, relies on effortful and deliberative processes to override these automatic temptations. When one’s ability to engage in such processes is curtailed, such as under states of cognitive load, self-control failure should be more likely. Indeed, restrained eaters indulged in greater amounts of unhealthy food when under cognitive load than restrained eaters who were not under cognitive load (Ward &
Mann, 2000), indicating that automatic impulses are likely to dominate unless effortful considerations are powerful enough to intervene.

Roy Baumeister and his colleagues have put forth an ego depletion model of self-control that falls within the umbrella of automatic versus effortful control theories. Ego depletion proposes that self-control draws on a limited motivational resource. Once this resource is depleted by an act of self-control, or effortfully overcoming impulses, there is less of this resource available to fuel the next self-control attempt. This makes people more likely to fail in a subsequent unrelated self-control conflict (Baumeister & Heatherton, 1996; Muraven, Tice, & Baumeister, 1998; Muraven & Baumeister, 2000). For example, subjects instructed to suppress a forbidden thought were less persistent on a subsequent unsolvable anagram task (Muraven et al., 1998).

Other theoretical frameworks of self-control have focused on whether information is processed affectively or cognitively as the primary determinant for self-control failure or success. Walter Mischel and colleagues have suggested a “hot” system and “cool” system that respond to self-control conflicts (Mischel, Shoda, & Rodriguez, 1989; Metcalfe & Mischel, 1999). When processing of such a conflict is dominated by the “hot” system, choices are likely to be based on emotional responses which overweight the salience of local rewards. When processing of such a conflict is dominated by the “cool” system, choices are likely to be based on rational deliberations that give greater weight to global considerations, increasing the chances of self-control success. The risk for self-
control is that the hot system can overcome the cool system in the moment of choice to nudge judgments and behavior towards the temptation (see also, Loewenstein, 1996). In these affect versus cognition theoretical frameworks, processing a self-control conflict cognitively rather than affectively has been shown to promote self-control success (Mischel & Baker, 1975). For example, children were better able to delay gratification in get a larger reward of a delicious food (two marshmallows instead of one) when instructed to think of the marshmallows as fluffy white clouds than when instructed to think of the appetitive qualities of the marshmallows.

Construal Level Theory

A relatively newer theoretical framework for self-control aims to integrate previous models by identifying underlying process that they have in common. Construal level theory maintains that a critical component of why people succeed or fail in self-control conflicts is how that conflict is subjectively construed. While two people may see the exact same event, they will understand that event quite differently, through the lens of individual experience. It is this subjective meaning, rather than any objective standard, that influences judgments and behaviors and it is these subjective construals that separate those with bad self-control from those with good self-control. A critical dimension on which subjective construals vary is in their level – high or low. Construal level theory is concerned with whether a situation is construed at a high or low level and how this impacts on judgments and decisions, including those relevant to self-control conflicts.
Construal level theory proposes that people create distant-dependent mental representations of the world around them based on level of abstraction (Liberman, Trope, McCrae, & Sherman, 2007; Trope & Liberman, 2003; Trope, Liberman, & Wakslak, 2007). Level of abstraction is primarily determined by the amount of psychological distance from the observer to the situation (Bar-Anan, Liberman, & Trope, 2006). Psychological distance increases as the situation moves away from one’s direct experience. Direct experience takes place in one’s immediate “here-and-now” and requires no mental traveling from this reference point. The farther an individual travels from the here-and-now of direct experience, the more psychological distance they have from that situation. Traversing greater psychological distances requires higher levels of construal. When construing at a higher level, people are more focused on the abstract, superordinate, and primary attributes of an object or event. Greater weight is given to desirability concerns and situations are considered outside of a specific context. Psychological proximity, on the other hand, requires lower levels of construal. When construing at a lower level, people are focused on the concrete, subordinate, and peripheral attributes of an object or event. Greater weight is given to feasibility concerns and events are considered within a specific context.

Level of abstraction hinges on psychological distance because of the type of information that is typically available about near versus distant objects and events. The closer the situation to the observer’s direct experience, the more detailed and reliable
information is known about that situation. On the other hand, when situations are distal, less detailed information is typically known and the observer must instead extract the gist given what is known about similar situations encountered in the past. Information is processed schematically. This association between distance and construal becomes overgeneralized such that distant situations are construed at a higher level regardless of the amount of detailed information that is known in that instance (Bar-Anan et al., 2006). Psychological distance has been found to vary along four dimensions: physical space, time, hypotheticality, and social distance. Objects and events that are separated from the observer by greater amounts of physical space (Fujita, Henderson, Eng, Trope & Liberman, 2006) or greater amounts of time (Liberman, Sagristano, & Trope, 2002; Liberman et al., 2007), either in the past or in the future, are construed at a higher level. Similarly, events that are seen as less likely to occur are construed at a higher level (Todorov, Goren, & Trope, 2007; Wakslak, Trope, Liberman, & Alony, 2006). Greater perceived social distance between the observer and another person evokes higher levels of construal (Liviatan, Trope, & Liberman, 2008). Individuals are therefore more likely to view the behavior of others as more global and dispositional than their own behavior, for which they have more context and detailed information (Robins, Spranca, & Mendelsohn, 1996). This association between construal and distance is bi-directional; while increased psychological distance results in higher levels of construal, higher levels of construal also increase perceived psychological distance (Trope & Liberman, 2010). The level at which
an individual construes a situation impacts on their judgments and behavior, including self-control behavior.

