

## ABSTRACT

Title of Document: MULTIFINAL NO MORE: DEACTIVATION OF THE BACKGROUND GOAL CAUSES (PRICE) DEVALUATION OF MULTIFINAL MEANS

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Motivation has been of interest to psychological researchers going back as far as Kurt Lewin (1936), but recent advances using the “New Look” in motivation paradigm have led to an explosion of research over the past fifteen years. One such new theory, goal systems theory (Kruglanski et al., 2002), predicts that multifinal means will lose their advantaged valuation over unifinal means when the background goal they facilitate is deactivated. Seven studies sought to provide evidence that this will occur whether the goal is deactivated due to loss of desirability, loss of attainability, or due to attainment of the goal. Evidence was obtained suggesting that goal attainment does in fact deactivate the goal and eliminate the valuation advantage, although evidence obtained from testing the mechanism of goal desirability was not supportive of the theory. The evidence for the role of goal unattainability deactivating the goal and eliminating the overvaluation was mixed, suggesting a potentially more complex mechanism than had been theorized. These studies provide

insight not only on a basic psychological process, but to illustrate potential applications in consumer and financial markets as well.

MULTIFINAL NO MORE: DEACTIVATION OF THE BACKGROUND GOAL  
CAUSES (PRICE) DEVALUATION OF MULTIFINAL MEANS

By

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Dissertation submitted to the Faculty of the Graduate School of the  
University of Maryland, College Park, in partial fulfillment  
of the requirements for the degree of  
Doctor of Philosophy  
2010

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## Dedication

To my wonderful wife Lauren: Thank you for loving me, growing with me, and sharing life with me these last 5 years. We've come a long way together and have given so much of ourselves to support each other.

To my parents: Thank you for your love, guidance, and sacrifices that have made it possible for me to become who I am today.

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# Chapter 1: Introduction

## *Motivation and the goal construct*

Motivation has long been of great interest in social psychology going back as far as Triplett's (1898) social facilitation experiment. Lewin's (1926) discussion of “intentions”, “needs”, and later levels of “aspiration” (Lewin, Dembo, Festinger, & Sears, 1944) were early inquiries into what we now consider motivational phenomena. Motivation has been prominent in social psychological theorizing since at least Festinger's (1957) theory of cognitive dissonance, and more recent studies have inquired into how motivation affects our beliefs about ourselves (Kunda, 1987) and others (Jones & Nisbett, 1971; Fein & Spencer 1997). In the past decade, research on motivation under the “New Look” paradigm has focused on the cognitive properties of motivation and their implications (Kruglanski, Shah, Fishbach, Friedman, Chun, & Sleeth-Keppler, 2002), resulting in the primacy of the goal construct in motivational research. The definition we will use for goals here is that they are cognitive representations in memory (Kruglanski, 1996) that are focused at some end state which is associated with positive affect (Fishbach & Ferguson, 2007).

The primary characteristic of goals is that they represent a discrepancy between a desired state and one's current state. This “tension” between the current and ideal states gives the goal its motivational property (Lewin, 1936). Carver & Scheier, (1998) identify the process of how this happens: people constantly monitor the discrepancy between their current state and their desired end state, and use their emotions as feedback to determine whether to continue pursuit (if affect is negative) or discontinue pursuit (affect is positive, suggesting the ideal state has been

reached). A common example of this is a very hungry person who feels tense and unpleasant until he has had enough to eat, at which point the feeling of pleasant satiation terminates the pursuit behavior (eating). Our attention is automatically directed toward goal-related stimuli (Moskowitz, 2002) as any struggling dieter can tell you, but goals differ from motivationally neutral constructs in how our memory retains them as well. Whereas research on neutral stimuli has found that knowledge decays in memory over time when unprompted (Atkinson & Birch, 1970), stimuli that are related to active goals actually *increase* in cognitive activation when left unaccomplished (Gollwitzer & Moskowitz, 1996). As a result, goal pursuit differs from non-motivated activities in that it is resistant to cessation as a result of encountering obstacles, and if momentarily disrupted pursuit will likely be resumed once the opportunity is available (Bargh, Gollwitzer, Lee-Chai, Barndollar, & Trötschel, 2001).

#### *Goal systems architecture.*

Since goals are cognitive representations of motivational constructs (Kruglanski, 1996), they behave according to rules of knowledge activation (Higgins, 1996). This suggests that our many goals are in a constant state of flux, as opposed to the “stable” motivations of past models (Hollis, 1994); goals can increase in urgency from one moment to the next as a result of spreading activation through related constructs (Anderson & Reder, 1999). Kruglanski et al.'s (2002) goal systems theory proposes a “railroad tracks” metaphor explaining the facilitative connections between a goal, its multiple means of accomplishment, and higher-level goals to which the goal itself serves as a means. For example, a student may have a goal of getting an important

paper written. This will in turn increase the cognitive activation of different means to accomplishing the goal (study materials, desk, and computer) as well as a higher-order goal that writing the paper is itself a means to (graduating from college). Thus, goals can be activated even by mention of a relationship partner or significant other in one's life (Fitzsimmons & Bargh, 2003). Consequently, accomplishing a goal will lead to decreased activation of its means and related concepts (Ferguson & Bargh, 2004). Goal systems theory also suggests inhibitory connections between competing goals, such as the sudden reminder that one needs to study for an important test inhibiting the temptation to spend the evening out with friends (Fishbach & Shah, 2006). Motivation is rarely stable from one moment to the next.

*Automatic and unconscious goal-consistent evaluations*

Having a goal active in memory has been found to result in potential means to that goal being automatically evaluated in terms of their perceived instrumentality to that goal (Ferguson & Bargh, 2004, Study 2). These authors utilized a sequential-priming lexical decision task to find that thirsty participants were faster at responding to words that were relevant to the goal of quenching thirst (water, juice) *only* when these words were preceded by a positive (vs. negative) prime. This was interpreted as evidence that the goal of quenching thirst caused the means to attain that goal to be evaluated more positively, leading to a faster reaction time. Subsequent studies have confirmed this basic finding in different contexts. In fact, not only does the activation of a goal result in the automatic evaluation of its direct means to accomplishment (such as a dieting goal having a positive effect on evaluations for healthy food but negative for unhealthy food, see Fishbach, Shah, & Kruglanski, 2004), but also

impacts the evaluation of things that are more peripherally instrumental to the goal, such as friends and relationship partners (Fitzsimons & Shah, 2008).

Importantly, these automatic evaluations (and the reactions stemming from them) often occur below the threshold of conscious awareness. Research done in the late 1990s on the phenomenon of behavioral mimicry produced ample evidence that subliminal visual primes could alter behavior in a manner consistent with the prime (Bargh, Chen, & Burrows, 1996; Dijksterhuis & van Knippenberg, 1998; Chartrand & Bargh, 1999). For example, participants in these studies waited longer to interrupt a conversation when primed with “politeness”, walked more slowly down the hall when primed with words related to the elderly, reacted more angrily to a fake computer crash after being shown pictures of African-American males, and were better at answering Trivial Pursuit questions when primed with “professor”. While these findings were originally interpreted as an unmotivated “perception-behavior link” (Chartrand & Bargh, 1999), a series of destructive replications by Cesario, Plaks, & Higgins (2006) demonstrated the crucial role that motivation (goals) played in these situations. Participants did not simply walk slower when primed with words related to the elderly: those who were pretested as *liking* the elderly did indeed walk slower when primed with these words, but those who were pretested as *disliking* the elderly actually walked faster if they were given the subliminal prime. Similarly, participants reacted more angrily to a fake computer crash when shown subliminal pictures of men labeled “gay” than those shown the same pictures labeled “straight”, despite the fact that gay men are not stereotyped as aggressive. Cesario et al. (2006) used these new studies to reinterpret the existing mimicry literature to suggest a

“motivated preparation to interact”, in which people unconsciously take steps to facilitate closer interactions with those who they like (walking slower will stereotypically help one interact better with elderly people; being in an analytical frame of mind will help one interact better with professors) and maintaining more distance from those they dislike (walking faster will help one get away from the elderly; angry confrontations with a gay man will make it less likely he will want to be around you). In short, this literature demonstrates the powerful effect active goals can have on our evaluations and subsequent behavior even when they operate outside our conscious awareness.

#### *Multifinality and the impact of background goals*

According to goal systems theory (Kruglanski et al., 2002), when multiple goals are active, people will try to find a multifinal means that will satisfy all goals (e.g., eating out with new colleagues is a means that can satisfy all the goals of alleviating hunger, networking, and having fun). Chun & Kruglanski (2005, Study 3) provide an example of multifinality in action. In this study, participants were given the goal of taste-testing 3 ostensibly different colas and deciding on the best one (the same cola was used for all three but labeled differently). Thus, participants had the focal (primary) goal of accuracy. However, the experimenters manipulated a background goal (affiliation) in this study as well. After a pretest revealed that Coke was viewed by participants as more “American” than the other two brands of cola (Pepsi and Shoppers), the experimenters set up a 2 X 2 design in which the affiliation goal was manipulated (participants read an article designed to induce either American-identity pride vs. shame) and the instrumentality of the colas to the focal goal of accuracy was

manipulated (in the “Shoppers Superior” condition the “Pepsi” and “Coke” were diluted and “Shoppers” was normal, whereas in the “Shoppers Inferior” condition all three were the same). The results of this study were that when the Shoppers Cola was “Superior” (undiluted) and thus clearly better tasting than the others, participants chose that as the best cola regardless of affiliation goal. However, in the “Inferior” condition, when all three choices tasted exactly the same (and thus were equally instrumental to the focal goal of being accurate), participants who had read the identity-pride article overchose Coke while those who had read the identity-shame article did not, suggesting that the influence of the background goal was decisive only when it was *unclear* which was the best option using the focal goal of accuracy.

