*WHY DIDN'T I THINK OF THAT?*

*SELF-REGULATION THROUGH SELECTIVE INFORMATION PROCESSING*

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In this paper, the authors present an information processing model of self-regulation. The model predicts that consumers with an active self-regulatory goal will tend to focus on the cost (rather than the pleasure) of consumption and, as a result, they are better able to control their behavior.  In contrast to prior research, the authors find that consumers with an active goal are most vulnerable to self-regulatory failure when the object of desire is *farther* away from them (in either time or space); because as the distance increases they focus less on the costs of consumption.  Finally, results indicate that if product information is not externally available (i.e., it has to be recalled from memory) people are more likely to focus on pleasure and fail at self-regulation. The results are robust across four experiments using a variety of stimuli, goal primes, and information processing measures.

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Self-regulatory failure often results when people have long-term goals that are in conflict with the desire for a short-term indulgence (Baumeister 2002; Fishbach and Shah 2006). Examples of such conflicts are common consumer experiences. From the shopper who desires a new pair of shoes at the expense of this month's savings goal to the dieter tempted by a chocolate dessert. Hoch and Lowenstein (1991) describe such situations as a struggle between desire and willpower, whereby consumers are drawn towards short-term pleasure at the cost of their longer-term goals. The research reported in this paper, adds to the extant literature by examining the role that selective information processing can play in the self-regulation of consumption behavior.

Broadly defined, self-regulation is the process used to exert control over one's thoughts, emotions, attention, or impulses, to bring the self in line with preferred long-term goals (Vohs and Baumeister 2004). Exercising such control can be challenging given the many opportunities for immediate consumption that provide short-term pleasure at the cost of achieving those long-term goals. For example, although enjoying a rich and creamy chocolate dessert might bring immediate pleasure to a dieter, it also has a cost (e.g., additional calories) that could compromise a weight loss goal. Therefore, to achieve this type of longer-term self-regulatory goal, an individual must overcome the short-term desire to consume (Hoch and Lowenstein 1991; Metcalfe and Mischel 1999).

Prior work has demonstrated a number of strategies that people can use to increase the likelihood of successful self-regulation. For example, research has demonstrated that making a desired object less salient can improve self-regulation. This can be accomplished by simply obscuring or covering up the desired stimulus (Metcalfe and Mischel 1999), increasing the

physical distance between an individual and the object of desire (Wertenbroch 1998), or by allocating one's attention somewhere else (Mischel, Ebbesen, and Zeiss 1972). Prior research has also argued that when attention towards a desired object is increased, the probability of self-regulatory failure increases (Karniol and Miller 1983; Mischel and Ebbesen 1970; Rodriguez, Mischel, and Shoda 1989; Vohs and Heatherton 2000).

However, the results of the research reported in this paper demonstrate that it is possible for consumers to allocate their attention towards a desired object, while simultaneously increasing the probability of successful self-regulation. Specifically, we demonstrate that consumers with a self-regulatory goal tend to allocate their attention towards the costs of consumption, while those without such a goal tend to focus on the pleasure of consumption. As a result of this selective information processing, consumers with a goal are better able to successfully regulate their behavior. However, we find that consumers with a self-regulatory goal activate this selective information processing strategy only when the object of desire is physically or temporally proximate. Therefore, in contrast to previous research (Metcalfe and Mischel 1999; Vohs and Heatherton 2000; Wertenbroch 1998), our results indicate that consumers with an active goal are most vulnerable to self-regulatory failure when the object of desire is *farther* away from them (in either time or space); because as the distance increases they are less likely to focus on the cost of consumption. We also find that in the absence of external attribute information, consumers tend to think more about the pleasure (versus the cost) of consumption and, as a result, they are more likely to experience self-regulatory failure.

A better understanding of self-regulatory behavior in the consumption of food is especially important and interesting, given rising concern over a global obesity epidemic (Caballero 2004; Morrill & Chinn 2004). Today, the average American consumes approximately

3800 calories per day – about twice the daily requirement – which has significantly contributed to the fact that two-thirds of the U.S. population are considered obese or overweight (Abelson 2004). At the same time, research has indicated that the self-regulation of food consumption is extremely difficult for most people (Herman & Polivy 2004), which makes this a particularly important domain in which to gain a better understanding of the factors that can lead to self-regulatory success and failure.

Overall, the research reported in this paper contributes to the extant literature by demonstrating: 1) that selective information processing can mediate the relationship between self-regulatory goals and consumption; 2) that selective information processing is triggered by a desired object being near to the consumer (in either time or space); and, 3) that in the absence of external attribute information (i.e., when product information must be recalled from memory) people tend to focus on the pleasure of consumption.

In the sections that follow, we develop a set of four hypotheses based on a review of the relevant literature on self-regulation and selective information processing. We then describe the studies that were designed to test those predictions. We find strong support for the role of selective information processing in self-regulation across four experiments using a variety of different stimuli, self-regulatory goal primes, and information processing measures. The paper concludes with a general discussion of the results, including the implications for theory and practice, as well as potential directions for future research.

*SELF-REGULATION THROUGH SELECTIVE INFORMATION PROCESSING*

In this paper we examine the common struggle that consumers face when indulging in short-term pleasure comes at the cost of longer-term goals. Specifically, we investigate the role that the selective processing of pleasure versus cost information can play in self-regulation within the domain of eating behavior. Food can be thought of in terms of both pleasure and cost attributes, which consumers are able to consider when making dietary decisions. Pleasure attributes – such as tastiness, richness, creaminess, etc. – provide information about the hedonic value of food. Research has demonstrated that foods high in hedonic value – e.g., desserts like chocolate and ice cream – tend to activate and increase desire (Shiv and Fedorikhin 1999). However, desserts also have cost attributes – such as fat and caloric content – which can provide information that a consumer can use to assess the consequences of consumption relative to their self-regulatory goals.

*Monitoring the Costs of Consumption*

Prior work has demonstrated that successfully regulating consumer behavior is heavily dependent upon the ability to monitor current consumption relative to longer-term goals. For example, it is very difficult for consumers to effectively manage their spending, without keeping track of what they have purchased relative to the income that they have earned (Baumeister 2002). In a particularly striking empirical example of the importance of monitoring, Wansink, Painter, and North (2005) found that participants who had been given self-refilling bowls of soup ate 73% more soup than those who had a normal bowl. They found that without the visual cue of an empty bowl, people were not able to monitor how much they were eating and as a result ate much more soup. The basic idea being that it is easier for a consumer to achieve a long-term goal

if s/he can monitor and evaluate the impact that current behavior is having on progress towards that goal (Baumeister 2002; Fishbach and Shah 2006; Wertenbroch 1998).

Hoch and Lowenstein (1991) have proposed that monitoring the cost of consumption can be a particularly effective when an individual is trying to overcome the immediate desire to consume. For a dieter this might mean focusing on the fat and calories in a piece of chocolate rather than thinking about how rich and creamy that chocolate might taste. Other researchers have suggested that it is possible to improve the probability of self-regulatory success by introducing additional costs, such as self-imposed penalties for failure (Trope and Fishbach 2000; Wertenbroch 2002). However, we suggest that it is not necessary for consumers to create additional costs in order to be successful in self-regulation. We argue that consumers can improve the probability of successful self-regulation by simply processing relatively more information about the costs that come with many types of short-term indulgences.