Higher level construals have also been shown to be more goal-relevant than lower level construals because higher level construals highlight the goal-relevant features of any given situation. An individual’s goals help determine what information is essential and primary, leading to construal in terms of “why” rather than “how” (Liberman & Trope, 1998) and promoting goal-relevant behavior (Trope & Liberman, 2000). For example, Trope & Liberman (2000) showed that people were more likely to make consumer choices that were in line with their goals when the decision was temporally distant than when it was temporally near. Subjects were given a goal of purchasing a clock-radio for the purpose of listening to music and were asked to choose between a product that performed well on the central feature (good sound quality) but poorly on a peripheral attribute (worthless clock) and a product that performed poorly on the central feature (bad sound quality) but well on a peripheral attribute (good clock). They were more likely to pick the product that performed well on the central feature when the decision was presented as a year away than when it was presented as a day away, indicating that higher level construals lead to evaluations that are in line with global goals.
Self-Control as a Construal-Dependent Process

There is much evidence supporting the notion that self-control is a construal-dependent process. Construing a self-control conflict at a low level focuses a decision-maker on local, immediate rewards and impedes self-control success while construing a self-control conflict at a high level focuses attention on the global, more abstract concerns and promotes self-control success (Fujita, 2008). This relationship can predispose people to fail at self-control because of the way the typical self-control conflict breaks down. In the typical self-control conflict, an indirect experience with a temptation (or greater psychological distance between the decision-maker and the stimulus) focuses attention on abstract goals and allows an individual to construe choices and preferences in terms of those global goals and ends. Conversely, a direct experience with a temptation (or greater psychological proximity between the decision-maker and the stimulus) focuses attention on concrete immediate rewards and constrains an individual to construe choices in terms of immediate, salient incentives. This typical scenario sets up a problem for self-control because at the moment of choice, the temptation is likely to be physically proximal; a dieter may have the best of intentions of eating only vegetables at the company holiday party only to find those intentions trumped by the invitingness of the dessert table. The physical proximity of the temptation cues low-level construal, which in turn promotes low-level, local goals.
For example, imagine a dieter choosing between a healthy apple and an unhealthy candy-bar. At greater psychological distance the dieter is able to construe the choice as one between a goal of weight loss and a goal of hedonism. Assuming a committed dieter values weight loss more than hedonism, such a high-level construal increases the likelihood of acting in accordance with that goal and choosing the apple. Now imagine that the food options are right in front of the dieter. The same choice between a healthy apple and an unhealthy candy-bar now becomes a choice between a Red Delicious and a Twix. Assuming that the Twix is considered to be better snack, such a low-level construal increases the chances that the dieter will choose the candy-bar, thereby forgoing the larger, later reward of weight loss in favor of the immediate gratification of the tasty snack. This example illustrates that shifts in distance trigger shifts in construal which impact on preferences and eventual choices and on whether or not those choices are in line with global goals.

While this distance-construal association can predispose people to fail at self-control, such tendencies can be overcome by higher levels of construal, as has been shown in laboratory studies. Research participants who are induced to higher-levels of construal have better self-control than those induced to lower-levels of construal. For example, subjects who are manipulated to think at a high-level of construal are more likely to associate candy-bars with negativity on an implicit association test and are more likely to choose an apple over a candy-bar in a forced choice, in line with dieting goals.
(Fujita & Han, 2009). While laboratory manipulations have reliably increased construal-level (and therefore self-control success), it is likely that there are also individual differences in chronic levels of construal, such that some people may be predisposed to construe at a higher or lower level. Critically, there may also be individual differences in how strongly distance and construal are associated, such that for some people the presentation of one (such as psychological proximity) rigidly cues the other (such as low level construal) while for other people this association may be more flexible. Construal level research has only begun to address the issue of individual difference in how self-control conflicts are construed. However, the same construal level framework that has been proven via experimental laboratory manipulation should also work with an individual differences approach. Because a weaker association between distance and construal creates the possibility for people to adopt high level construals in the face of immediate temptations, even when cued by the environment to construe at a low level, individual differences in the strength of association between distance and construal should predict how successful people are at self-control.

**Individual Differences in Distance-Construal Association**

Psychological distance and construal are associated theoretically as well as empirically, as indicated by results of an implicit association test (IAT). An IAT asks participants to sort stimuli representing four different concepts into two response categories. Subjects should respond faster to concepts that are included in the same
response category if those concepts are associated and respond slower if concepts in the same response category are not associated (Greenwald, McGhee, & Schwartz, 1998). Bar-Anan et al. (2006) used an IAT to examine the association between distance and construal and found that physically distant concepts were associated with high level construal concepts (and physically proximal concepts with low level construal concepts). Subjects performed faster (had lower reaction times) when distant objects (such as airplane and clouds) and words denoting abstraction (such as general and universal) were responded to on the same key than when distant objects were paired with concrete words. Similarly, subjects performed faster when near objects (such as door and chair) and words denoting concreteness (such as specific and detailed) were responded to on the same key than when near object were paired with abstract words (Bar-Anan et al., 2006). While such distance-construal associations are likely universal, individuals may differ in the extent to which these two dimensions are associated.

Individual differences in the strength of distance-construal association may impact on self-control. For individuals with strong associations between distance and construal, one would expect more dramatic shifts in construals based on psychological distance. Distance would strongly cue high-level construal while proximity would strongly cue low-level construal. Such a disposition may predispose such individuals to fail because temptations are often proximal at the moment of choice in a self-control conflict. Individuals with a relatively weaker association between distance and construal
would likely have less dramatic shifts in construals based on psychological distance, which would permit for great ability to construe temptations in a different way than the one cued by the environment. This allows for the possibility for someone with a weaker distance-construal association to construe a proximal temptation at a high-level and therefore increase their chances of self-control success. In other words, someone with a weak distance-construal association might be able to opt out of the construal level cued by the situation and instead construe a proximal temptation at a high level, which is likely to advance self-control goals. To examine the role of strength of distance-construal association in self-control, we must first measure the strength of association between these two dimensions, which can be achieved via a Stroop task.

Similarly to the IAT, a Stroop task measures strength of association between two dimensions based on speeded classification (Stroop, 1935). The difference between performance on congruent versus incongruent compounds of the dimensions provides a measure of strength of association, controlling for individual differences in baseline performance speed. In the classic Stroop experiment, subjects were asked to report the font color of a color-word. Performance was speeded when the stimulus was matched on these dimensions (the word “RED” written in red ink) but impeded when the stimulus was mismatched on these dimensions (the word “RED” written in green ink). A Stroop effect can also indicate strength of association between distance and construal, as in a recent study by Amit, Algom, & Trope (2009).
Amit et al. (2009) examined the amount of psychological distance conferred by picture representations versus word representations via a Stroop Task. Subjects were shown two objects and were asked to classify those objects by pressing a designated key on the keyboard. Construal was manipulated by presenting the objects as pictures in half of the trials and words in the other half. Amit et al.’s use of pictures and words to represent low and high levels of construal is supported by construal level theory. Pictures are more concrete than words because they generally refer to a specific object rather than an entire class of objects and physically resemble the object to which they refer. This physical resemblance makes pictures closer to a direct experience with the object and maps on to a low level of construal, relative to words. Words are more abstract than pictures because they generally refer to an entire class of objects and are physically dissimilar from those referent objects. This physical dissimilarity makes words less like our direct experience with the object and maps on to a higher level of construal, relative to pictures.