#### *The present research*

One aspect of the multifinality principle that has not yet received empirical support is the impact of goal *deactivation* on the valuation of multifinal means. If one of the goals that made a means multifinal in the past is deactivated, this means should not be valued over the unifinal means in pursuing the remaining goal, as it was previously. In this respect, goal systems theory (Kruglanski et al., 2002) extends earlier motivational models such as Thagard & Millgram's (1995) “coherence” model. Goal systems theory specifies what will happen when there are changes to the goal system, such as new goals being activated and introduced into the system while existing goals can be deactivated and taken out, while the “coherence” model omits any mention of the consequences of goal deactivation. This contrast is indicative of the theoretical gap between the “New Look” in motivation underlying goal systems theory and more traditional rational-choice theories. In the “New Look” (see

Kruglanski et al., 2002), motivation is dynamic and in constant flux, context dependent (can be primed), and is interconnected with other units of the system (such as a goal and its means) with automatic transfer of properties (activation, commitment, affective qualities) from one unit to the next. On the other hand, traditional decision models (such as the widely-applied rational choice theory of classical economics) assumes *stable* preferences that are unaffected by context and presentation (Hollis, 1994, p.116). While Thagard & Millgram (1995, p.444) agree with Kruglanski et al. that greater *desirability* of a “supergoal” will cause greater activation of units linked to it within the system, Thagard & Millgram are silent on the effects of changes of a goal's *perceived attainability* or *attainment* on its activation within the system. In both circumstances, goal systems theory predicts the goal should be deactivated; it is not “goal-worthy” if it is not both desirable and attainable, and there is no current/desired state discrepancy once it is attained (Kruglanski, 1996). As a result, the deactivated goal should no longer exert influence on decision-making, and the multifinal means should lose its valuation advantage.

While much of the research on motivation has been done in traditional social psychology domains such as person perception and self-regulation or business domains such as consumer choice, goal systems theory can advance understanding in behavioral economics as well when applied to the domain of market and pricing distortions. For that reason, the present research will investigate the phenomenon of goal-moderated price devaluation in the context of evaluating financial products and consumer products. Despite a increased interest on the part of traditional finance researchers to incorporate psychological principles into their models, the impact of

multiple motivations has not found a prominent place in this literature. In his book summarizing the major findings in behavioral finance, Hersh Shefrin (2002) identifies three major themes that behavioral finance has been focused on to date: heuristic-driven biases, frame dependence, and inefficient capital markets. While the first two themes are based on cognitive psychological principles (see Tversky & Kahneman, 1974), researchers in this field have not drawn significantly from social psychological research on motivation despite a large literature suggesting motivation does influence perceptions and judgments (Bruner, 1957; Kunda, 1987), particularly under conditions where the “accurate” choice is unclear or uncertain (Chun & Kruglanski, 2005). Thus, the present research provides the contextual opportunity for advancing understanding in financial economics as well as consumer and social psychology.

#### Overview of Research

Seven studies were conducted to establish the impact of deactivating background goals on the valuation of multifinal means, relative to those who have not had the background goal deactivated. All these studies involved both the focal goal of accurately pricing a product at its “fair” market value, and background goals (such as affiliation, personal success or personal accomplishment) that could bias the estimates of fair market value. Study 1 examined how fulfillment of an affiliation goal through a substitute means affected valuation of a consumer product that is relevant to a common affiliation (a University of Maryland sweatshirt) compared to a neutral product. Study 2 examined the predicted cause of this valuation bias, that goals that are attained will be deactivated. Study 2 replicated Study 1's procedure but used a reaction time task to measure whether the attained goal showed lower cognitive

activation (instead of the price estimation task of Study 1). Study 3 investigated how fulfillment of the goal of being personally successful affects valuation of companies that are seen as more (but not less) successful. Study 4 examined the impact that making a goal (the goal of accomplishing something great and innovative with your life) seem unattainable had on valuations of companies that are seen as more vs. less innovative. Study 5 examined the predicted cause of this valuation bias, replicating Study 4's procedure but using a reaction time task to measure differences in goal activation (instead of the price estimation task) as a function of goal attainability. Studies 6 and 7 examined the impact of lessening the desirability of a goal on valuations of consumer products that are potential means to accomplishing that goal. A common thread in these seven studies is that each was designed in such a way as to attempt to provide evidence that the goal deactivation manipulation not only decreases evaluation of the multifinal mean (the goal-relevant object) relative to those who have the goal still active, but will have the opportunity to show that evaluations of goal-neutral (non-multifinal) objects do not differ as a function of the goal prime (condition). This procedural aspect will rule out differences due to cognitive or affective factors, leaving motivation as the sole possible explanation.

## Chapter 2: Devaluation Due to Goal Attainment (Studies 1-3)

### Study 1: The Effect of Goal Attainment on Consumer Product Valuations

Study 1 investigated how fulfillment of a background goal (vs. unfulfillment) caused multifinal means to lose their price valuation advantage over unifinal means (those to which the only relevant goal is to be accurate), using a scenario similar to those encountered by shoppers at online retailers such as Amazon.com.

#### *Methods*

*Participants.* 112 undergraduate psychology students at the University of Maryland took part in this research in exchange for partial course credit.

Recruitment, appointments, and credit were handled by the university's online research participation system.

*Design.* This study utilized a 2(substitute means attainment/no substitute means attainment) X 2(goal-relevant product/goal-irrelevant product) within-subjects design.

*Procedure.* Participants were recruited for an ostensibly 2-part "Consumer Marketing Study". After they had arrived at the lab, been greeted by the experimenter and given informed consent, participants sat down in a cubicle to complete the experiment on a computer using MediaLab software. Their task was described as first take part in an experiment investigating the relationship between personality types and goal pursuit, and then taking part in a second experiment investigating their valuation of consumer products over the internet vs. in person. After completing a number of personality measures that were irrelevant to the design of the study (and were introduced merely for the purpose of supporting the cover story), all participants completed an "impressions" task in which they quickly rated

an unfamiliar character of text as more “positive” or “negative”. Responses to this task were not relevant to the research hypothesis; instead, the task served as a vehicle to subliminally prime all participants with the word “TERPS”, which is the short nickname for the university's mascot, the Maryland Terrapins. This was done so that students would have this group affiliation accessible for use later in the study. The prime was presented for 20ms and was masked both before and after by an alternating series of XXXXX, HHHHH, and EEEEE. It can be safely assumed that the prime was unconscious since no one was able to identify the word in pretesting even when forewarned that a word was being primed, and no participants voiced suspicion about this task at the end of the experiment.

Following the impressions task, all participants were informed of research suggesting numerous psychological benefits for those who affiliate themselves with at least one community as opposed to those who are complete individualists. As a manipulation check, participants were asked questions of whether they agreed with this research and whether they thought it applied to them. Following this, half of the participants were asked to write a short paragraph about a group they affiliate with and why that group is important to them (substitute attainment condition), while the other half wrote a short paragraph about their favorite food and why they like it (no substitute attainment). After writing this paragraph, all participants started the “second study” in which they were shown pictures of consumer products from a large online retailer. They were then given the explicit (focal) goal to evaluate 15 items of athletic apparel in randomized order (shirts, running pants, shoes, socks, sweatshirts), saying what they think the *retail* price is for each item. Notably,

participants were asked right after this what they *personally* would pay for this item; this was intended as a subtle way to remind them for subsequent trials that they are focusing on what the objective retail price *should be* for the item in the first question. Two of these 15 items were the dependent variables for this study: a University of Maryland sweatshirt (which is a means to the University of Maryland students' affiliation goal) and a plain gray sweatshirt (which is affiliation-goal neutral). When all 15 items had been responded to, participants were fully debriefed and thanked for their participation.

It was predicted that the Maryland sweatshirt would be valued more highly by those with the goal unattained (no substitute fulfillment) than those who had experienced attainment through a substitute means, while the plain sweatshirt would be valued the same regardless of goal attainment or unattainment. This finding would rule out the possibility of a main effect due to cognitive factors or from the positive affect enjoyed from goal fulfillment, and would give evidence of an active goal influencing perceptions of what a consumer good *should* be priced at in a large market (as opposed to a mere personal preference).