Although we suspect that people consider both the pleasure and cost attributes of food, prior research has clearly demonstrated that consumers have a limited ability to process information and, as a result, they are selective in the information that they attend to during decision making (Bettman et al. 1998; Payne 1976; Schneider and Shiffrin 1977). We also know that what consumers pay attention to is, to a large extent, determined by the goals that they pursue (Bettman 1979; Bettman et al. 1998). For example, consumers who aim to save money are more likely to pay attention to price and people who are health conscious are more likely to focus on nutritional information, as compared to those who do not share these goals. Therefore,

**H1:**    Consumers with an active self-regulatory goal will tend to process more cost (versus pleasure) product information.

Our first hypothesis predicts the fundamental main effect that we expect self-regulatory goals to have on selective information processing. Nevertheless, we expect that this effect will be conditional upon two key boundary conditions: 1) *Proximity:* the closer a desired product is to a consumer with an active self-regulation goal, the more likely s/he is to process cost (versus pleasure) attribute information; and 2) *Information Availability:* the main effect predicted in hypothesis 1 will hold only when the consumer has access to external attribute information. Each of these boundary conditions is discussed in detail below.

*Proximity Triggers the Selective Processing of Cost Information*

A consistent finding in self-regulation research is that the physical or temporal distance between an individual and an object of desire affects the likelihood of self-regulatory failure (Laran 2009; Metcalfe and Mischel 1999; Mischel and Ebbesen 1970; Mischel and Grusec 1967; Vohs and Heatherton 2000). Intuitively, this idea makes a lot of sense – e.g., for most consumers a box of chocolates is easier to resist when it is in a different room, or even on the other side of the same room, than when it is sitting open right in front of them. In their two-system framework, Metcalf and Mischel (1999) argue that this occurs because at a distance people engage in "cool" system processing, which allows them to think about their behavior in a more deliberate manner. The cool system is better adapted to ensuring that current behavior is consistent with longer-term self-regulatory goals. However, the authors argue that when the same object is close to the individual and desire is high, the "hot" system is dominant and behavior becomes increasingly emotion-driven and under stimulus (rather than self) control. Therefore, they suggest that people will be more likely to succeed in self-regulation if they are

able to distance themselves from the desired object or distract themselves from thinking about or paying attention to it (Metcalf and Mischel 1999).

Hoch and Lowenstein (1991) agree that physical and temporal proximity tends to increase desire. However, they argue that there are *two* ways in which a consumer can respond to such an increase. First, a consumer might simply react to sate desire with little or no cognitive deliberation. This is consistent with Metcalf and Mischel's (1999) prediction that the "hot" system becomes dominant when desire is heightened by physical or temporal proximity, which increases the probability of impulsive behavior. Second, such increased desire has the potential to trigger an "interrupt" (Bettman 1979; Simon 1967) that results in more "cool" and deliberate processing (Hoch and Lowenstein 1991).

We argue that it is the presence (or absence) of a self-regulatory goal that determines whether proximity triggers an interrupt that leads to selective processing. In the absence of a self-regulatory goal, we predict that consumers will tend to focus on the pleasure of consumption – for example, how good food will taste or how nice new clothes will look. In contrast, for consumers with a self-regulatory goal, we predict that the increase in desire that comes with greater physical or temporal proximity will trigger a relatively greater focus on cost information.

Moreover, we contend that when the object of desire is farther away (physically or temporally), and desire for it is lower, the need to actively engage in self-regulation is also lower (Hoch and Loewenstein 1991). This prediction is consistent with prior research that has found that people expend significantly greater self-regulatory resources when a desired object is nearby than when it is farther away (Vohs and Heatherton 2000). Therefore, we argue that when the distance between the consumer and the product reduces desire, so that it is not necessary to actively regulate one's behavior, the need for consumers with a self-regulatory goal to selectively

focus on the cost of consumption is reduced. Continuing with the chocolate example, there is less

reason for a dieter to think about the calories in a box of chocolates that is on the other side of

the room than there is when that box of chocolates is open in front of them. Therefore, we are

proposing that when a desired object is nearby it triggers selective information processing among

those consumers that have a self-regulatory goal. Specifically,

**H2:**    The effect of a self-regulatory goal on information processing increases as the physical or

temporal proximity of the product to the consumer increases.


*The Availability of Attribute Information*

So far we have predicted that people will attempt to bolster their ability to self-regulate by

focusing on the costs of consumption, when the product is near the consumer.  Yet, in many

cases, products are presented without cost (or pleasure) information being made explicitly

available.  How often, for example, does a dessert menu include information on the fat and

caloric content of items offered for sale? Keeping track of one's actions and understanding the

cost of consumption is critical to successful self-regulation (Baumeister and Heatherton 1996);

however, when information is not available it becomes substantially more difficult to monitor

current behavior  relative to self-regulatory goals.  Polivy et al. (1986) provide empirical

evidence of the increased probability of self-regulatory failure when the information required to

monitor behavior is not explicitly available. They found that dieters who had explicit information

about how many candies they had consumed – e.g., they could count the empty wrappers they

had produced – were able to significantly reduce the number of candies that they ate as compared

to dieters who did not have such information available.

In the context of eating behavior, if cost and pleasure information are not externally available – e.g., packaging describing the tastiness of the product or nutritional labels with information on fat, salt, calories, etc. – then any processing of attribute information has to rely on recall from memory. However, the probability that pleasure and cost information will be retrieved from memory depends on each attribute's relative accessibility and the ease with which that information can be retrieved (Bettman et al. 1998; Kahneman and Tversky 1973; Menon et al. 1995; Menon and Raghubir 2003). Given that pleasure information is more affect laden and experiential in nature, we predict that it will be more accessible than cost information (Metcalfe and Mischel 1999; Shiv and Fedorikhin 1999). As a result, in the absence of external cost and pleasure attribute information, we expect that consumers with or without a self-regulatory goal will tend to recall and think about the pleasure of the product rather than its costs. Therefore,

**H3:**    Consumers with an active self-regulatory goal will tend to process less cost (versus pleasure) product information when such information is not externally available (i.e., when it must be recalled from memory).

*The Effect of Selective Information Processing on Consumption Behavior*

Hypothesis 1 predicts a positive effect of an active self-regulatory goal on the processing of cost attribute information relative to pleasure attribute information. Furthermore, we have predicted that proximity (H2) and the availability of attribute information (H3) will moderate this main effect. Ultimately, however, we are interested in how the activation of a self-regulatory goal affects consumer decision making. A great deal of research has demonstrated that the type of information processed during decision making can influence the choices that consumers make (Bettman et al. 1993; Bettman et al. 1998; Bettman and Park 1980; Payne 1976). Building on this

research, we predict that people who spend more time processing information about the cost of consumption will be more likely to succeed at self-regulation. Therefore,

**H4:**     The relative processing of cost (versus pleasure) product information will mediate the relationship between self-regulatory goals and consumption.

In H2, we have predicted that when a consumer with a self-regulatory goal is physically or temporally close to a desired object, s/he will tend to process more cost information than consumers without such a goal or consumers with a self-regulatory goal who are far from the object. H4 predicts that the type of information processed will affect consumption. In combination, these two hypotheses imply that if desirable food is close to a consumer with a self-regulatory goal, s/he will process more cost information and, as a result, eat less (than when that food is farther away). That is, we predict that self-regulatory failure is *less likely* for consumers with a self-regulatory goal when the desired product is nearby, because proximity triggers the selective processing of cost (versus pleasure) information. This prediction is in stark contrast to previous research, which has argued that the probability of self-regulatory failure increases when a desired object is more physically or temporally proximate (e.g., Metcalfe and Mischel 1999). However, it is consistent with the propositions of Hoch and Lowenstein (1991) and we find strong empirical support for this prediction in the experiments reported below.