Psychological distance, in this case, physical distance, was manipulated via the slanted lines of a Ponzo illusion designed to make objects appear physically near or distant. Subjects were instructed to ignore the manner in which the object was represented (picture or word) as well as its physical location and only focus on classifying the object as quickly and accurately as possible. Stroop trials were either matched on distance and construal (proximal pictures and distal words) or mismatched on
distance and construal (distal pictures and proximal words). Results revealed that subjects responded significantly faster on the matched trials than the mismatched trials, taking less time to classify the target object when it was presented as a proximal picture or distal word than when the object was presented as a distal picture or a proximal word. This pattern of responding, which I will refer to as the picture-word effect, was replicated using different measures of psychological distance. For example, subjects responded faster when socially proximal objects (such as an Israeli shekel for Israeli participants) were presented as pictures and when socially distal objects (such as a U.S. dollar) were presented as words than when these trials were mismatched on representation and social distance (Amit et al., 2009, Study 1).

Present Research

The present research includes two studies that examined the relationship between strength of distance-construal association and self-control success, using dieting as the domain of self-control conflict. In both studies individual differences in the strength of association between distance and construal were assessed via a speeded classification task. Participants identified one object that was relevant to the dieting goal and one object that was irrelevant to the dieting goal. Self-control success in the dieting domain was assessed using both subjective and objective measures. In addition, dieting concern was measured via participant self-report. The first hypothesis was that participants would be faster to identify the target objects when there was a congruency between distance and
construal than when there was an incongruency between distance and construal, a replication of earlier picture-word effect with new goal-relevant and goal-irrelevant stimuli. The second hypothesis was that strength of association between distance and construal should distinguish successful dieters from unsuccessful dieters. Specifically, those who were successful in dieting self-control are expected to have a weaker association between distance and construal, or a weaker picture-word effect, as indicated by the speeded classification task. It is possible that this effect should be particularly true when the target object is relevant to goals, if those who are high in self-control are attempting to break out of this typical association in an attempt to promote self-control. A weaker association would allow individuals to construe proximal temptations at a high level, which should promote self-control success. The second hypothesis was only anticipated for participants who are concerned about dieting. Strong distance-construal associations are only problematic for those who have the goal of dieting, and only when the goal-relevant object is construed as a temptation. Therefore, no prediction is made for those who are not concerned about dieting.
Chapter 2: Study 1

Study 1 was designed to answer two questions. The first goal of Study 1 was to replicate the picture-word effect that subjects respond faster when there is a congruency between distance and construal than when there is an incongruency between distance and construal. The second goal of Study 1 was to test whether individuals with a weaker strength of association between distance and construal report greater self-control success and whether this effect is magnified for goal-relevant versus goal irrelevant target objects.

A Stroop task paradigm used by Amit et al. (2009) was modified to address the self-control question by having the target objects consist of one goal-relevant object (brownie) and one goal-irrelevant object (glasses). Reaction times on the Stroop task were used to measure the strength of association between distance and construal by measuring the extent to which congruency on these two dimensions facilitated identification of the target object (ignoring distance and medium of representation), resulting in faster reaction times, while incongruency on these two dimensions impeded classification of a target object, resulting in slower reaction times for each of the two target objects (goal-relevant and goal-irrelevant).

Following the Stroop task, several measures assessed the extent to which participants were concerned with dieting as well as past success in the dieting domain. It
was expected that among those indicating that dieting was a concern, those who were successful in managing this conflict would have weaker associations between distance and construal level as indicated by less facilitation on trials where distance and construal were matched as compared to trials were distance and construal were mismatched. It was also expected that this weaker association between distance and construal among those high in self-control would be more pronounced when the target object was goal-relevant than what it was goal-irrelevant.

Method

Participants

The study included 254 students (104 males, 150 females) in introductory psychology at The Ohio State University who participated in exchange for partial course credit.

Procedure

Participants were tested in the laboratory in groups of one to ten. Participants were greeted by a research assistant who gave verbal instructions and directed each participant to a computer. Participants read instructions on a computer screen and completed the study individually. All instructions and study materials were presented via MediaLab.

Measure of Strength of Association Between Distance and Construal
Participants were informed that their task for this study was to identify two target objects on the computer screen by touching a key on the keyboard. They were additionally told that the target objects would be presented as either a word or a picture and asked to identify the object as quickly and as accurately as possible. One target object was relevant to the self-control conflict of dieting to provide a measure of distance-construal association in the face of a relevant temptation. A second object was irrelevant to the goal of dieting as a measure of baseline distance-construal association. The goal-relevant target object was selected on the basis of pretesting. In this pretesting session, thirty pilot subjects from the same sample population provided ratings of various unhealthy foods including brownie, cookies, cake, and cupcake. Subjects were asked how fattening and indulgent these foods were on a 7-point Likert scale anchored by “not at all” and “extremely” as well as how much these foods would serve a goal of losing weight and being healthy, on the same 7-point Likert scale. “Brownie” emerged as a top choice for a food that was high in indulgence and low in serving a weight loss goal. “Glasses” was chosen as the dieting irrelevant object because it is a common object that has the same number of letters as brownie. Participants categorized the object as quickly as possible, pressing the “S” button on their keyboard to indicate that the object on the screen was a brownie and the “L” button to indicate glasses. A research assistant explained which key was designated for each target object. These instructions were reiterated via a slip of paper at each computer station. Psychological distance was
manipulated via a Ponzo illusion, as in Amit et al. (2009) (see Figure 1). In the proximal trials, the target object was presented in the bottom, wide part of two slanted lines, creating the illusion of physical proximity. In the distal trials, the target object was presented in the top, narrow part of the slanted lines of the Ponzo illusion, creating the illusion of distance. In addition, the objects in the distal trials were presented as 70% of the size of the objects in the proximal trials. Construal level was manipulated by representing the target object as a picture (in the low level construal trials) or a word (in the high level construal trials).