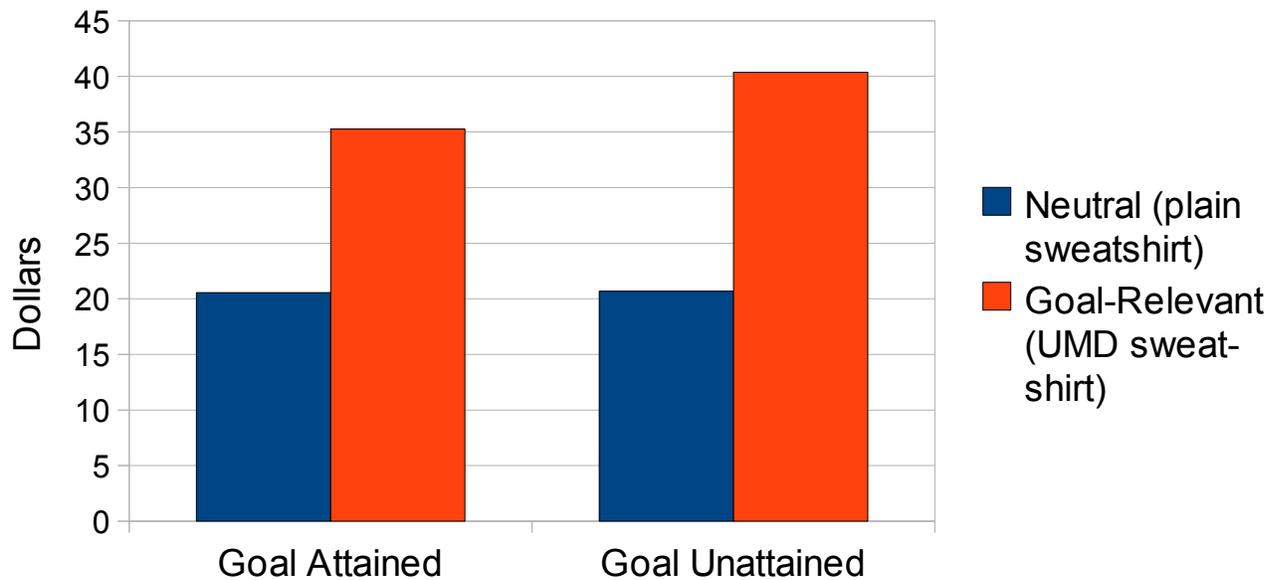
### *Results*

*Treatment check of goal activation prime.* Participants' responses to two questions were evaluated: whether they believed the research statement that affiliating with some group provided psychological benefits generally and whether they believed it was true for them personally. All participants did respond on the affirmative side of the scale for both questions (5-7 on a 7-point scale), providing evidence that the goal was indeed active for all participants prior to the experimental manipulation.

*Analysis of participants' conscious responses to an important group.* It was theoretically important to provide evidence consistent with the hypothesis that participants' *unconscious* goals could influence their valuation of goal-relevant objects. Thus, any participant in the substitute-attainment condition who wrote about the University of Maryland as their important group were removed from the final analysis (5 in total). Post-hoc analyses revealed that the removal of these participants did alter results enough to change the findings of the experiment, and will be reported along with the normal results.

*Primary analysis: valuation of multifinal vs. unifinal means under goal activation vs. deactivation.* 104 participants were included in this final analysis. Two datapoints were analyzed per participant: what they thought the fair market price of the University of Maryland sweatshirt (goal-relevant product) and the plain gray sweatshirt (goal-irrelevant product) *should* be. Results were analyzed first as a 2 (condition: substitute fulfillment vs. no substitute fulfillment) X 2 (goal-relevant vs. goal-irrelevant product) factorial ANOVA. A significant interaction was found,  $F(1, 102) = 4.96, p < .028$ , indicating that valuation patterns of the objects differed as a function of goal fulfillment condition. Valuations of the goal-irrelevant object (the plain gray sweatshirt) did not differ as a function of prior goal attainment: those in the substitute means attainment condition estimated the cost to be \$20.56, while those unable to attain their goal through a substitute means similarly valued it at \$20.67. Valuations of the goal-relevant object (University of Maryland sweatshirt) did however vary as a function of prior goal attainment: \$35.26 for those in the goal-attainment condition, but \$40.37 for those who had not attained their goal through a

substitute means (see Figure 1),  $F(1, 102) = 4.67, p < .033$ . This evidence is consistent with the hypothesis and the underlying theory that motivated evaluative biases will only be influential when the background goal causing the bias is currently active, having not been already attained.



Inclusion of the 5 participants (109 total) who reported the University of Maryland as their important group did not nominally alter group means drastically, although the test of significance for the interaction term did become insignificant ( $p > .13$ ). None of these participants reported suspicion at seeing an object related to the subject they had just written about when given an opportunity to do so during the debriefing, although to do so would have required additional effort at a time when they had been told they were “almost done”.

*Follow-up analysis using the BIC.* A follow-up analysis (of the 104 participants) was conducted using a Bayesian method designed to provide evidence diagnostic of whether the null hypothesis or experimental hypothesis is preferable given the data

(as opposed to being diagnostic of how likely the data were to have occurred assuming the validity of the null hypothesis; see Wagenmakers, 2007 for a discussion). The results of this test were that there was improvement from the main effects model to the interaction model,  $\Delta\text{BIC} = -.293$ , indicating that the interaction is preferred to the null model (albeit very weakly). This analysis too was supportive of the experimental hypothesis.

### *Discussion*

Study 1 was designed to test the hypothesis that deactivation a goal through attainment will cause goal-relevant (but not goal-irrelevant) objects to lose their evaluation advantage relative to a state of goal unattainment. The data obtained showed the pattern predicted by the theory and the validity of those mean differences was supported using both the conventional null hypothesis sampling distribution significance test and the Bayesian method. The hypothesis was supported.

#### Study 2: Conceptual Replication of Study 1 using a Reaction Time Measure

Study 2 sought to verify that the experimental manipulation used in Study 1 did actually deactivate the goal in question, using a reaction times measure. Study 2 sought to provide evidence that goal attainment will lead to deactivation of goal-related constructs (which was how the valuation advantage was theorized to be lost in Study 1). This experiment replicated the methodology of Study 1 up until the point where participants were to view the consumer products whose retail price they were supposed to estimate. However, instead of the price estimation task, participants took part in a lexical decision task designed to assess the activation of the goal using words

that are related to it compared to words that are goal-unrelated (Higgins, 1996; Kruglanski, 1996).

### *Method*

*Participants.* 111 psychology undergraduates at the University of Maryland participated in this experiment in exchange for partial course credit. Recruitment, appointments, and credit were handled by the university's online research participation system.

*Design.* This study utilized a 2(substitute means attainment/no substitute means attainment) X 2(goal-relevant words/goal-irrelevant words) within-subjects design.

*Procedure.* As in Study 1, participants were recruited for an ostensibly 2-part study, this time entitled “Reflexes and Reactions”. After using MediaLab software to complete two personality scales in order to support the multiple-studies cover story, participants were subliminally primed using DirectRT software with the word “TERPS” while completing a reaction time task that was ostensibly measuring their positive and negative impressions of novel text characters. Following this, all were given the same affiliation goal-activation prime as occurred in Study 1, citing research about the health and happiness benefits of affiliating with an important group or community, including the same treatment checks that had been used prior. Next, participants in the goal-attained condition were asked to write a short paragraph about a group that was important to them and why it was important while those assigned to the goal-unattained condition wrote about their favorite food and why they liked it.

After this point, the methodology of the present study diverged from that of Study 1. Participants were informed that the next study they would be taking part in today

was a reaction task, in which their goal would be identify character strings that appeared on the screen as either words or nonwords by pressing the “Z” key if it was a word and the “/” key if it was a nonword. Specifically, they were told that their task was to respond as quickly and accurately as they possibly could, seeing as this task was a measure of their reflexive ability. After repeating the instructions and going through five practice trials, the actual experimental task began.

The lexical decision task actually contained three classes of word stimuli: 25 nonwords (FTERC, YADENS, TOGGIX), 15 words that were unrelated to the affiliation goal (SHOESTRING, PET, YESTERDAY) and 10 words that were related to the goal (MARYLAND, TERPS, BASKETBALL, TEAM, RED, SCHOOL, SPIRIT). After all 50 words were presented in a completely randomized manner and responded to, participants were debriefed, thanked for their participation, and assigned credit for the study. The hypothesis was that due to the increased cognitive accessibility of goal-related constructs (see Higgins, 1996a; Kruglanski, 1996 for a discussion), those in the goal unattained condition would be able to react faster in correctly identifying goal-related words than those in the goal attained conditioned, whereas no differences were predicted across condition on the goal-irrelevant words.