EXPERIMENT 1A

*Method*

*Design and Procedure.* Upon entering the lab, 90 undergraduate student participants were randomly assigned to condition in a 2 (self-regulatory goal: present vs. absent) by 2 (proximity: near vs. far) between subjects design. Participants were told that they would participate in two unrelated studies. The first study was a short "lifestyle survey" that was designed to prime health consciousness. In the *goal-present* condition, participants were primed as follows: they were asked to "list at least 5 things that you have done in the last week that you expect will have a negative impact on your health." In the *goal-absent* condition participants were primed as follows: they were asked to "list at least 5 things that you have done in the last week that you expect will have a positive impact on your health." A pretest, conducted prior to experiment 1, indicated that the priming procedure worked as intended. Specifically, after completing the priming manipulation, participants responded to a questionnaire, that included seven state self-control items adapted from Moorman and Matulich (1993). Those in the primed *goal-present* condition scored higher (M = 4.58) than those in *goal-absent* condition (M = 3.68; $F(1, 57) =$ 6.35, $p < .05$).

After completing the priming manipulation, the participants were thanked and they were informed that the second study required them to evaluate chocolate. They were told that they could consume as many pieces of chocolate as they wanted after they completed an information search task. Participants were then given the opportunity to use a MouselabWEB (Willemsen and Johnson 2009) computer-based interface to search for information about the chocolate. MouselabWEB is a process tracing tool that allows researchers to monitor the information acquisition process of decision makers. Participants could acquire information on any or all of the four attributes: two pleasure (creaminess and richness) and two cost (fat content and caloric content) using the MouselabWEB interface (figure 1). As long as the mouse pointer remained

over a square, the attribute information was visible. As soon as the pointer was moved outside of the square, the attribute became hidden again. The order in which the attributes appeared on screen was counterbalanced and MouselabWEB recorded the time spent processing each attribute.

In the *near* condition, the bowls of chocolate were placed directly in front of participants during the information search task (within 12 -18 inches). They were told that they would be permitted to eat the chocolate only when they had completed the information search task (no participants attempted to eat the chocolate before they completed that task). In the *far* condition, participants were told that they would be given chocolate to evaluate after they had completed the information search task. Twenty-five pieces of chocolate were placed in individual bowls at the front of the lab within sight of the participants (i.e., participants' computer cubicles were approximately 15 to 25 feet away from the chocolates). The bowls of chocolate were presented to participants in the far condition when they had finished the information search task. At that time they were told that they could eat as many chocolates as they would like while they completed the follow-up survey. Therefore, consumption of the chocolate began at the same stage of the experiment for all participants.

*Measures.* The key dependent measures for experiment 1 are: (1) the ratio of the time spent processing cost information to the time spent processing pleasure information (Fazio 1990). The processing ratio was calculated as: (time processing cost information – time processing pleasure information) / (time processing cost information + time processing pleasure information). The resulting ratio is such that a positive number indicates that a greater proportion of cost information was processed; whereas a negative number indicates a greater proportion of

pleasure information was processed[1]; and (2) the number of chocolates consumed. Additional

measures taken at the end of the experiment included a health consciousness scale (Moorman

and Matulich, 1993) and a three item measure of involvement.

*Results and Discussion*

    *Manipulation Checks.* Participants in the primed *goal-present* condition scored higher on

the health consciousness scale ($M_{GP}$ = 6.34) than participants in the *goal-absent* condition ($M_{GA}$ =

5.61; $F(1, 88) = 8.27, p < .01$). There were no differences in responses to the health

consciousness scale ($p > .10$) as a result of the proximity manipulation. There were no

differences in involvement between participants primed across either of the goal conditions ($p >$

.40) or proximity conditions ($p > .80$).

    *Selective Information Processing Results.* To test our hypotheses, a 2 (self-regulatory goal)

by 2 (proximity) ANOVA on the processing ratio was conducted. The main effect of proximity

on the processing ratio was significant ($M_{Far}$ = -.14 vs. $M_{Near}$ = .05; $F(1,86) = 6.13, p < .05$);

however, the main effect of self-regulatory goal on information processing was not significant

($M_{GP}$ = .02 vs. $M_{GA}$ = -.10; $F(1,86) = 2.23, p > .10$). The two-way interaction was significant

($F(1, 86) = 5.71, p < .05$; see figure 2), indicating that the effect of an active self-regulatory goal

on information processing varied with the proximity of the product (H2). Specifically, the

increase in proximity had a significant effect on information processing among goal-present

participants ($M_{Near}$ = .21 vs. $M_{Far}$ = -.17, $F(1, 86) = 11.54; p < .01$), but not among goal-absent

participants ($M_{Near}$ = -.01 vs. $M_{Far}$ = -.10, $F(1, 86) < .01; p > .90$). Consistent with H2, when the

chocolate was near to consumers with a self-regulatory goal, they spent more time processing

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[1] A detailed analysis of alternative approaches to analyzing information processing times, as well as a detailed explanation for using the ratio reported in this paper, is included in the Appendix. Ultimately, across the four experiments, the results are not affected by alternative methods of representing the time spent processing cost vs. pleasure information.

cost information (i.e., positive mean ratio), whereas consumers without a self-regulatory goal spent more time processing pleasure attribute information (i.e., negative mean ratio). Significant differences in processing between goal-present and goal-absent participants were observed in the near condition ($M_{GP}$ = .21 vs. $M_{GA}$ = -.10; $F(1,86)$ = 8.08, $p < .01$), but not in the far condition ($M_{GP}$ = -.17 vs. $M_{GA}$ = -.10; $F(1,86)$ = .38, $p > .50$).

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Insert figure 1 about here

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*Chocolate Consumption Results.* To examine the effect of our manipulations on chocolate consumption, a 2 (self-regulatory goal) by 2 (proximity) ANOVA on the number of chocolates consumed was conducted. A main effect of self-regulatory goal was observed indicating that goal-present participants (M = 2.53) consumed fewer chocolates than goal-absent participants (M = 5.19; $F(1,86)$ = 21.68, $p < .001$). The main effect of proximity ($M_{Near}$ = 3.94 vs. $M_{Far}$ = 3.78; $F(1,86)$ = .08, $p > .70$) was not significant. The effect of the goal by proximity interaction on consumption proved to be significant ($F(1,86)$ = 4.50, $p < .05$). Consistent with what was observed in with the information processing results, follow-up tests revealed significant differences in consumption between goal-present and goal-absent participants in the near condition ($M_{GP}$ = 2.00 vs. $M_{GA}$ = 5.87 chocolates; $F(1,86)$ = 24.63, $p < .001$), but not in the far condition ($M_{GP}$ = 3.05 vs. $M_{GA}$ = 4.50 chocolates; $F(1,86)$ = 3.01, $p > .05$).

*Moderated Mediation Results.* To test hypothesis 4, we use a three-step mediation analysis (Muller et al. 2005; Preacher et al. 2007). The results of the first two steps are reported above:

the interaction between self-regulatory goal and proximity affects both the number of chocolates eaten ($F(1,86) = 4.50$ $p < .05$) and the information processing ratio ($F(1, 86) = 5.71$, $p < .05$). The third step examines the effect of the self-regulatory goal by proximity interaction on the number of chocolates eaten while controlling for the information processing ratio. The results indicate that the effect of the information processing ratio on consumption remained significant ($\beta = -1.99$, $t(85) = -2.60$, $p < .05$); however, the interaction term was not significant in this model ($\beta = -1.69$, $t(85) = -1.47$, $p > .10$). Thus, all criteria for *complete* mediation were met.