Following eight practice trials on which they received error feedback, participants saw eighty trials: forty in the brownie condition and forty in the glasses condition. Half of the trials for each object were presented as pictures and half as words and half were presented as physically near and half as physically distant. Trials were randomized by MediaLab.

Measures of Self-Control Concern and Success

Following the Stoop task, participants filled out a questionnaire on dieting. This questionnaire included five items designed to measure the extent to which participants were concerned with dieting and regarded it as an important and relevant self-control conflict. These items included, “To what extent are you concerned with being slim?” and “To what extent are your food choices due to concerns with health and/or fitness?” (see Appendix A). Participants responded to these items on a five-point Likert scale (1 = to a
very small extent, 5 = to a very great extent). These items were averaged to obtain an index of concern with dieting ($\alpha = .88, M = 2.94, SD = 0.92$). Higher scores on this index indicate higher dieting concern. The questionnaire also included seven items assessing dieting success including “How successful have you been at maintaining your weight?” and “How easy do you think it would be for you to diet successfully in the future, if you decided to lose weight?” (see Appendix B). Participants responded to these items on a five-point Likert scale (1 = to a very small extent, 5 = to a very great extent). These items were averaged to obtain an index of dieting success ($\alpha = .89, M = 3.31, SD = 0.78$). Several items were reversed scored so that higher scores on this index indicate higher dieting success. Participants also reported their current height and weight, which we used to calculate each participant’s body mass index (BMI) as an objective assessment of weight-control success. Finally, demographic information such as age, gender, and class year were collected. Participants were debriefed, thanked, and dismissed.

**Results**

*Picture-Word Effect*

The first goal of this study was to replicate the picture-word effect. It was hypothesized that subjects would be faster to classify a target object on trials where distance and construal were matched, that is trials where the object was presented as a proximal picture or a distal word, than on trials were distance and construal were
mismatched. The same protocols for analyzing reaction time data adopted in Amit et al. (2009) were adopted here. Given the difficulties in interpreting response latencies for errors, only correct responses were used in the analysis. Errors were relatively rare, accounting for 2.5% of all responses. Furthermore, response times less than 150 ms or greater than 1500 ms were dropped from the analysis. Because non-native English speakers may respond more slowly to the word trials due to less exposure to written English, thirty-five non-native English speakers were also dropped from all analyses.

Response times (in ms) were analyzed using a 2 (distance: near vs. far) X 2 (construal: picture vs. word) X 2 (object: brownie vs. glasses) repeated measures ANOVA. There was no main effect of object ($F<1$) or distance, $F(1, 218) = 1.58, p = .21$, but there was a significant main effect of construal, such that pictures were processed significantly faster than words, $F(1, 218) = 470.43, p < .001$ (pictures: $M = 569.84, SD = 86.17$; words: $M = 622.97, SD = 98.47$). There was a significant object by construal interaction $F(1, 218) = 94.25, p < .001$ (see Figure 2). Specific comparisons revealed that brownies ($M = 559.40, SD = 88.82$) were processed faster than glasses ($M = 580.29, SD = 88.33$), $t(218) = -7.55, p < .001$ in the picture condition but brownies ($M = 632.50, SD = 99.18$) were processed slower than glasses ($M = 613.43, SD = 104.36$), $t(218) = 5.47, p < .001$, in the word condition. While this interaction was not expected, it may be that in the picture condition, the temptation is more accessible as a concrete entity (picture), while in the word condition, the temptation is less accessible as an abstract entity (word) because
temptations are experienced as concrete more frequently. The expected distance by construal interaction (the picture-word effect) did not emerge, $F(1, 218) = .34, p = .56$ (see Figure 3), indicating that participants did not respond faster to proximal pictures and distal words than distal pictures and proximal words. The distance by construal by object three-way interaction was marginally significant, $F(1, 218) = 2.70, p = .10$ (see Figure 4).

Although marginal, we decided to perform follow-up analyses to better understand the nature of the three-way interaction. It might be expected that the strength of the picture-word effect varied as a function of goal-relevance of the target object. However, the distance X construal interaction did not vary as a function of object. The distance X construal interaction was not significant for either the goal-relevant brownies, $F(1, 218) = .45, p = .51$ or the goal-irrelevant glasses, $F(1, 218) = 2.13, p = .15$. Instead analyses revealed that the distance X object interaction varied as a function of construal. While the distance X object interaction was significant in the picture condition, $F(1, 218) = 5.04, p = .03$ (proximal brownies were identified faster than distant brownies, but distant glasses were identified faster than proximal glasses) this interaction was not significant in the word condition, $F(1, 281) = .001, p = .98$. Because the distance X construal interaction did not vary as a function of object and because the three-way interaction between distance, construal, and object was not replicated in Study 2, we do not discuss the present result any further.
Because the critical two way (distance by construal) interaction was not significant, the hypothesis that subjects are faster to identify a target object when distance and construal are matched (the picture-word effect) was not supported. This indicates that these results differ from those of Amit et al. (2009) on which the proposed research was based.

_Distinguishing successful vs. unsuccessful dieters_

The second hypothesis was that differences in the strength of distance-construal association reliably distinguishes those with a history of successful vs. unsuccessful self-control, with those reporting high self-control success having a weaker strength of association than those with low self-control success. It is expected that this effect may be stronger when the target object is goal-relevant than when it is goal-irrelevant. Strength of association between distance and construal was calculated using a facilitation score. The facilitation score was calculated by subtracting the average response latencies from the matching brownie trials from the mismatching brownie trials to create a brownie sub-score. A corresponding sub-score was then calculated for the glasses trials and subtracted from the brownie sub-score. Facilitation for glasses was subtracted from facilitation for brownies to provide a measure of how rigidly an individual associates pictures with proximity and words with distance in a self-control conflict above and beyond their typical strength of association. The more positive the facilitation score, the stronger the
association between distance and construal for temptations (or goal-relevant objects) above and beyond the association for goal-irrelevant objects.