### *Results*

*Treatment checks.* Responses to the question of whether individuals believed that seeing yourself as group or community was personally important were analyzed. Only one individual indicated moderate/strong disagreement with this question (5 or 6 on a 1-6 scale); this participant was excluded from the final analyses and will not be

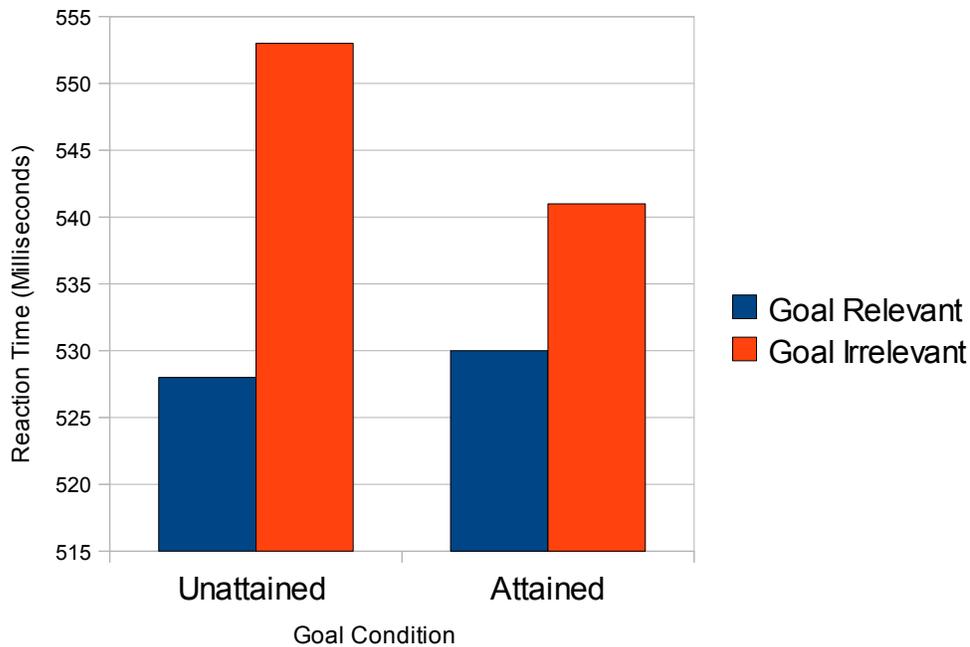
discussed further since exclusion did not change the statistical conclusions of the study.

*Analysis of participants' conscious responses to an important group.* In Study 1, it was theoretically important to provide evidence that participants' *unconscious* goals could influence their valuation of goal-relevant objects. Thus, any participant in the substitute-attainment condition who wrote about the University of Maryland as their important group were removed from the final analysis. In Study 5 this was not an important concern since no goal-related object was being evaluated, but for the sake of consistency with the earlier study, subsequent analyses were run both with and without the 5 participants who mentioned the University of Maryland as their important group.

*Incomplete data/coding errors.* 3 participants had data that were incomplete (they had MediaLab entries but not DirectRT entries or vice-versa) or duplicated in one program but not the other, so they could not be included in the final analysis. This left 103 participants available for the final analysis.

*Primary analysis.* The scores of the 10 goal-related words and the 15 goal-unrelated words were averaged together to form indices. Prior to being averaged together, all individual responses that were incorrectly responded to (indicating a word was in fact a nonword) were deleted. Participants who had an overall error rate above 20% were removed from the analysis entirely (3 participants in total); one additional participant was removed because a bimodal response pattern was detected within all three categories of stimuli (early trials averaged 650ms, while later trials averaged 1500ms). To reduce the dataset's expected skew, individual RT scores for

both innovative and non-innovative words were (natural) log-transformed, and any individual datapoint that exceeded three standard deviations from the individual's mean was eliminated; the final mean score indices were then constructed and incorporated with the rest of the survey data in MediaLab. These indices were then examined in a 2(condition: goal attained vs. unattained) X 2(word: goal related vs unrelated) repeated measures factorial ANOVA. The resulting interaction was significant,  $F(1, 94) = 5.069, p < .027$  ( $\Delta\text{BIC} = -.33$ , suggesting the interaction model was weakly preferable to the main effects only model). The resulting examination of the (log-transformed) means found the pattern predicted: those in the goal-unattained condition identified goal-relevant words (528ms,  $ln = 6.270$ ) faster than the goal-irrelevant baseline words (553ms,  $ln = 6.316$ ) by a greater margin than those in the goal-attained condition did (530 vs 541ms,  $lns = 6.274$  and  $6.294$  respectively; see Figure 2). To confirm that these results were not due merely to the method of analysis, a identical analysis was run using the median scores for each individual instead of the log-transformed means; the results were the same,  $F(1, 94) = 4.792, p < .031$  ( $\Delta\text{BIC} = -.32$ ). This evidence supported the experimental hypothesis and conceptually replicated the finding of Study 1.



An analysis was also run incorporating the 5 participants who specifically mentioned Maryland as their important group and were thus omitted earlier. Including these participants did not substantially alter the scale means, however, their presence did reduce the interaction  $F$  ratio test to statistical insignificance ( $p > .15$ ). This also matches the finding of Study 1, that if participants who had mentioned Maryland as their important group were included in the final analysis, the previously significant test result became insignificant.

### *Discussion*

The hypothesis that deactivating the affiliation goal would lead to decreased cognitive accessibility of goal-related (but not goal-unrelated) constructs as measured by reaction times was supported, and Study 2 conceptually replicated Study 1 using much of the same procedure. This successful replication strongly supports the underlying theory behind both studies: that a background goal will not longer cause

goal-relevant items to be overvalued after it is attained because the goal has been deactivated and is thus less cognitively accessible in memory.

### Study 3: Replication of Study 1 using financial products

Studies 1 and 2 provided evidence of a substitute means fulfilling a background goal of affiliation, leading to a decrease in the premium participants estimated on a goal-relevant (but not goal-irrelevant) consumer product. Study 3 was designed to replicate this finding, using financial products (stocks of different companies) instead of clothing products and a personal success goal instead of a group affiliation goal.

#### *Method*

*Participants.* 80 students enrolled in a psychology research methods course took this survey during a class session in exchange for partial course credit.

*Design.* This study used a 2(substitute fulfillment/no substitute fulfillment) X 3 (goal-consistent stock/goal-inconsistent stock) within-subjects design.

*Procedure.* Participants completed a survey packet described as containing multiple studies conducted by 3 graduate students in the psychology and marketing departments. Participants first completed a pair of personality scales that were unrelated to the hypothesis of this experiment but included to support the “separate studies” cover story. Immediately after the personality scales, the goal of being personally successful was induced as participants read the following statement:

“Research over the past 30 years has suggested that feeling successful at one's pursuits is an important factor in how happy someone is. Those who consider themselves successful report having higher satisfaction, lower stress, and greater anticipated enjoyment of future

pursuits. However, it is not clear what all the specific aspects of situations and individual personalities are that make one person feel successful where another does not.”

Participants were then asked to indicate on a Likert scale how strongly they believed that feeling successful was important for psychological health, and how important it was for them personally to be successful also.

Next, participants were given the experimental manipulation. Those in the goal attained condition were asked to write about a time when they were very successful at something, while those in the goal unattained condition were asked to write about a time when they had been unsuccessful:

“Now, please write a short paragraph on a time when you were very successful/very unsuccessful at something (such as a school, work, or social setting). Describe what happened and why it was important to you. Please emphasize how you felt about yourself and toward others in that situation.”

Participants then turned the page and were told that they would now be entering the final section of the survey (to support the separate-studies cover story). They were told that the purpose of this research was to understand how lay-people valued corporate stocks, and that they would be given three pieces of information: what the company's industry sector was, its price one year ago and its price today, and its expected prospects for growth in the future. Participants were told that all the companies (whose stock prices they were about to see) were too small for most people to have heard of them, but in order to prevent the names from biasing their

judgments, the companies would merely be identified as A, B, C, etc. Furthermore, participants were told that the five industry sectors all the companies could be classified into (regional grocers, cellular software, medical equipment, telecommunications, and insurance) were recession-resistant, so the country's current economic environment would not greatly affect them.

Next, participants were given information on all 15 companies, labeled A-O. Each company was identified first with a market sector, its expected growth prospects were explained, and then its stock price both one year ago and today was given. Following this, participants were asked, "By what percentage do you think the stock price will increase/decrease one year from now? (circle)", and were given a Likert-type scale of percentage increases or decreases ranging between positive and negative 25% at intervals of 5%. Following this, participants were asked to provide a explain in a sentence or two why they made the prediction that they did. Once predictions had been made for all 15 companies, participants were asked a question to gauge their suspicion about the true nature of the experiment and were given a verbal debriefing.

The independent variable of interest was the company's expectations for growth, since this is how successful the company is expected to be in the future (all the companies had been said previously to be small, so past success could be inferred to be equal). Three possible answers were given for the growth prospects of each company: growth was expected to be positive ("The company is expected to grow substantially in the near future."), growth was expected to be neutral ("The company is not expected to grow further, but is not expected to contract either. Profits are expected to be stable."), or growth was expected to be negative ("The company is

expected to contract in the near future.”). Companies expected to have high growth were success-goal *consistent*, while companies expected to have zero or negative growth were success-goal *inconsistent*. The price of the company's stock (both the year ago and today values) was given as a dollar amount; each company had an objective increase or decrease of between -20 and +20% over the last year (for example, a year-ago price of \$35.52 and price today of \$39.06). While each company had a different sized increase or decrease individually, each growth category (positive, neutral, and negative) had five different companies (one from each of the 5 market sectors) whose total objective increase/decrease averaged 7%, assuring that neither objective price change over the past year nor industry sector was confounded with the independent variable of growth expectations.

It was predicted that those in the no substitute fulfillment condition (wrote about a time when they were personally unsuccessful in pursuing a goal) would value the growing companies much higher than non-growing companies, while those in the substitute fulfillment condition would value those growing only slightly higher (or no differently) than the companies that are not growing.