Next we conducted a holistic test of the moderated mediation model – i.e., the information processing ratio as the mediator, and proximity as the moderator, of the self-regulatory goal effect on consumption – including an analysis of the conditional indirect effect. This approach allows for interpretation of mediation at particular values of a moderator (Preacher et al. 2007). The moderated mediation results are consistent with hypotheses 2 and 4 revealing a marginally significant indirect effect in the near condition ($Z = -1.86$, $p < .10$), but not in the far condition ($Z = .56$, $p > .50$). That is, mediation occurred when the chocolate was placed directly in front of participants, but not when it was at the front of the lab.

Overall, the results of Experiment 1A provide strong support for the role of selective information processing in self-regulation. The results indicate that the selective processing of more cost (relative to pleasure) attribute information is only triggered when the desired product is near to consumers with an active self-regulatory goal. Experiment 1A also found a significant goal by proximity interaction on the number of chocolates consumed, which was completely mediated by the selective processing of cost (relative to pleasure) attribute information.

However, although the means are in the right direction, we do not find significant support for hypothesis 1 in this experiment. To some extent this is not particularly surprising given that

the main effect is predicted (and found) to be conditional upon the interaction. In addition, the prime that we used to manipulate the presence of the self-regulatory goal in Experiment 1A may have been too subtle. Although pre-tests indicated that the prime did result in a significant difference between goal-present and goal-absent groups, the effect may not have been strong enough to cause a substantial difference in information processing across conditions. In Experiments 2 and 3, we employ a more powerful priming procedure, which provides strong support for hypothesis 1.

The results from Experiment 1A suggest that the presence of a self-regulatory goal can trigger the selective processing of cost versus pleasure information. However, this study looked at self-regulatory goals as either absent or present. In the study that follows we extend our initial results and examine the impact that the strength with which a goal is held has on selective information processing. Based on the theory presented above, we expect that as the strength of the goal increases, the ratio of processing cost relative to pleasure information will also increase. In Experiment 1B we test this prediction by measuring health consciousness and examining the effect that it has on selective information processing.

EXPERIMENT 1B

*Method*

*Design and Procedure.* 34 undergraduate student participants were seated in front of a computer terminal. The procedure followed that of Experiment 1A's *near* condition, with the exception that in Experiment 1B it was ice cream rather than chocolate that was placed directly

in front of all participants.  In addition, using the scale from Moorman and Matulich (1993), we measured (rather than manipulated) health consciousness. As in Experiment 1, the participants could acquire information on any or all of the four attributes: two pleasure (creaminess and richness) and two cost (fat content and caloric content) using the MouselabWEB interface.  The order in which the attributes appeared on screen was again counterbalanced and MouselabWEB recorded the time spent processing each attribute. The dependent variable was the same processing ratio that was used in Experiment 1.

*Results and Discussion*

The twelve health consciousness items loaded onto a single factor and were averaged to form a single health consciousness scale ($\alpha = .85$). Regression analysis revealed a significant main effect of health consciousness on the processing ratio ($\beta = .21$, $t = 4.48$, $p < .001$), which indicates that as health consciousness increases, the time spent processing cost (relative to pleasure) information also increases.

EXPERIMENT 2

Experiment 2 aims to replicate the key findings from the first experiment and test a second boundary condition (i.e., information availability).  In many situations, consumers are faced with a consumption decision without access to explicit external information about a product's cost and/or pleasure attributes.  For example, restaurant menus rarely provide detailed cost attribute information about the foods that they serve. In such cases, the information that consumers'

process has to be recalled from memory. As predicted by hypothesis 3, in the absence of external attribute information, we expect that when chocolate is placed directly in front of a consumer, s/he will tend to focus on how good it will taste, rather than thinking about how much fat or how many calories it contains. We test this prediction in Experiment 2.

Experiment 2 also introduces two methodological changes. First, a simpler and more powerful priming procedure is used to manipulate the presence of a self-regulatory goal. Second, rather than using MouselabWEB, as in Experiments 1A and 1B, Experiment 2 collected information processing data via participant-written thought protocols. The results demonstrate that the effects observed across the experiments are not stimulus, prime, or measure specific.

*Method*

*Design and Procedure.* Upon entering the lab, 138 undergraduate student participants were randomly assigned to the conditions of a 2 (self-regulatory goal: present vs. absent) by 2 (attribute information: present vs. absent) between subjects design. Participants were told that they would participate in two unrelated experiments. The first experiment would (ostensibly) examine their ability to construct sentences. In fact, participants completed the goal priming manipulation, which used a scrambled sentence task that included 10 items, each requiring the participant to form a grammatically correct four-word sentence from five scrambled words. Examples of the goal-present prime items are "*I, good, diet, want, grades*" and "*he, health, what, want, did*". Self-regulatory goal absent items contained neutral sentences. Examples are *"is, dog, the, car, hairy"* and *"begin, I, orange, will, when"*. Similar scrambled tasks have been effectively used in prior research to prime goals (Bargh et al. 2001, Laran 2009).

After completing the scrambled sentence task, the participants were thanked and they were informed that they would be completing a second experiment that required them to evaluate

chocolate. Bowls of 25 individually wrapped chocolates were then placed directly in front of all of the participants (i.e., the chocolate was *near* in all conditions). In the *information-present* condition, participants were given the empty bag that the chocolates were originally purchased in. On the bag were photos of the same wrapped chocolates that were in the bowls located directly in front of them. The brand name was on the front of the bag and the nutritional information was on the back. Participants were told that they could pick up and look at the bag if they thought that it would help them evaluate the chocolate; however, they were not specifically instructed to look at the nutritional information. Those in the *information-absent* condition did not have access to the bag and, therefore, they did not have any explicit cost or pleasure attribute information available to them. In all conditions, packaging for each individually wrapped chocolate included the brand name.

Participants were then given the following instructions: "To begin with and PRIOR to eating any chocolate, please write down whatever your thoughts are regarding the chocolate that is directly in front of you. Simply write down the first thought that comes to your mind on the first line, the second thought that occurs to you on the second line, and so on." After completing this thought listing task, the participants were told that they could eat as many pieces of chocolate as they liked in order to make an accurate evaluation.

*Measures.* Items listed in the thought protocol were coded by two judges as either being *cost* or *pleasure*. Examples of cost thoughts were "these are high in fat" (information-present condition) and "I wonder how fattening these are" (information-absent condition). Examples of pleasure thoughts were "I love milk chocolate" and "Chocolate tastes really good". Judges were not aware of the experimental hypotheses or of the conditions to which participants were assigned. Inter-judge reliability was .91. Discrepancies were resolved through discussion.

The critical ratio measure was constructed by subtracting the number of pleasure thoughts from the number of cost thoughts and then dividing by the total number of pleasure and cost thoughts listed overall. This ratio was consistent with the one used in the first two experiments; however, it was based on the participant-written thought protocols rather than processing time recorded by MouselabWEB. Consistent with the previous experiments, the ratio is such that a positive number indicates a greater proportion of cost thoughts, whereas a negative number indicates a greater proportion of pleasure thoughts. Chocolate consumption was measured by subtracting the number of chocolates left in the bowl from 25 (i.e., the number originally in the bowl). Additional measures included the same health consciousness/awareness (Moorman and Matulich, 1993) and involvement scales used in the previous 2 studies. In addition, a seven item chocolate evaluation measure was included to be consistent with our cover story.