Facilitation scores were regressed onto self-reported concern with dieting and self-reported dieting success. It was anticipated that among those for whom dieting was a concern (1 SD above the mean), those who reported dieting success (1 SD above mean) would show lower facilitation scores, indicating weaker strength of association between distance and construal. While in the right directional pattern, this interaction was not statistically significant, \(b = -5.69, SE = 9.45\), \(p = .55\) (see Figure 5). There was a marginally significant effect of concern \(b = -13.72, SE = 7.87\), \(p = .08\), such that those who reported greater concern had lower facilitation scores.

Recall that height and weight information was collected from each participant and was used to calculate body mass index (BMI) as a more objective measure of self-control success. A similar regression analysis was run using BMI as the success indicator. Facilitation scores were regressed onto concern and BMI. This interaction was not statistically significant \(b = .75, SE = 2.02\), \(p = .71\) (see Figure 6). No other significant effects emerged from analyses. Neither analysis (using both subjective and objective measures of dieting success) presented supportive evidence that successful dieters were more likely to have a weaker association between distance and construal.

As an additional attempt to find evidence supporting the claim that weaker distance-construal associations promote self-control, a second analysis was performed
looking only at the proximal trials. While a rigid association between distance and construal is likely to impede self-control when a temptation is proximal, the same is not true when the temptation is distal. In such instances, when psychological distance cues high level construals, people are led towards a strategy that is helpful for promoting self-control. There is no self-control advantage for construing a distal temptation at a low level. It is only when the temptation is proximal that the distance-construal association can predispose individuals to self-control failure. With this premise in mind, a near facilitation score was calculated as above, only with the distal trials excluded. This near facilitation score was regressed onto self-reported concern with dieting and self-reported dieting success. Once again, subjects with high dieting concern and high self-reported success were expected to have lower near facilitation scores, indicating weaker strength of association between distance and construal. Once again, the data were in the right directional pattern, but were not statistically significant, \((b = -5.34, SE = 7.18), p = .46\) (see Figure 7). Near facilitation scores were then regressed onto self-reported concern and BMI. This interaction was also not significant, \((b = 1.04, SE = 1.55), p = .5\) (see Figure 8). No other significant effects emerged. Therefore, neither of these analyses (using both subjective and objective measures of dieting success) provided support for a weaker distance-construal association for successful dieters when considering only the proximal trials.
Discussion

Study 1 did not yield the anticipated results for either hypothesis. The first hypothesis predicted that participants would be faster to classify objects when they were matched on distance and construal then when they were not matched on distance and construal. The data did not support this hypothesis. The second hypothesis predicted that those who were successful in dieting self-control would have a weaker association between distance and construal as indicated by the speeded classification task. This also was not supported.

Although the self-control hypothesis was not supported, it is difficult to interpret this finding without first replicating the picture-word effect documented in past research (Amit et al., 2009). It may be that the picture-word effect did not emerge because the distance manipulation was ineffective. The slanted lines of the Ponzo illusion may have been too abstract and decontextualized for our particular sample to effectively create the illusion that larger objects in the wider part of the lines were more proximal than smaller objects in the narrow part of the lines. One other reason why this study did not replicate the picture-word effect may be a small methodological difference. Whereas participants in Amit et al.’s (2009) study were explicitly instructed to ignore method of representation
and distance while identifying the objects, participants in Study 1 were only instructed to identify the object, without explicit mention of representation or distance. Study 2 attempted to remedy these shortcomings using a more effective manipulation of physical distance and by explicitly instructing participants to ignore representation and distance.
Chapter 3: Study 2

Method

The design of Study 2 was similar to that of Study 1 with several exceptions. Most importantly, a stronger manipulation of physical distance was used and participant instructions were modified to more closely match those used by Amit et al. (2009).

Participants

Two hundred forty-three students (145 males, 98 females) in introductory psychology at The Ohio State University participated in exchange for partial course credit.

Procedure

As in Study 1, participants came into the lab in groups of 1 to 10. After receiving instructions from the experimenter, each participant completed the study individually at a computer station.

The Stroop task in Study 1 used a decontextualized version of a Ponzo illusion to create an illusion of varying physical distance, presenting the target objects between two inwardly slanting black lines. Study 2 put this illusion in a more ecologically valid context, presenting target objects in a context with which study participants are likely to be familiar: railroad tracks (see Figure 9). The objects themselves were presented inside a green arrow, which pointed to a physically proximal part of the railroad tracks (at the
bottom of the computer screen) or a physically distal part of the railroad tracks (at the top of the screen). As in Study 1, participants first responded to eight practice trials to which they received feedback, followed by eighty critical trials. Half of the target objects were the goal-relevant brownies as in Study 1, while half were the goal-irrelevant glasses. Half of the trials presented the target object as pictures and half as words. Finally, half of the trials presented the target object as physically proximal and half as physically distal. In a modification from Study 1, subjects were explicitly instructed to ignore how the object was represented (as a picture or a word) and whether it appeared to be near or far and focus solely on identifying it as quickly and accurately as possible. After completing the Stroop task, participants filled out the same dieting questionnaire as in Study 1. Dieting concern items were averaged to form a composite concern score ($\alpha = .87$, $M = 3.39$, $SD = .89$). Dieting success items were averaged to form a composite success score ($\alpha = .88$, $M = 3.44$, $SD = .85$). Participants were debriefed, thanked, and dismissed.

Results

Picture-Word Effect

The first goal of Study 2 was to replicate the picture-word effect. It was expected that participants would be faster to identify the target object on trials where distance and construal were congruent than on incongruent trials. The same protocols used in Amit et al. (2009) for analyzing reaction time data were followed here. Trials where the target object was misidentified were excluded from the analysis. Errors were relatively rare,
accounting for 3.25% of all responses. In addition, responses less than 150ms or greater than 1500ms were excluded from the analysis. Because non-native English speakers may respond more slowly to the word trials due to less exposure to written English, twenty-seven non-native English speakers were excluded from these and all analyses.