### *Results*

*Suspicion check.* No participants were removed due to answers on the suspicion check. Three participants gave answers that were somewhat similar to the hypothesis of this study (for example, “I think someone's personality or putting them in a bad mood could make them less optimistic about stock performance”) but retention vs. removal of these participants did not change the statistical conclusions of the study.

*Analysis of explicit reasons given for stock's expected performance.* Participants cited the price change and growth expectations listed for the company as the reasons for their predictions. No one mentioned the past event of being successful or not that they had written about earlier in the survey packet, so there was no evidence suggesting this made a conscious impact on their decisions.

*Primary analysis: valuation of goal consistent/inconsistent stocks under differing goal fulfillment.* All 80 participants were included in this final analysis. Scores for the 15 companies evaluated were averaged together to construct three indices: one for those with positive growth expectations, one for neutral expectations, and one for those with negative growth expectations. Results were analyzed as a 2(success goal: fulfilled/not) X 3(company growth expectation: positive/neutral/negative) repeated-measures factorial ANOVA. The resulting test was not significant,  $F(2, 156) = 2.11$ ,  $p < .125$ , evidence that the experimental hypothesis was not confirmed. The Bayesian analysis of the same hypothesis revealed that the main effects only model was decidedly preferable to the interaction model,  $\Delta\text{BIC} = 2.25$ . Furthermore, an examination of the index means by condition revealed a pattern that was not even trending in the direction anticipated. The group of stocks expected to grow the most were nominally valued higher by those in the goal *attained* condition (10.75%) than those in the goal *unattained* condition (9.37%), while the stocks expected to be unchanged were nearly identical between conditions (1.47% vs. 1.54%) and stocks with negative growth expected were nominally valued less by those in the goal *attained* condition (-4.10%, vs. -2.31% for those in the goal *unattained* condition).

Further exploration of the repeated-measures ANOVA model revealed a potential insight into why the results were not as predicted: the main effect of the repeated measure in the model (expectations of positive, neutral, or negative growth expectations) accounted for 65.45% of the sums of squares (variability) in the study, compared to less than 1% that could be attributed to the interaction. It is thus entirely possible that the main effect was so strong as to wipe out the possibility of the effect hypothesized for the study to manifest.

### *Discussion*

Study 3 was designed to test the hypothesis that deactivation a goal through attainment will cause goal-relevant (but not goal-irrelevant) objects to lose their evaluation advantage relative to a state of goal unattainment. The data obtained did not confirm the experimental hypothesis, or even show the pattern predicted by the theory. Furthermore, the Bayesian statistical technique suggested that it was decidedly preferable to adopt the null hypothesis (main effects only) as opposed to the interaction model. The hypothesis was not supported. This may have happened because the experimental manipulation had too weak of an effect; since no manipulation check was used (as it likely would have caused suspicion as to the true nature of the experiment), there is no further analysis that can be done to investigate this possibility. However, another explanation for why the experiment did not work as hypothesized can be inferred from the extraordinarily large (nearly 66%) amount of variability attributable to the main effect of stimulus type in this study relative to the insignificant interaction effect of interest (less than 1%). Just as Chun & Kruglanski (2005) found no difference in taste when an unambiguous and relevant criteria for

differentiating cola taste was available, it is possible that the clarity of growth expectations for the companies left no room for motivated biases to show up in companies' future price projections.

## Chapter 3: Devaluation Due to Goal Unattainability

### Study 4

Study 4 had three purposes. First, it was run to provide evidence that deactivating a goal by making it appear *unattainable* (and thus not goal-worthy) will have an effect on stock valuations similar to the one predicted in Study 2: that deactivating the goal, now due to *attainment* through substitute means, would lead to a decrease in the valuation of goal-consistent companies' stocks but not . Second, it will address a potential alternative explanation left open in the earlier studies. Research consistent with self-affirmation theory (Cohen, Aronson, & Steele, 2000) suggests that motivated evaluative biases can be reduced by giving people the chance to affirm a belief or value that is important to their self-concept. For example, recalling a time when one acted in accordance with a self-generated important value can result in greater persuasion on a counterattitudinal topic such as capital punishment (Cohen et al., 2000, Studies 1 and 2). In Study 1 of the present research, the manipulation (writing about an important group/goal attainment vs. favorite food/goal nonattainment) and expected results (higher valuation of the goal-relevant Maryland sweatshirt when the goal has not been attained) can be reinterpreted in line with self-affirmation theory. Study 4, in contrast, predicts that the “biased” positive evaluation of goal-consistent objects will subside when a goal is appraised as less/not attainable; in other words, this procedure involves “unaffirming” a potentially self-important goal, with the expected result of reducing a motivational bias. This is decidedly different from what self-affirmation theory would predict. Third and finally, this study provides a potential explanation using experimental evidence for a distortion in

real-world financial markets: that companies or industry sectors in growth areas that are seen as “innovative” could be chronically overvalued (and thus poorer investments) than less innovative (“value”) companies or sectors. This possibility will be explored more fully in the implications section following the proposed studies.

This study borrows conceptually from Lockwood and Kunda's (1997, Study 2) research on social comparison processes. In their study, first-year accounting students rated themselves more positively after reading about a “superstar” fourth-year accounting student than a control group of their peers, while fourth-year accounting students rated themselves less positively as a result of reading about the same target. The reasoning for this result was that the outstanding accomplishments described were still attainable to first-year-students, that this inspired them to want to work harder and thus increased how positively they saw themselves. Conversely, the outstanding accomplishments described were not perceived to be attainable to fourth-year students because they did not have the time or opportunity required to accomplish them. While post-hoc analyses revealed that fourth-year students were much more likely to denigrate the comparison process than first-years, another way of reducing the discomfort caused from the negative upward comparison would be to deactivate the goal of being a great accounting student (“maybe good/average is good enough after all”). Study 3 sought to demonstrate a similar effect by manipulating the attainability of our participants' life accomplishment goal, but using valuation of investments instead of self-evaluation as the dependent variable of interest.

### *Method*

*Participants.* 102 psychology undergraduates at the University of Maryland took part in this study for partial course credit. Recruitment, appointments, and credit were handled by the university's online research participation system.

*Design.* This study utilized a 3(goal: attainable/unattainable/not primed) X 2(goal-relevant product/goal-irrelevant product) repeated-measures design.

*Procedure.* Participants were recruited for a study on “Choices”. After they had arrived at the lab, been greeted by the experimenter and given informed consent, participants sat down in a cubicle to complete the experiment on a computer using MediaLab software. Their task was described as to first take part in an experiment on personality and life goals, and second to take part in a qualitative pilot study investigating lay-people's reasoning for investments and predictions.

After being given a battery of personality questionnaires, participants in the goal attainable and goal unattainable conditions (but *not* the no goal primed condition) read the following short article in order to activate the goal of innovativeness:

All throughout our lives, we are constantly reminded of stories about people who have achieved great things and changed the world for the better. We hear about people active in the political arena like Abraham Lincoln and Martin Luther King, Jr., who helped to promote racial equality and national unity.

Other societal heroes have made scientific innovations, like Albert Einstein's theory of relativity that revolutionized physics and astronomy or Jonas Salk inventing a vaccine for polio. Inventors like Thomas Edison have made the world a better place by making new

things that improve people's lives in small ways. Entertainers like Walt Disney have brought smiles to millions of faces around the world, and elite athletes like Michael Jordan inspire us with their tireless work ethic and dazzling skills.

Famous military leaders like General Washington and General Eisenhower have inspired us to struggle for just causes and protecting innocent people. Great philanthropists like Bill Gates devote their time and money supporting worthy causes that help solve the world's problems. These are the people that we hear stories about, those who society calls “great” and honors long after they pass on.

The article was split into three short sections in order to increase the likelihood that participants would read it more closely. As a treatment check, participants were asked to rate how important it was for them personally to accomplish something great in their lives.

Following this goal prime, the experimental manipulation was given. Those in the goal *attainable* condition read about how these great societal pioneers were often unsuccessful at an early age:

This next question pertains to how far along you are on the path to accomplishing something great, considering where you are in life. Since you are a college student, it may seem like you haven't really had much of a chance to get your name in the history books at this point. In fact, many great people were not very distinguished at a young age.

Participants in the goal attainable condition then read some examples of failures these great men had as teens and young adults, such as Einstein being an unspectacular student in formal settings, Jordan being cut from the high school basketball team his freshman year, Gates dropping out of college at age 21, and Lincoln losing numerous elections early in his political life.

Those in the goal *unattainable* condition, however, read about how these same people were very successful even at an early age:

This next question pertains to how far along you are on the path to accomplishing something great, considering where you are in life. Since you are a college student, it may seem like you haven't really had much of a chance to get your name in the history books at this point. But in fact, many great people were very distinguished even at a young age.