*Results and Discussion*

*Manipulation Checks.* Participants in the primed self-regulatory goal condition scored higher on health consciousness ($M_{GP}$ = 5.36) than participants in the goal absent condition ($M_{GA}$ = 4.74; $p$ <.01). There were no differences in involvement between goal primed participants ($p$ >.30). Information availability had no effect on health consciousness scores ($p$ > .40) or on involvement ($p$ > .60).

*Selective Information Processing Results.* A 2 (self-regulatory goal) by 2 (attribute information) ANOVA on the ratio processing measure revealed two main effects. First, supporting hypothesis 1, the results revealed a main effect of goals on the ratio of thoughts processed ($M_{GP}$ = .11 vs. $M_{GA}$ = -.08; $F(1, 132) = 3.92$, $p = .05$). A significant effect of information condition on the processing ratio measure was also observed ($M_{IP}$ = .11 vs. $M_{IA}$ = -.10; $F(1,132) = 6.10$, $p < .05$). More importantly, the self-regulatory goal by information

condition interaction was also significant (F(1, 132) = 7.75, $p$ <.01; see figure 3). Consistent with hypothesis 3, follow-up tests indicate that goal-present participants in the information-present condition ($M_{IP}$ = .37) had a significantly greater number of thoughts about the cost (vs. pleasure) of consumption than those in the information-absent condition ($M_{IA}$ = -.14; F(1,132) = 14.22, $p$ < .001). No differences in processing were observed for goal-absent participants across attribute information conditions ($M_{IP}$ = -.09 vs. $M_{IA}$ = -.06; F(1,132) = .05, $p$ > .80). Significant differences in processing between goal-present and goal-absent participants were observed in the information-present condition ($M_{GP}$ = .37 vs. $M_{GA}$ = -.10; F(1,132) = 11.34, $p$ < .01), but not in the information-absent condition ($M_{GP}$ = -.14 vs. $M_{GA}$ = -.06; F(1,132) = .32, $p$ > .50).

Based on our review of prior research, we have argued that pleasure information should be easier for consumers to access. If this is true, then given that we asked participants to "write down the first thought that comes to your mind on the first line" (see instructions above), consumers should tend to list pleasure thoughts first, before listing thoughts about the cost of consumption. Consistent with this expectation, we find that participants listed pleasure thoughts first 77.9% of the time (106/136; binomial test $p$ < .001).

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Insert figure 3 about here

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*Chocolate Consumption Results.* To examine the effect of our manipulations on chocolate consumption, a 2 (self-regulatory goal) by 2 (attribute information) ANOVA on the number of chocolates eaten was conducted. Main effects of self-regulatory goal (F(1,134) = 1.83, $p$ > .10) and attribute information condition (F(1,134) = 1.37, $p$ > .20) were not significant; however, the interaction was significant (F(1,134) = 5.20 $p$ < .05). Comparisons across information conditions indicated that the presence of information had a significant effect on the number of chocolates

consumed for goal-present participants ($M_{IP}$ = 2.01 chocolates vs. $M_{IA}$ = 3.34 chocolates; $F(1, 134)$ = 6.05, $p$ < .05), but had no influence on the number of chocolates consumed for goal-absent participants ($M_{IP}$ = 3.41 chocolates vs. $M_{IA}$ = 2.99 chocolates; $F(1, 134)$ = .61, $p$ > .40). Consistent our theorizing, we observed significant differences in consumption between goal-present and goal-absent participants in the information present condition ($M_{GP}$ = 2.01 vs. $M_{GA}$ = 3.41 chocolates; $F(1,134)$ = 6.59, $p$ < .05), but not in the information absent condition ($M_{GP}$ = 3.34 vs. $M_{GA}$ = 2.99 chocolates; $F(1,86)$ = 3.01, $p$ > .05).

*Moderated Mediation Results.* To test hypothesis 4, we use a three-step mediation analysis (Muller et al. 2005; Preacher et al. 2007). The results of the first two steps are reported above: the interaction between self-regulatory goal and proximity affects both the number of chocolates eaten ($F(1,134)$ = 5.20 $p$ < .05) and the information processing ratio ($F(1, 132)$ = 7.75, $p$ < .01). The third step examines the effect of the self-regulatory goal by physical proximity interaction on consumption while controlling for the information processing ratio. The results indicate that the effect of the ratio on the number of chocolates eaten is significant ($\beta$ = -1.01, $t(134)$ = -2.97, $p$ < .01); however, the interaction is no longer significant ($\beta$ = -1.22, $t(134)$ = -1.57, $p$ > .10). Thus, all criteria for *complete* mediation were met.

Finally, we tested the entire moderated mediation model holistically – i.e., the information processing ratio as the mediator, and information availability as the moderator, of the self-regulatory goal effect on consumption – including an analysis of the conditional indirect effect. The results reveal conditional indirect effects in the information present condition ($Z$ = -2.17, $p$ < .05), but not in the information absent condition ($Z$ = .53, $p$ > .50). These results further support hypothesis 3: consumers with an active self-regulatory goal processed fewer cost (relative to pleasure) thoughts when product information was not externally available. The results of

Experiment 2 provide additional support for the information processing model of self-regulation. As in Experiment 1A, we find that when consumers are near a desired product, those who have a self-regulatory goal tend to process more cost (relative to pleasure) information. In addition, Experiment 2 demonstrated that this effect depends upon the availability of external attribute information (H3). Even those consumers with a self-regulatory goal, tended to think more about the pleasure of consumption, when they did not have access to external product information. This result, which has important implications for consumer welfare, is explored further in Experiment 3.

EXPERIMENT 3

In many consumption scenarios, consumers make purchase decisions for products to be consumed later that day or even later in the week. Experiment 3 replicates key findings from the first two experiments and extends those results by examining the role of temporal proximity (as compared to physical proximity that was tested in Experiments 1 and 2).

*Method*

*Design and Procedure.* Upon entering the lab, 176 undergraduate student participants were randomly assigned to the conditions of a 2 (self-regulatory goal: present vs. absent) x 2 (attribute information: present vs. absent) x 2 (temporal distance: near vs. far) between subjects design. Participants were told that they would participate in two unrelated experiments. They first completed the scrambled sentence priming manipulation used in experiment 3. The

participants were then told that the second study required them to evaluate chocolate. Bowls of 25 individually wrapped chocolates were placed directly in front of all of the participants. Participants were told to follow the instructions and not to eat the chocolate until they were instructed to do so. The procedure up to this point, including the information present and absent condition manipulation, was identical to the procedure used in the previous experiment. We then manipulated temporal distance as follows. In the *near* condition, participants received the following instructions prior to completing the thought listing protocol: "Soon you will be permitted to sample the chocolate but before you do so, we want to know what thoughts come to mind. To begin with, please write down whatever your thoughts are regarding the chocolate that is directly in front of you." After completing the thought protocol, participants in the near condition were told that they could eat the chocolate. In the *far* condition, prior to completing the thought listing task, participants received the following instructions: "You are not allowed to eat any of the chocolate in the lab. You will be permitted to take some home with you to sample later but before you do so, we want to know what thoughts come to mind … please write down whatever your thoughts are regarding the chocolate that is directly in front of you." After completing the thought protocol, participants in the far condition were told that they could take some chocolate to sample later at home.