Response times (in ms) were analyzed using a 2 (distance: near vs. far) X 2 (construal: picture vs. word) X 2 (object: brownie vs. glasses) repeated measures ANOVA. There was a main effect of construal, such that pictures were processed significantly faster than words, $F(1, 215) = 1201.19, p < .001$ (pictures: $M = 581.21, SD = 83.98$; words: $M = 670.44, SD = 93.37$). There was also a marginal main effect of object such that brownies ($M = 623.27, SD = 88.43$) were processed faster than glasses ($M = 628.38, SD = 90.05$), $F(1, 215) = 3.23, p = .07$. There was no effect of distance. A significant object by construal interaction emerged, $F(1, 215) = 30.62, p < .001$, replicating the findings of Study 1 (see Figure 10). Specific comparisons revealed that brownies ($M = 572.98, SD = 86.99$) were responded to faster than glasses ($M = 589.44, SD = 87.34$), $t(215) = -5.18, p < .001$, in the picture condition, but brownies ($M = 673.56, SD = 95.19$) were responded to slower than glasses ($M = 667.33, SD = 99.70$), $t(215) = 1.64, p = .10$, in the word condition. The critical distance X construal interaction (picture-word effect) was statistically significant, $F(1, 215) = 20.97, p < .001$ (see Figure 11). Proximal pictures were responded to faster than distant pictures, but distant words were responded to faster than proximal words, replicating the picture-word effect of Amit et al.
(2009) with this new set of stimuli. The distance by construal by object three way interaction was not significant $F (1, 215) = .20, p = .65$ (see Figure 12), indicating that, overall, subjects did not respond differentially when the target object was goal-relevant versus goal-irrelevant.

Distinguishing successful vs. unsuccessful dieters

The second goal of Study 2 was to use self-reported self-control success to predict the strength of association between distance and construal. It was anticipated that subjects who reported high self-control success in dieting would have a weaker association between distance and construal and that this effect may be magnified for goal-relevant objects as compared to goal-irrelevant objects.

To examine the strength of association hypothesis, a facilitation score was calculated as in Study 1, with higher scores indicating greater strength of distance-construal association in a self-control conflict beyond an individual’s typical strength of association. This facilitation score was then regressed onto concern with dieting and self-reported self-control success in dieting. It was anticipated that among those for whom dieting was a concern ($1 SD$ above the mean), those who reported dieting success ($1 SD$ above mean) would show lower facilitation scores, indicating weaker strength of association between distance and construal. This interaction was not statistically significant ($b = -3.83, SE = 11.02), p = .73$ (see Figure 13). No other significant effects emerged. Facilitation score was then regressed onto concern and BMI, as in Study 1, to
provide an objective measure of self-control success. This did not yield a significant interaction \((b = 1.08, SE = 1.99), p = .59\) (see Figure 14). There was a significant effect of BMI \((b = -4.36, SE = 2.00), p = .03\), such that those with lower BMI had higher facilitation scores. No other significant effects emerged. Neither analysis using subjective vs. objective measures of success presented supportive evidence that successful dieters were more likely to have a weaker association between distance and construal.

An additional facilitation score was then calculated using only the proximal trials as distance-construal associations are expected to be more problematic for self-control when the temptation is proximal. This near facilitation score was regressed onto concern with dieting and dieting success. This interaction was not statistically significant \((b = -.99, SE = 7.02), p = .89\) (see Figure 15). There were no other significant effects. Near facilitation was then regressed onto concern and BMI, yielding a non-significant interaction \((b = 1.07, SE = 1.22), p = .38\) (see Figure 16). No other significant effects emerged. Neither of these analyses (using both subjective and objective measures of self-control success) supported the hypothesis that successful dieters would have a weaker distance-construal association when considering only the proximal trials.

Discussion

The results of Study 2 supported the first hypothesis that people respond faster when distance and construal are congruent than when they are not congruent (evidencing
the *picture-word effect*). Subjects were significantly faster to identify a target object when it was presented as a proximal picture or a distal word than when it was presented as a distal picture or a proximal word. This pattern did not vary according to the goal-relevance of the target object. The second hypothesis that self-control success is related to the strength of association between distance and construal was not supported. Subjects who reported high self-control success did not have significantly weaker strength of association between distance and construal. Potential reasons for why the predicted results were not obtained as well as possible strategies to address these concerns, are considered in the general discussion.
Chapter 4: General Discussion

The studies reported here were designed to test the hypotheses that distance and construal are associated such that invoking a level of one evokes the matching level of the other and that individual differences in the strength of this association are related to self-control success. In Study 1, strength of association between distance and construal was assessed using a Stoop task. Participants were expected to be faster to classify a target object when that object was matched on psychological distance (near or far) and construal level (low or high, as indicated by representation as a picture or word). A second hypothesis predicted that those who had a weaker strength of association between distance and construal would be more successful in self control, as indicated by both subjective and objective measures. The data from Study 1 did not support either hypothesis. The goal of Study 2 was to find evidence of a picture-word effect by addressing some of the concerns of Study 1, particularly by using a stronger manipulation of distance and by more closely matching instructions to participants to those used by Amit et al (2009). These modifications proved effective in eliciting the picture-word effect. Participants in Study 2 were faster to identify target objects when they were matched on distance and construal when they were mismatched, providing support for Hypothesis 1. Hypothesis 2, that those with weaker distance-construal associations would have better self-control, was again not supported by the data.
Limitations and future directions

There are several possible explanations for why the expected self-control results were not obtained. One possible explanation is that the timeline of the study design did not provide for an effective method to test the hypothesis. In essence, these studies used past self-control success (as indicated by objective body mass index and subjective participant ratings) and current dieting concern to predict current construals of dieting temptations (as indicated by the strength of association between distance and construal). This is problematic because it may be that those who are concerned with dieting are concerned because they have failed in the past. If this is the case, then it is difficult to separate those who are committed to the goal of weight loss from those who are anxious about the goal of weight loss. We would expect the first group to show our predicted pattern of construing temptations abstractly, even when psychologically proximal, but we would not expect the same pattern from our anxious dieters because anxiety about a dreaded outcome says nothing about commitment towards a desired outcome. This notion (that dieting concern may be confounded with some sort of factor of dieting anxiety) is supported by the fact that self-reported concern and self-reported success are significantly negatively correlated (Study 1: $r (219) = -0.31, p < .001$; Study 2: $r (216) = -0.38, p < .001$).