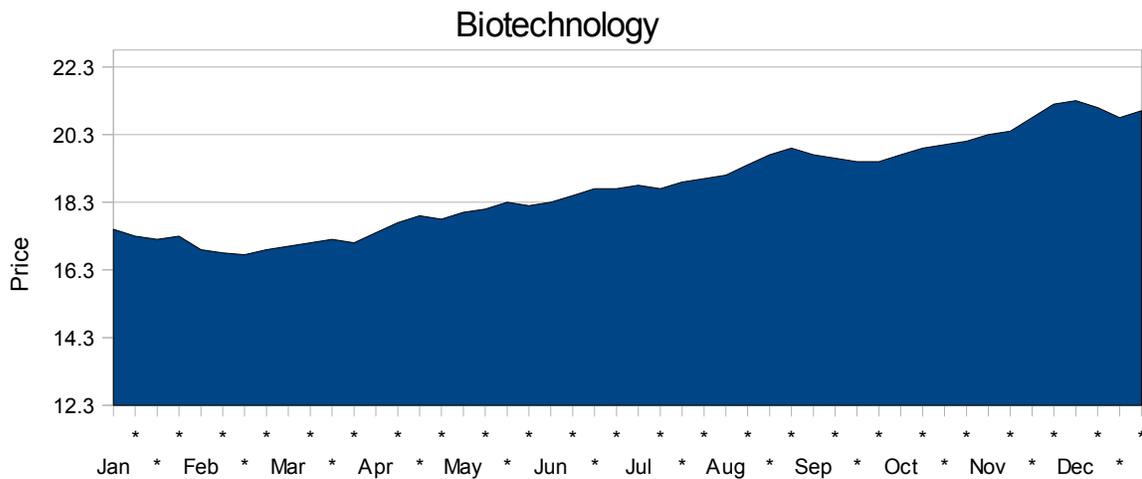
They then read about Einstein first proposing general relativity at age 24, Jordan winning all-ACC honors his freshman year in college, Gates starting his successful business at age 21, and Lincoln teaching himself law and passing the Illinois bar as a young man. Participants in both conditions were then given the manipulation checks: they rated how attainable they believed their goal of accomplishing something great to be, and how much progress they have made toward it compared to these historical figures, again taking into consideration that the participant is only still a college student.

Next, participants in all 3 conditions (the no goal prime condition was included once again) started what they were told was the second study examining how people

project trends and what their reasoning is for those decisions. After familiarizing the participants with what a mutual fund and an economic sector is, participants were told that their job in this experiment is to predict the average yearly gain/loss of a sector mutual fund over the next 5 years, given a description of that sector and a chart of that fund's price over the last year (the 5 year period average was selected in an attempt to decrease random variability in the data). Participants were further told that these funds and charts are not taken from the economy recently, so current economic events are not relevant. Most importantly (they were told), the experimenter is interested in their reasoning for the prediction they have made and thus they will write a sentence describing their rationale for the decision.

Participants were then shown in succession 14 charts of different sector funds with a description of the sector included below (see Figure 3 for an example). These sectors were selected based on a pretest of over 35 sectors; 7 were those that were rated in the pretest as the most “innovative” and “positive” (information technology, internet companies, biotechnology, entertainment, pharmaceuticals, computers, and consumer electronics), while the other 7 were those that pretested as the least innovative and positive (banks, retailers, homebuilders, groceries, healthcare, insurance, and waste management). Similar to Study 3, the innovative sectors were goal-consistent (related to the goal of accomplishing something great in your life), whereas the non-innovative sectors are goal-inconsistent. The objective chart increase/decrease for each innovative sector fund was matched by a nearly identical chart for a non-innovative sector fund (for example, if an innovative sector like biotechnology charted a 12% increase over the past year, a non-innovative sector like

insurance also showed a 12% increase on their chart, and so on). For each chart, participants were asked what they thought the average increase/decrease would be for this fund over the next 5 years, and then asked to write a sentence explaining their reasoning. After completing all 14 sector funds, participants were fully debriefed and thanked for their participation.



It was predicted that those in the goal attainable condition would value the innovative sectors more highly than the non-innovative sectors, while those in the goal unattainable and no goal primed conditions would not show a difference between the two.

### *Results*

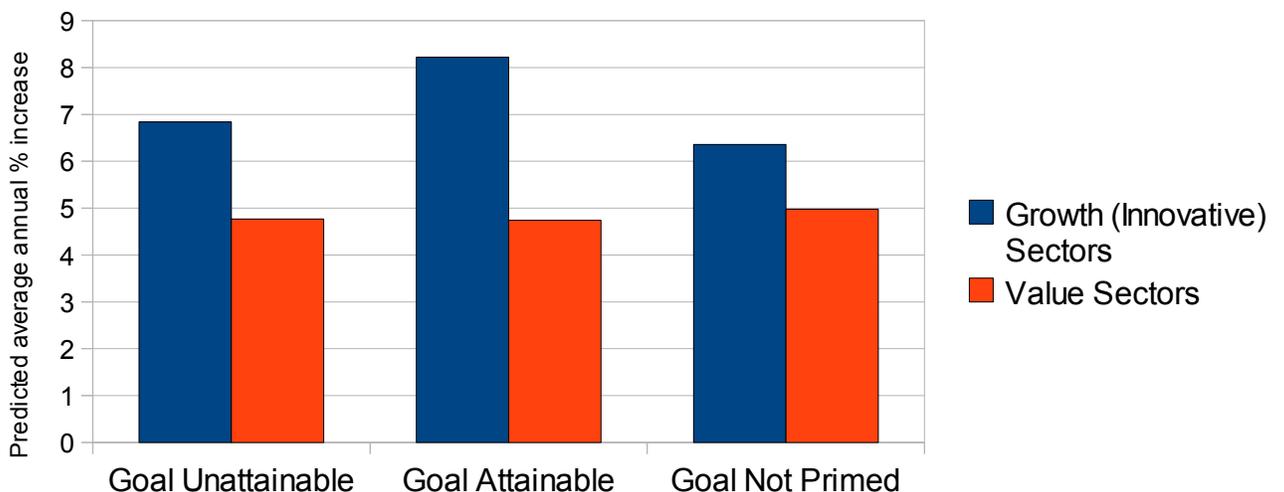
*Preliminary analyses.* In preparing the data for analysis, participants' one-sentence responses in explaining their reasoning for their predictions were examined. Four participants were excluded from the final analysis: two who either cited current events as their reasons, which the instructions prominently prohibited (“the banking sector is going to get helped out by the government now so it will do better”) and two

who clearly and repeatedly stated not understanding the instructions given were excluded from the final analysis. This left 98 participants.

*Manipulation checks.* Three manipulation checks were administered to the goal-attained and goal-unattained (but not no goal prime) groups. Participants were asked after the goal prime but before the attainability prime how important the goal of accomplishing something great with your life was, and no mean differences were found between the groups (as expected due to random assignment). Attainability and progress were both measured after the attainability prime; there were no significant differences between the groups in their ratings of how attainable their goal was ( $F(1, 57) = .006, p < .937$ ), although those in the goal-attainable group reported significantly more perceived progress toward their goal compared to the goal-unattainable group ( $F(1, 57) = 5.80, p < .019$ ). Thus, there is some evidence that our goal attainability manipulation was effective, although not exactly in the way that was predicted.

*Primary analyses.* The seven innovative sectors and the seven non-innovative sectors were averaged together to create two separate indices. These two indices were examined using a 3(condition: goal attained/unattained/not primed) X 2(sector: goal consistent/inconsistent) factorial ANOVA for the 98 participants that were retained in this analysis. A significant interaction was found,  $F(2, 95) = 4.42, p < .015$ , suggesting that the pattern of means did in fact differ as a function of condition. A review of the means suggested that they did fit the pattern that was predicted: non-innovative sectors did not differ significantly as a function of condition, while innovative sectors did. Those in the goal attainable condition predicted a 4.75%

increase for the non-innovative sectors, compared to 4.76% for goal-unattainable and 4.98% in goal not primed conditions. For the innovative sectors however, those in the goal attainable condition predicted an 8.21% increase compared to a 6.68% increase for those in the goal attained and 6.35% in the goal not primed conditions (see Figure 4). While the means for the goal attained condition and goal not primed conditions were very similar for both sectors, a 2 X 2 ANOVA revealed that there was a significant interaction of condition\*sector type for the goal attained and goal unattained conditions,  $F(1, 61) = 4.52, p < .038$ . The pattern of the means suggest that this could only be due to greater valuation of the innovative sectors by those in the goal unattained condition, since valuations of non-innovative sectors were almost exactly the same for the two conditions. Analysis of the mean differences were confirmed by the Bayesian statistical method as well: the 3 X 2 interaction model was strongly favored over the main effects-only model ( $\Delta BIC = -4.12$ ) while the 2 X 2 interaction model was preferred over its main effects only alternative, albeit only weakly ( $\Delta BIC = -.367$ ). This evidence is supportive of the experimental hypothesis.



*Discussion.*

The results of this experiment were supportive of the theory that it came to test. The 3 X 2 and 2 X 2 interactions of the type of sector rated and goal attainability condition were significant and in the predicted direction. Those who had the goal still active (attainable condition) valued the goal-consistent sectors more highly than those in the goal deactivated (unattainable condition) but no differences were found for goal-inconsistent sectors. Furthermore, the data from those in the goal attained condition was essentially equivalent to the results of those in the condition where the goal was never primed, offering confirmatory evidence consistent with the goal not being highly active in either condition.