*Measures.* Items listed in the thought protocol were coded by two judges as either cost or pleasure. Inter-judge reliability was .94. Discrepancies were resolved through discussion. As in experiment 3, health consciousness and involvement were measured at the end of the study, and the information processing ratio was calculated from the thought listings provided by participants.

*Results and Discussion*

*Manipulation Checks.* Participants in the primed self-regulatory goal condition scored higher on the health consciousness/awareness scale ($M_{GP}$ = 6.04) than participants in the no goal condition ($M_{GA}$ = 4.93; $F(1,174)$ = 41.12, $p$ <.001). There were no differences in involvement between participants primed with a self-regulatory goal and those in the goal absent condition ($p$ > .30). The proximity manipulation had no influence on responses to the health consciousness ($p$ > .60) or involvement ($p$ > .80) scales. The information presence manipulation did not affect responses to either the health consciousness ($p$ > .50) or involvement ($p$ > .20) scales.

*Selective Information Processing Results.* The data were analyzed using a 2 (self-regulatory goal) x 2 (attribute information) x 2 (temporal distance) ANOVA with the ratio processing measure as the dependent variable. The analysis revealed a three-way interaction among self-regulatory goal, information, and temporal distance ($F(1, 168)$ = 8.23, $p$ < .01). The nature of this three way interaction (depicted in figure 4) is such that the goal by temporal distance interaction was significant in the information present condition ($F(1, 168)$ = 11.43, $p$ < .001), but it was not significant in the information absent condition ($F(1, 168)$ = .52, $p$ > .40). Follow-up tests were carried out to investigate the goal by temporal distance interactions in the information present condition. Goal-present participants in the near condition ($M_{Near}$ = .36) were significantly more likely to have cost (relative to pleasure) thoughts as compared to those in the far condition ($M_{Far}$ = -.14; $F(1,168)$ = 7.15, $p$ < .01). The reverse was found for goal-absent participants, as those in the temporally far condition ($M_{Far}$ = -.17) were significantly more likely to have cost (relative to pleasure) thoughts than those in the near condition ($M_{Near}$ = -.54; $F(1,168)$ = 4.38, $p$ < .05). Follow-up tests also revealed significant differences between the goal-absent and goal-present groups in the near condition ($M_{GP}$ = .36 vs. $M_{GA}$ = -.54; $F(1, 168)$ = 23.11, $p$ < .001), but not in the far condition ($M_{GP}$ = -.14 vs. $M_{GA}$ = -.17; $F(1, 168)$ = .14, $p$ > .70).

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Insert figure 4 about here

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*Chocolate Consumption Results.* The results of a 2 (self-regulatory goal) x 2 (attribute information) x 2 (temporal distance) ANOVA with the number of chocolates eaten as the dependent variable are reported in table 1. The analysis revealed a significant three-way interaction among goal, information, and temporal distance ($F(1, 168) = 6.95, p < .01$; see figure 5). To further explore the three-way interaction, we analyzed the self-regulatory goal by temporal distance interactions for the information present and absent conditions. Consistent with what we observed with information processing as the dependent variable, the goal by temporal distance interaction was significant in the information present condition ($F(1, 168) = 21.87, p < .001$); however, it was not significant in the information absent condition ($F(1, 168) = .74, p > .30$). Follow-up tests investigating the interaction in the information present condition revealed that goal-present participants consumed significantly more in the far condition than in the near condition ($M_{Near} = 1.42$ vs. $M_{Far} = 3.79$ chocolates; $F(1,168) = 3.90, p = .05$). The reverse was found for goal-absent participants, as consumers in the near condition ate significantly more than in the far condition ($M_{Far} = 1.13$ vs. $M_{Near} = 6.96$ chocolates; $F(1,168) = 23.30, p < .001$). Follow-up tests also revealed significant differences between goal conditions when consumption was temporally near ($M_{GP} = 1.42$ vs. $M_{GA} = 6.96$ chocolates; $F(1, 168) = 18.59, p < .001$) and when consumption was temporally far ($M_{GP} = 3.79$ vs. $M_{GA} = 1.13$ chocolates; $F(1, 168) = 4.98, p < .05$).

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Insert figure 5 about here

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*Moderated Mediation Results.* To test hypothesis 4, we use a three-step mediation analysis

(Muller et al. 2005; Preacher et al. 2007). The results of the first two steps are reported above:

the 3-way interaction between self-regulatory goal and proximity affects both the number of

chocolates eaten ($F(1,168) = 6.95$ $p < .01$) and the information processing ratio ($F(1, 168) = 8.23$,

$p < .01$). The third step examines the three-way interaction on consumption while controlling for

the ratio of information processed. Consistent with *complete* mediation, the results indicate that

the effect of the information processing ratio on the number of chocolates eaten was still

significant ($\beta = -1.68$, $t(85) = -3.26$, $p < .01$); however, the interaction term was not ($\beta = -4.87$,

$t(167) = -1.94$, $p > .05$).

An analysis of the full moderated mediation model was used to test the indirect effect of

self-regulatory goals on consumption through selective processing at the four different levels of

the moderators using all the data simultaneously (Preacher et al. 2007). Consistent with our

theorizing, this approach yield a significant indirect effect in the temporally near, information

present condition ($Z = -2.91$; $p < .001$). None of the other conditions revealed significant indirect

effects (confidence intervals contain zero and $p$'s $> .60$).

*Information Accessibility.* Experiment 4 successfully replicated the key findings from the

first three experiments and tested the effect of temporal, rather than physical, proximity on

information processing and consumption. The results from this study are consistent with our

model and the previous three experiments. When the desired product is near to the consumer –

in either time or space – consumers tend to selectively process more cost than pleasure

information. However, this is true only when the product information is made externally

available to them. Consistent with the results of Experiment 2, we find that when participants are

not provided with explicit cost or pleasure information they tend to list a pleasure thought first

70.5% of the time (124/176; binomial test p < .001).  This result supports our contention that

consumers' tend to focus on pleasure information because it is easier to access from memory.

Nevertheless, it may be that when cost and pleasure information are not externally

available, people focus on pleasure information because little or no cost information is available

in memory to be accessed. To examine these competing explanations, we ran a follow-up test

with a new sample of 30 undergraduate students consumers drawn from the same population as

in Experiment 3. Once again, participants were seated at a computer terminal and a bowl of

chocolate was placed directly in front of them.  No cost or pleasure information was available.

Participants were randomly assigned to 1) "list 5 thoughts about the costs - i.e., negative

consequences - that you would associate with eating the chocolates in the bowl in front of you";

or 2) "list 5 thoughts about the pleasure - i.e., positive consequences - that you would associate

with eating the chocolates in the bowl in front of you." Participants were asked to list 5 thoughts

based on the results of Experiment 3, which indicated that the mean number of total thoughts

(i.e., both pleasure and cost) participants listed was 3.8 (median of 4). After completing the

listing task, participants responded on a 7-point scale (anchored at 1 = easy and 7 = difficult) to

the following question: "How difficult was it to come up with these thoughts?"  We found that

participants were able to list 5 unique thoughts in *both* the cost and pleasure conditions.