A more effective method of testing the hypothesis that those with weaker distance-construal associations have better self-control would be to use past success and current concern to predict future self-control success in dieting. In our current design, those who
are currently on a diet may be on a diet because they have not yet been successful in losing weight. Measuring future self-control success would allow those who are committed to a dieting goal the time to reap the success that should stem from a weakened association between distance and construal.

One way to achieve this would be to run a prospective study in the laboratory. Such a study would bring participants into the lab, measure concern with dieting and distance-construal association, and then measure how well they succeeded in a laboratory self-control conflict, such as a “taste test” that asked subjects to eat brownies. This would lead to a clearer set of predictions: those who are concerned with dieting and have a weaker distance-construal association should eat fewer brownies as part of the taste-test than those with a stronger distance-construal association. Another way of addressing this same issue would be to conduct a longitudinal study where dieting concern and distance-construal association are measured in the lab and participants are contacted for follow-up several weeks or months later to track their dieting success as indicated by weight loss.

Another potential problem that may have prevented us from obtaining the expected results is that the study design had low correspondence of specificity between measures. Attitudes research suggests that the correspondence between people’s attitudes and behavior are higher when a specific attitude predicts a specific behavior or a global attitude predicts a global behavior (Ajzen & Fishbein, 1977; Fishbein & Ajzen, 1974). The same principle of correspondence of specificity applies to non-attitudinal domains,
such as cognitive associations predicting behavior discussed here. So while the assessment of distance-construal association used one specific temptation stimulus (brownie) the subjective measures of self-control success were more global, assessing general success in the dieting domain. This issue could be addressed by matching specific to specific, as in using the same Stroop task and modifying the subjective success measures to be about brownies specifically, or by matching global to global, as in modifying the Stroop task to include a variety of temptation stimuli and retaining the current measure of general dieting success.

It is possible that our goal-relevant stimulus, the brownie, was not considered to be relevant to dieting by our participants. While pretesting indicated that most people find brownies to be tempting, the manipulation of distance may have made them less so by presenting a brownie hovering above a set of railroad tracks. Participants may have found this to be so unappetizing, or so odd, that normally-tempting brownies lost their appeal. This issue could be addressed by a future study by changing the background across trials, rather than using the same background (the railroad tracks) for each. By changing the background to include various other ecologically-valid Ponzo illusions (and by adding a stronger instruction to ignore background), participants may be more likely to determine that background is irrelevant and pay attention strictly to the stimulus itself. Alternatively, we could place the objects on a background that is likely to seem more sensible to subjects, such as placing the stimuli nearer or farther away on a buffet table.
It may also be the case that the Stroop task is not an ideal way to measure individual differences in distance-construal associations. Research has shown that while test-retest reliability on a picture-word Stroop task is acceptable for the same type of trial (congruent = .63, incongruent = .72), test-retest reliability is unacceptably low (.26) when computing difference scores between congruent and incongruent trials (Strauss, Allen, Jorgensen, Cramer, 2005). This may be problematic for the current research because the prime interest is in the difference between congruent and incongruent reaction times for the goal-relevant stimulus and the goal-irrelevant stimulus. This issue could be addressed by using a different task to measure distance-construal associations. One possibility is an implicit association test, which has already successfully been used for this purpose (Bar-Anan et al., 2006) and has been shown to have acceptable test-retest reliability (Cunningham, Preacher, & Banaji, 2001). Nosek, Greenwald, and Banaji (2007) determined that the IAT has a median test-retest reliability of .56 across studies. Sequential priming (Neely, 1977; Fazio, Sanbonmatsu, Powell, & Kardes, 1986) might provide another method of assessing distance-construal association, though priming measures have been shown to have widely variable reliability (Fazio & Olson, 2003).

A final consideration is that the present studies may not have provided enough of a nuanced consideration of the hypothesis that strength of distance-construal association predicts self-control success. This strength of association may only be half of the story while an ability to break out of this association when it is advantageous to do so
comprises the other half. In most cases, a strong association between distance and construal is adaptive, allowing us to plan for the future and navigate complex environments. It is only in the limited case of an encounter with a proximal temptation that such (ordinarily useful) construals become problematic. Therefore, in addition to measuring this strength of association, it is also important to measure one’s ability to break out of this association. We attempted to measure this ability to break out of an overgeneralized distance-construal association by comparing strength of association for goal-relevant and goal-irrelevant objects. It may be the case that although associations between distance and construal are more automated, breaking out of these associations requires more deliberative cognitive processing. If this is true, it may be possible to disentangle these processes (the process of associating distance and construal and the process of breaking out of these associations) by means of a process dissociation procedure (Jacoby, 1991).

Process dissociation procedures (PDP) are designed to separate the effects of automatic and controlled perceptual processes. When cognitive capacities are limited, such as under cognitive load or time pressure, individuals’ response tendencies reflect a default association. For example, under time pressure, participants were more likely to mistake a tool for a weapon when primed by black faces, indicating an association between blacks and weapons. When time pressure was removed, participants who were motivated to control prejudice were able to correct for these automatic response
tendencies while those who were not motivated to control prejudice did no correction (Payne, 2001). This correction suggests a breaking of an existing association (between blacks and weapons). PDP may be applied to the present research question by first measuring response tendencies for identifying goal-relevant and goal-irrelevant stimuli under time pressure as an indicator of default strength of association. A subsequent task would remove the time pressure and measure the extent to which individuals who are motivated to lose weight are able to correct for these response tendencies. Participants who are motivated to lose weight but are unable to correct for their default response tendency (participants whose performance on the pressured and non-pressured tasks do not differ) are likely to have an inability to break out of the typical association between distance and construal. In turn, they may be more likely to fail in their dieting attempts.