The single concern of this study was with the lack of differences between groups on the attainability manipulation check. Perceptions of attainability were hypothesized to be the mechanism through which the innovativeness goal was predicted to be deactivated, so a link is missing in the story this experiment was supposed to tell. However, there are at least two reasonable explanation for why no differences were found on this item. One is that it could be seen as universally socially undesirable to say that an important life goal is unattainable, because one could be viewed as a quitter; thus no differences on attainability were found between conditions, but the progress manipulation check (which should be less sensitive to social desirability concerns) did show differences. A second explanation is that the single item measure of attainability could have been insufficiently sensitive to detect small differences between the groups. The concern about this manipulation check aside, the experiment offered evidence consistent with the theory.

### Study 5: Conceptual Replication of Study 4 Using Reaction Time Measure

Study 5 sought to verify that the experimental manipulation used in Study 4 did actually deactivate the goal in question, using a reaction times measure. Study 5 sought to provide evidence that making a goal appear unattainable will lead to deactivation of goal-related constructs (which was how the valuation advantage was theorized to be lost in Study 4). This experiment replicated the methodology of Study 4 up until the point where participants were to view the sector mutual funds whose future performance they were supposed to predict. Instead of the future price estimation task, participants took part in a lexical decision task designed to assess the activation of the goal using words that are related to it compared to words that are goal-unrelated (Higgins, 1996; Kruglanski, 1996).

#### *Method*

*Participants.* 97 psychology undergraduates at the University of Maryland participated in this experiment in exchange for partial course credit. Recruitment, appointments, and credit were handled by the university's online research participation system.

*Design.* This study utilized a 2(goal unattainable/goal attainable) X 2(goal-relevant words/goal-irrelevant words) within-subjects design.

*Procedure.* As in Study 3, participants were recruited for an ostensibly 2-part study, this time entitled "Reflexes and Reactions". After using MediaLab software to complete two personality scales in order to support the multiple-studies cover story, participants read the same short essay given in Study 3 about great people who have done important work that changed the world for the better (such as MLK Jr., Einstein,

Jonas Salk, etc.). Following this, they completed the same treatment check as had been used previously: whether accomplishing something great with their life was personally important to them. Next, those in the goal-unattainable condition read the essay about how many of these historical figures were very successful even at an early age, while those in the goal-attainable condition read about how many of these figures were not very distinguished at an age comparable to that of most college students. Participants were then asked how attainable they believed their goal of accomplishing something great in life was and how much progress they had made toward it (1-6 Likert scale).

After this point, the methodology of the present study diverged from that of Study 4 and closely followed the reaction time procedure of Study 2 with some minor modifications. Participants were informed that the next study they would be taking part in today was a reaction task, in which their goal would be identify character strings that appeared on the screen as either words or nonwords by pressing the “Z” key if it was a word and the “/” key if it was a nonword. Specifically, they were told that their task was to respond as quickly and accurately as they possibly could, seeing as this task was a measure of their reflexive ability. After repeating the instructions and going through five practice trials, the actual experimental task began.

The lexical decision task actually contained three classes of word stimuli: 25 nonwords (FTERC, YADENS, TOGGIX), 15 words that were unrelated to the affiliation goal (SHOESTRING, PET, YESTERDAY) and 10 words that were related to the goal (INNOVATE, LEADER, GREAT, NEW, PIONEER, BRILLIANT). After all 50 words were presented in a completely randomized manner and responded

to, participants were debriefed, thanked for their participation, and assigned credit for the study. The hypothesis was that due to the increased cognitive accessibility of goal-related constructs (see Higgins, 1996a; Kruglanski, 1996 for a discussion), those in the goal attainable condition would be able to react faster in correctly identifying goal-related words than those in the goal unattainable condition, whereas no differences were predicted across condition on the goal-irrelevant words.

### *Results*

*Manipulation checks.* Three manipulation checks were administered to the groups at two different settings. Participants were asked after the goal prime (but before the IV attainability prime) how important the goal of accomplishing something great with your life was. While no statistically significant mean differences were found between the groups ( $F(1, 97) = 1.54, p < .21$ ), there was a small nominal gap with those in the goal unattainable condition saying the goal was slightly less important (mean = 2.10) than those in the goal attainable condition (mean = 1.86; “1” was strong agreement on a 1-6 scale).

Attainability and progress were both measured after the attainability prime; there were no significant differences between the groups in their ratings of how attainable their goal was ( $F(1, 97) = 1.62, p < .207$ ), although the statistically insignificant trend was of similar size and direction to the “importance” question asked earlier (post-hoc analysis revealed that responses to the importance and attainability questions were significantly positively correlated,  $r(96) = .327, p < .001$ ).

Replicating a previous finding from Study 3, those in the goal-attainable group

reported significantly more perceived progress toward their goal compared to the goal-unattainable group ( $F(1, 96) = 11.16, p < .001$ ).

*Incomplete data/coding errors.* 2 participants had data that were incomplete (they had MediaLab entries but not DirectRT entries or vice-versa) or duplicated in one program but not the other, and 2 others were excluded because of what looked like bimodal response patterns (they averaged 5-600 ms for the first half of the trials and 900-1100 for the second half); these were not included in the final analysis. This left 92 participants available for the final analysis.

*Primary analysis.* The scores of the 10 goal-related words and the 15 goal-unrelated words were averaged together to form indices. Prior to being averaged together, all responses that were incorrectly responded to (indicating a word was in fact a nonword) were deleted. To reduce the dataset's expected skew, individual RT scores for both innovative and non-innovative words were (natural) log-transformed, and any individual datapoint that exceeded three standard deviations from the individual's mean was eliminated; the final mean score indices were then constructed and incorporated with the rest of the survey data.

These indices were then examined in a 2(condition: goal attained vs. unattained) X 2(word: goal related vs unrelated) repeated measures factorial ANOVA. The resulting interaction term was not significant,  $F(1, 90) = 2.31, p < .113$ ; this was insufficiently strong evidence to support the experimental hypothesis. There was no main effect found for this model, so for the Bayes factor test the interaction term was tested against the simple null model, and the resulting  $\Delta\text{BIC} = 1.86$  made it clear that the null hypothesis was more likely than the experimental hypothesis given the data.

An analysis of the (insignificantly different) means revealed that the direction they were trending toward was actually opposite of that expected: those in the goal-unattainable condition identified goal-relevant words ( $ln = 6.328$ ) faster than the goal-irrelevant baseline words ( $ln = 6.345$ ), but those in the goal-attainable condition identified goal-relevant words slower ( $ln = 6.322$ ) than the goal irrelevant baseline ( $ln = 6.311$ ). Thus, an insufficiently powerful test can be effectively ruled out as a possible explanation for why the experiment did not work as hypothesized.

### *Discussion*

The hypothesis that deactivating the goal of being innovative and accomplished would lead to decreased cognitive accessibility of goal-related (but not goal-unrelated) constructs as measured by reaction times was not supported, and Study 5 failed to conceptually replicate Study 4 using much of the same procedure. Furthermore, the means did not even trend in the predicted direction, suggesting that either the results of Study 4 or 5 or both were chance occurrences, or the mechanism responsible for the evaluation differences found in Study 4 was simply not capable of being tapped by a measure of cognitive accessibility (as measured in Study 5). The cause of this result will be considered further in the General Discussion.

## Chapter 4: Devaluation Due to Goal Undesirability

### Study 6

Research reviewed earlier (e.g. Kruglanski et al., 2002) suggested that there were three ways to deactivate a goal: attaining the goal, perceiving the goal to be unattainable, and perceiving the goal to be undesirable. Studies 1-2 were run in an attempt to provide evidence for attainment reducing the valuation advantage, while Study 3 was an attempt to show this through manipulating the goal's attainability. The purpose of Study 6 was to provide evidence for the third way, that lowering the desirability of a goal can lower the valuation of means to accomplishing that goal without affecting the valuation of goal-irrelevant objects, again using a scenario similar to those encountered by shoppers at online retailers such as Amazon.com.

#### *Method*

*Participants.* 131 psychology undergraduates at the University of Maryland took part in this study for partial course credit. Recruitment, appointments, and credit were handled by the university's online research participation system.

*Design.* This study utilized a 2(goal: desirable/undesirable) X 2(goal-relevant product/goal-irrelevant product) repeated-measures design.

*Procedure.* Participants were recruited for an ostensibly 2-part "Judgment Study". After being greeted by the experimenter and giving informed consent, participants were placed in a cubicle to complete the experiment using MediaLab software. Participants were informed that they would take part in two separate experiments, the first of which was investigating the relationship between personality types and judgment. After completing a number of personality measures (for the purpose of

supporting the cover story), participants were given a short paragraph explaining that survey research has consistently found that getting good grades is very important to college students (students were subsequently asked as a treatment check how important getting good grades is to them personally).