However, those asked to list cost thoughts rated the task as being significantly more difficult (M

= 4.13) than those asked to list pleasure thoughts (M = 2.60; $F(1,28) = 5.79$, $p < .05$). Consistent

with our expectations, these results indicate that although participants are able to recall

information about both the pleasure and the cost of consuming the chocolate, it is substantially

easier to retrieve pleasure thoughts from memory.

GENERAL DISCUSSION


Self-regulation is a complex combination of processes. This research is a first step towards a better understanding of how selective information processing affects self-regulation. Across all four experiments, the ratio of processing cost relative to pleasure information predicted consumption. When the balance of processing favored cost information, less chocolate was consumed. When the balance of processing favored pleasure information, more chocolate was consumed. In contrast to prior research, we find that consumers with an active goal are most vulnerable to self-regulatory failure when the object of desire is *farther* away from them in either time or space; because as the distance increases they focus less on the costs of consumption. Finally, our results indicate that if product information is not externally available – i.e., it has to be recalled from memory – people tend to focus on the more accessible thoughts about the pleasure of consumption and fail at self-regulation.

Future research could extend these findings by further examining the effects of selective information processing. For example, does focusing on cost versus pleasure information change or bias the way consumers perceive products? It may be that people who focus less on cost information believe the chocolate is healthier, which justifies consuming more of it. Or, it could be that people who plan to eat more ice cream willfully avoid thinking about the negative consequences of consumption. A better understanding of how selective information processing affects consumers' perceptions of products is a potentially fruitful avenue for future research.

Prior research on self-regulation has identified three necessary factors for effective self-regulation: 1) a goal intended to guide behavior; 2) a monitoring process; and 3) self-regulatory

resources (Baumeister 2002; Baumeister and Heatherton 1996). In this research we focus on the first two. However, it is possible that selective information processing also affects self-regulatory resources. For example, focusing on the pleasure of eating a piece of chocolate might be significantly more depleting than focusing on the consequences of such consumption. If so, selectively processing cost information might not only increase the probability of resisting immediate temptations, it could also allow the consumer to use fewer resources in the current act of self-control and, thereby, improve the likelihood of future self-regulatory success.

In this paper, we measured information processing in two ways: using the process tracing software of MouselabWEB and through participants' self-reported thought listings. Both measures provided consistent support for our theory. However, it might be useful to consider other measures of processing – including recall measures taken a different points in time – to better understand the role that memory and time play in the decision making process. For example, does a dieter have to continually think about the cost of consumption in order to resist chocolate? It may be that an intense focus on cost information results in a longer lasting (negative) affective association with the chocolate, which in turns leads to more successful self-regulation over time. Alternatively, it is possible that successful self-regulation requires the dieter to be constantly vigilant in focusing on the costs of consumption (which makes long-term success substantially more difficult).

The current work examines what consumers think about when they do not have explicit external information available. We find that the lack of such information results in a focus on the more accessible thoughts about the pleasure of consumption and, subsequently, a higher probability of self-regulatory failure. This has important implications for consumer welfare, given that in many common consumption situations cost information is not readily available.

Our results suggest that not having access to such information can seriously compromise the ability of consumers to achieve their self-regulatory goals.

**FIGURES**

FIGURE 1: MOUSELABWEB DISPLAY



Evaluating Chocolate Ice Cream

Each of you will be given a premium chocolate ice cream to eat after you have completed the study.

You are asked to evaluate the chocolate ice cream based on four attributes prior to eating it. The levels of each attribute were obtained from a recent Consumer Reports survey on ice cream.

**Please start by looking at the attribute that is most important to you in making your evaluation of the product, followed by the next most important.**

| Degree of Creaminess | Degree of Richness | High Fat 39 grams | Calories |

Please Click Here To Continue

MouselabWEB Matrix Values for Experiment 1A

| Fat Content | Caloric Content | Richness | Creaminess |
|:-----------:|:---------------:|:--------:|:----------:|
| 4.5 grams | 75 calories | 9/10 | 9/10 |

MouselabWEB Matrix Values for Experiment 1B

| Fat Content | Caloric Content | Richness | Creaminess |
|:-----------:|:---------------:|:--------:|:----------:|
| 39 grams | 650 calories | 9/10 | 9/10 |

FIGURE 2:  THE EFFECT OF SELF-REGULATORY GOALS AND PROXIMITY ON
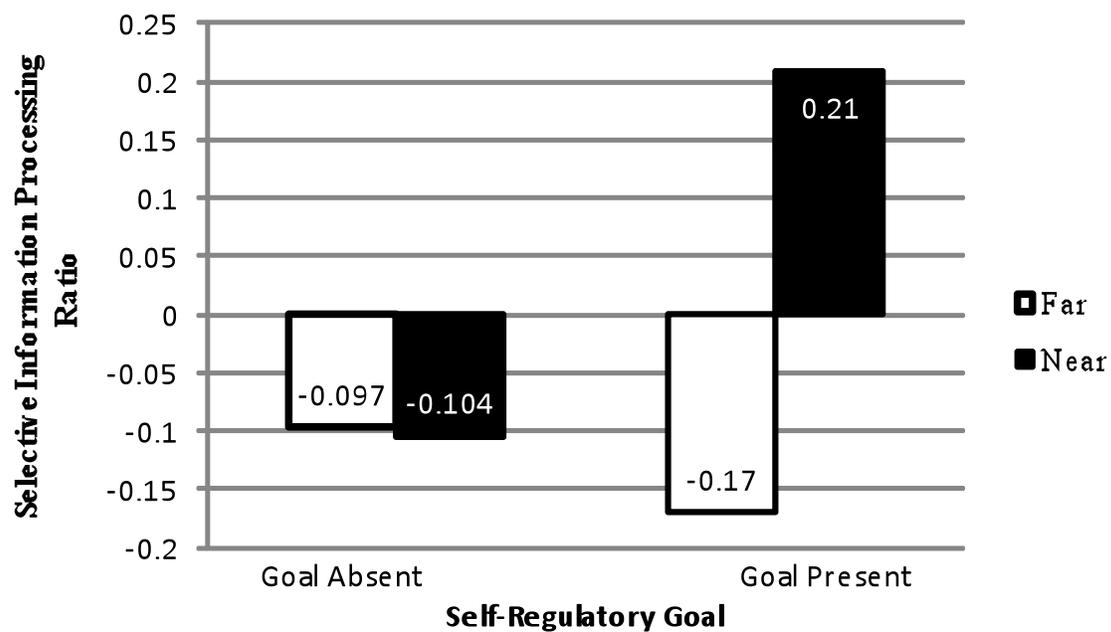
INFORMATION PROCESSING IN EXPERIMENT 1.