**Implications**

While the data did not support our theoretical framework, it is quite possible that the lack of empirical support was due to errors in study design and measurement rather than flaws in the theory that led to the hypotheses. If the theory is indeed correct, it could have important implications across a variety of fields (once properly measured). One important implication is that such distance-construal associations may eventually be able to serve as a diagnostic tool in clinical settings to assess who is likely to struggle with self-control. Doctors might be able to predict, for example, who is more likely to deviate from their medication regimen following surgery and substance abuse counselors might
be able to get more accurate information about who is at highest risk for a relapse. While
self-control failure is multiply-determined, this research could make it possible to identify
those whose struggle with self-control is due to a rigid association between distance and
construal and allow for individually tailored self-control interventions. For example,
among those with a rigid distance-construal association, those identified as having a
cognitive ability to break out of this association might benefit from a cognitive retraining
task that encourages individuals to construe proximal temptations at a higher-level,
thereby promoting self-control. Those with a rigid distance-construal association who
appear to be unable to break out of this association might be better served by avoiding
being in the proximity of temptations whenever possible.

This program of research also has important implications within construal level
theory. This work presents an early attempt to examine individual differences in
construals, an area which has not yet received much attention in the construal level
literature. Such an individual differences approach may open up fruitful new areas of
research not just in self-control, but into other psychological processes that construal
level has been shown to influence. For example, temporal distance has been shown to
improve outcomes in negotiations, with negotiators induced to have a temporally distant
perspective from the outcome more likely to consider negotiations holistically rather than
piecemeal and more likely to make concessions on low priority issues in exchange for
high priority issues (Henderson, Trope, & Carnevale, 2006). It may be that those with a
weak association between distance and construal are able to adopt a high level construal, even for negotiation outcomes that are temporally proximal, and reap the benefits of optimized outcomes usually afforded by temporal distality. There is also evidence that construal level influences moral judgments. With greater psychological distance, individuals are more likely to consider moral transgressions in terms of moral principles rather than in terms of contextual information and judge those transgressions more harshly than when they are psychologically proximal (Eyal, Liberman, & Trope, 2008). It is possible that people who are able to break the association between distance and construal when motivated to do so may apply their moral principles even to proximal situations, thereby increasing the consistency between one’s principles and one’s actions.

In sum, the current research addresses a new way of considering how construal levels impact on self-control. While the importance of subjective construals on self-control success has been well established, construal level theory has yet to determine how individual differences in these subjective construals influence self-control behaviors. Since people differ in the extent to which they are likely to succeed in self-control conflicts, it may be that individual differences in construal levels account for these effects.

**Conclusion**

The present studies attempted to uncover a relationship between individual differences in the strength of distance-construal associations and tendencies to succeed or
fail in self-control. While the current studies did not support the predicted hypotheses, it is possible that modifications to the research design may prove successful in the future. Given the important implications for self-control research, construal-level theory, and applied clinical interventions, this program of research certainly seems worthy of further inquiry.
References


Appendix A: Dieting Concern Scale

To what extent are you concerned with being slim?

1 2 3 4 5
To a very small extent To a small extent Somewhat To a great extent To a very great extent

To what extent are you concerned with watching your weight?

1 2 3 4 5
To a very small extent To a small extent Somewhat To a great extent To a very great extent

To what extent are your food choices due to concerns with health and/or fitness?

1 2 3 4 5
To a very small extent To a small extent Somewhat To a great extent To a very great extent

To what extent are your food choices due to concerns with weight?

1 2 3 4 5
To a very small extent To a small extent Somewhat To a great extent To a very great extent
How much does the following statement describe you?

I have restricted what I ate for the purpose of losing weight or not gaining weight?

<table>
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<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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<tr>
<td>Not at all</td>
<td>Slightly</td>
<td>Moderately</td>
<td>Very much</td>
<td>Extremely</td>
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Appendix B: Dieting Success Scale

How easy is it for you to stay at your preferred weight? (R)

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<tr>
<td>Very easy</td>
<td>Easy</td>
<td>Neither easy nor difficult</td>
<td>Difficult</td>
<td>Very difficult</td>
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How easy do you think it would be for you to diet successfully in the future, if you decided to lose weight? (R)

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<tr>
<td>Very easy</td>
<td>Easy</td>
<td>Neither easy nor difficult</td>
<td>Difficult</td>
<td>Very difficult</td>
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How difficult is it for you to stay at your preferred weight? (R)

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<tr>
<td>Very easy</td>
<td>Easy</td>
<td>Neither easy nor difficult</td>
<td>Difficult</td>
<td>Very difficult</td>
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How successful have you been at maintaining your preferred weight?

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<tr>
<td>Very unsuccessful</td>
<td>Unsuccessful</td>
<td>Neither unsuccessful nor successful</td>
<td>Successful</td>
<td>Very successful</td>
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To what extent are you successful in watching your weight?

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<tr>
<td></td>
<td>To a very small extent</td>
<td>To a small extent</td>
<td>Somewhat</td>
<td>To a great extent</td>
<td>To a very great extent</td>
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To what extent are you successful in losing extra weight?

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To what extent do you find it difficult to stay in shape? (R)

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Appendix C: Figures

Figure 1: Study 1 - Ponzo Illusion
Figure 2: Study 1 - Object by Construal Interaction

Figure 3: Study 1 - Distance by Construal Interaction (picture-word effect)
Figure 4: Study 1 - Distance by Construal by Object Interaction. Brownies are on the left and glasses are on the right.
Figure 5: Study 1 – Overall Facilitation by Concern & Success

Figure 6: Study 1 - Overall Facilitation by Concern & BMI
Figure 7: Study 1 – Near Facilitation by Concern & Success

Figure 8: Study 1 - Near Facilitation by Concern & BMI
Figure 9: Study 2 - Ecologically valid Ponzo illusion

Figure 10: Study 2 - Object by Construal Interaction
Figure 11: Study 2 - Distance by Construal Interaction (picture-word effect)
Figure 12: Study 2 – Distance by Construal by Object Interaction. Brownies are on the left and glasses are on the right.
Figure 13: Study 2 - Overall Facilitation by Concern & Success

Figure 14: Study 2 - Overall Facilitation between Concern & BMI
Figure 15: Study 2 - Near Facilitation by Concern & Success

Figure 16: Study 2 - Near Facilitation by Concern & BMI