FIGURE 3: THE EFFECT OF SELF-REGULATORY GOALS AND ATTRIBUTE

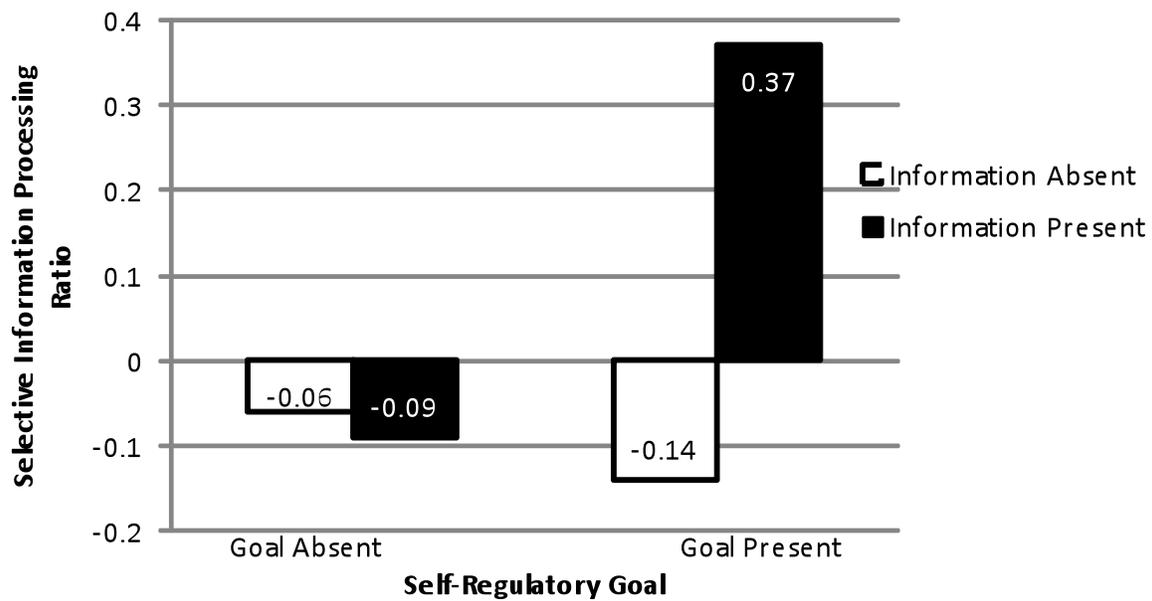INFORMATION AVAILABILITY ON INFORMATION PROCESSING IN EXPERIMENT 2

FIGURE 4: THREE-WAY INTERACTION AMONG GOALS, INFORMATION AND

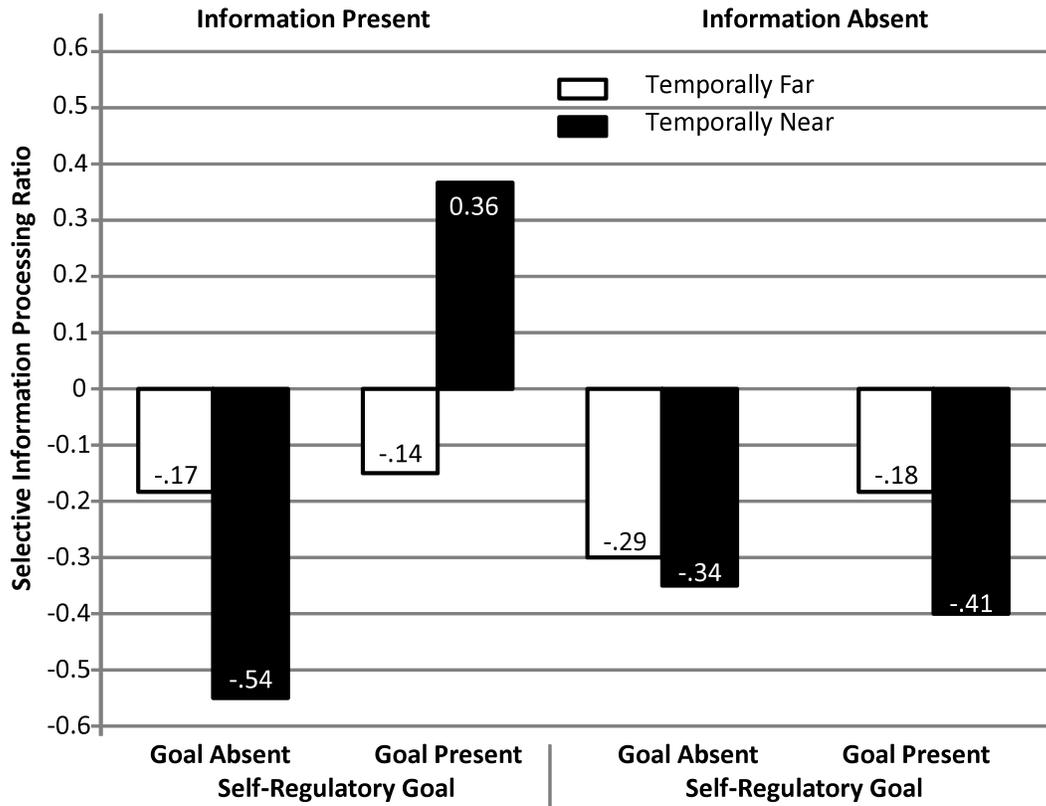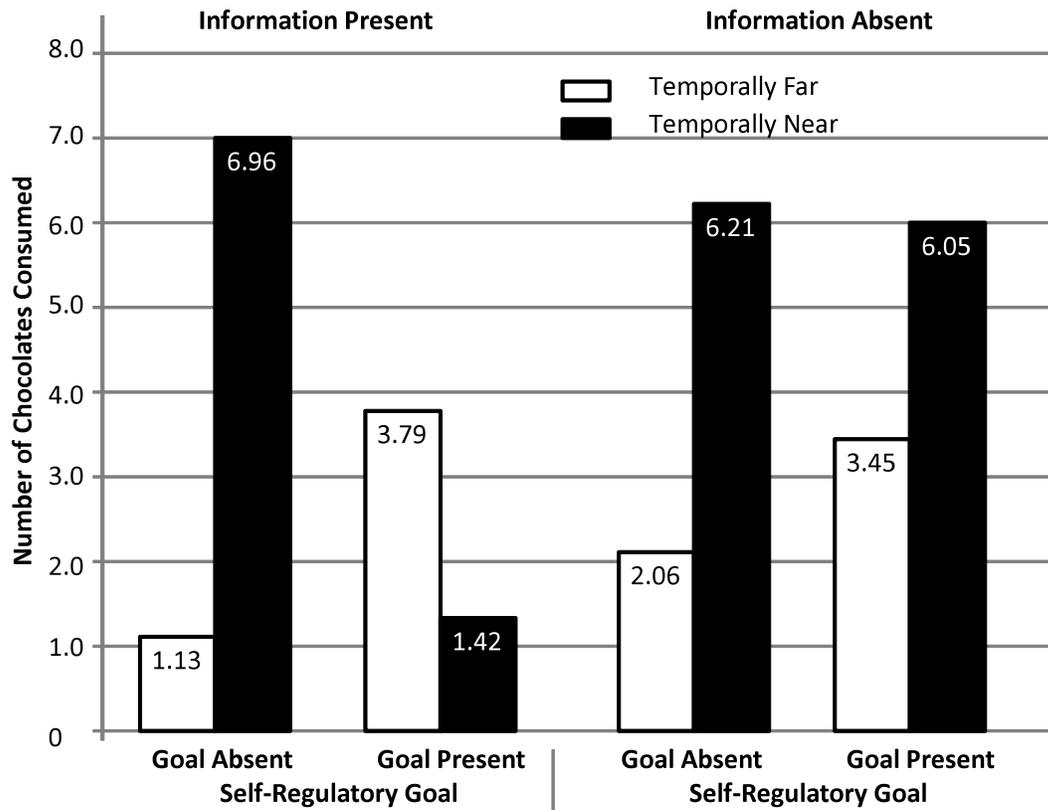TEMPORAL PROXIMITY ON INFORMATION PROCESSING IN EXPERIMENT 3

FIGURE 5: THREE-WAY INTERACTION AMONG GOALS, INFORMATION AND

TEMPORAL PROXIMITY ON CONSUMPTION IN EXPERIMENT 3

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