Participants were then given the experimental manipulation: those in the goal-*desirable* condition were told that other research has found that getting good grades in college is correlated with long-term happiness, possibly because college grades are also correlated with long-term job salary, security, and choice. Conversely, those in the goal-*undesirable* condition were told of otherwise identically-worded research finding that getting good grades in college is *not* correlated with long-term happiness, possibly because grades are not correlated with long-term job salary, security, and choice. Participants were then asked a treatment check question on how surprising this finding is to them; this question was added because pretesting had suggested that a number of participants in the goal-undesirable condition were suspicious of what they had been told, and this question was an attempt to offer further support for what had been said while legitimizing students' surprise. Following this, both conditions were told that they had completed the "Personality and Honesty" section of the session (both to support the "separate studies" cover story and to suggest that the participants' honesty was being gauged) and are ready to begin the final section.

In this "Judgment" section, the students read another paragraph giving an introductory statement about the difficulty that inflation of college costs is posing for universities and students alike. They were further told that "One aspect of college cost inflation that has not been well-investigated is how good students are at

shopping for everyday items, which can impact students' living costs.” This provided the ostensible rationale for the task that was to follow. Participants were then told that in the second part of the experiment, they would be looking at pictures of products many college students have in their dorm rooms or apartments, and be asked to estimate what its price is. They were told that they would be asked first how much they think it retails for, and second how much they personally would be willing to pay for it.

Participants were then presented with 16 pictures of items, one at a time and in randomized order, half of which were instrumental to the goal of being successful with classwork (desk lamp, alarm clock, backpack, notebook, calendar, etc.) and half of which would not be useful for studying and may even constitute a tempting alternative to it (video game console, microwave cookbook, coffee table book about beer, board game, etc.). Each picture initially was presented with the phrase, “Take a look at this item”, and then participants were asked what they personally were willing to pay for it, followed on the next screen by the true dependent variable, “How much do you think this item SHOULD sell for?”. This cycle repeated for all 16 items. After participants had typed in their responses to all questions, they were fully debriefed, thanked for their participation, and credited for the session. Unlike in previous studies, participants were not asked to voice suspicions about this study during the debrief. This was because pretesting had found suspicions to be quite common, necessitating a change in tactic: the “how surprised were you” treatment check question was added in hopes of it being both an indicator of suspicion as well as a means for defusing suspicion (when combined with the “Honesty and

Personality” study labeling) prior to the measurement of the dependent variable. Including a suspicion check would have likely yielded redundant data with the existing item or even caused an increase in false alarms.

It was predicted that the studying-related (goal relevant) items would be evaluated more positively for those in the goal-desirable condition than for those in the goal-undesirable condition, whereas the non-studying-related items will be evaluated equally between the two conditions.

### *Results*

*Preliminary analyses of treatment/suspicion checks.* All participants responded that getting good grades was of at least moderately high importance to them, so none were excluded from further analyses on this basis. The question of how surprised participants were to hearing about the purported relationship (or lack thereof) was analyzed. Large differences in self-rated surprise were found: of 66 participants assigned to the goal-desirable condition, 54 rated themselves as not surprised (a 1-3 on a 6-pt. Likert scale), but of the 65 assigned to the goal-undesirable condition, only 30 rated themselves as not surprised. This preliminary evidence is suggestive that the attempt to defuse suspicion about the undesirability of good college grades using the surprise question was largely unsuccessful.

*Primary analyses.* All participants were retained in the initial analysis. The goal-consistent items (desk lamp, alarm clock, backpack, notebook, calendar) and goal-inconsistent items (video game console, microwave cookbook, coffee table book about beer, board game) were averaged together to form two indices. These two indices were examined using a 2(condition: goal desirable/undesirable) X 2(item:

goal consistent/inconsistent) factorial ANOVA. An insignificant interaction was found,  $F(1, 129) = .201, p < .655$ , suggesting that the pattern of means did not differ as a function of condition, and the experimental hypothesis was not supported.

A second analysis was run using all participants who responded that they were not surprised in the manipulation check (1-3; the purported link/lack of link between grades and happiness). Another 2 X 2 factorial ANOVA was run, and the interaction term was still not significant,  $F(1, 82) = 2.47, p < .12$  (the  $\Delta\text{BIC} = 1.93$ , which still solidly favored rejecting the interaction model and retaining the main effects-only model instead; the fundamental conclusion of the study did not change). Yet due to the large difference between conditions on the number of unsurprised participants retained, even these nominal valuation differences cannot be causally attributed solely to the experimental manipulation. An analysis of the (insignificantly different) means did at least find them trending toward a pattern similar to that predicted by the theory: those in the goal-desirable condition valued the goal-relevant items (\$12.67) nominally more than those in the undesirable condition (\$12.34), while the goal-irrelevant items (which could potentially have even been seen as temptations to the goal) were nominally valued more by those in the goal-undesirable condition (\$40.57) than those in the goal desirable condition (\$39.94).

### *Discussion*

The 6<sup>th</sup> study attempted unsuccessfully to provide evidence that reducing the desirability of a goal would lead to goal deactivation and subsequent devaluation of objects related to the goal. The lack of success in this endeavor may be attributable to an insufficiently believable manipulation of goal desirability (that getting good grades

in school is/is not related to long-term happiness). This problem was first identified during pretesting, and persisted in the regular experiment despite attempts to mitigate it with changes to the experimental procedure. A post-hoc analysis excluding those who found the experimental manipulation surprising (or potentially unbelievable) did find a pattern of means that were insignificant but trending in the direction predicted. However, both the substantial number of those who reported surprise and the asymmetry between experimental conditions leave open the possibility that even these trends were due to personological factors, not due to the experimental manipulation.

#### Study 7: The effect of goal desirability on school product valuations

Study 6 attempted unsuccessfully to demonstrate that lowering the desirability of a background goal would lead to lower valuation of objects that were instrumental in accomplishing that goal, while evaluations of goal-neutral products would not be affected. The reason for the lack of success in this endeavor can be plausibly attributed to a manipulation that was not believable to a large segment of the experimental condition. Study 7 sought to rectify this problem by having students themselves generate reasons why a goal is desirable vs. reasons why a goal could be undesirable, in which the latter would dilute the goal's overall desirability. The hypothesis and basic methodology of Study 6 were otherwise retained.

#### *Method*

*Participants.* 237 psychology undergraduates at the University of Maryland took part in this study for either partial course credit or as an uncredited in-class learning experience (the decision to assign course credit was made at the discretion of the

instructor). Classrooms sampled included two sections of a research methods course, a psychology of close relationships course, and a consumer psychology course.

*Design.* This study utilized a 2(goal: desirable/undesirable) X 2(goal-relevant product/goal-irrelevant product) repeated-measures design.

*Procedure.* This study was conducted as a series of classroom surveys. At the beginning of the period, the course instructor introduced the experimenter, who told the students that they were taking part in a survey that contained two separate studies. The first study would investigate the relationship between personality and goal construal, while the second was introduced as “an evaluation task which is the control condition for an online study that we have not been able to recruit enough participants for” using the psychology department's recruiting system (no such study existed, but all students would have been familiar with the online survey system referenced). Further, in an effort to ensure that they were motivated to be accurate, participants were told that they would be given the “correct” answers for the evaluation task after completing the experiment. Participants indicated informed consent, were given 15 minutes to complete the survey, and were then fully debriefed and thanked for their participation.

The survey itself consisted of a title page reaffirming the cover story given verbally before the class, followed by the Promotion/Prevention Scale (Lockwood, Jordan, & Kunda, 2002). The third page asked a goal treatment check question, “Most college students would agree that doing well in school is important to them. Is success in school important to you?” (1-7 Likert scale with Unimportant/Very

Important as the endpoints). Students in the desirable goal condition then read the following:

In this study we are interested in the “complete spectrum” of what students think about when they consider their goals. Please list as many **positive** (good/happy) *consequences* or *implications* of (resulting from) you being successful in school. List and number these in the space below:

Students in the undesirable goal condition read the same statement, but listing **negative** (bad/unhappy) things instead. The number of things the students listed (either positive or negative) was recorded, and students then moved on to the second “study” in the survey package.

Since this study was the last chronologically to run of the 7 in this package and since there was no way to exclude participants from “signing up” for this study if they had participated in a similar one before, the instructions on the next page read:

Thanks, you have completed the first study! The second survey is adapted from a lab study on students’ consumer price estimations for everyday products, but we need more participants in order to complete the study. If you have already done this study in the lab last semester, please indicate that on the last page of the survey but still do the questions! (we can still use them in a cross-validation analysis).

For added fun, when the class is finished with the survey, the experimenter will tell you the correct answers so you can see how close you were!

(Hint: most of the items **do not** have “regular” prices like “\$29.99”)

Participants then saw pictures of 8 total items, four of which had been pretested to be helpful in succeeding at school (a notebook, alarm clock, Post-It Notes, and focus/memory pills) while the other four were pretested as not being helpful (a tour book of Washington, D.C. attractions, a board game, balance ball, and book of Mad Libs). Each picture was preceded by the question, “How much do you think this *(insert product description)* retails for on Amazon.com?”, with a answer line formatted as “\$ \_\_\_\_.” next to the item. Since this was a survey it was not possible to completely randomize the items, although an attempt to control order effects was made in that two versions of each survey condition were distributed. Items that were presented in the 1, 2, 7, & 8 spots in one version were presented in the middle four spots in the second version. Following the final item, participants were asked, “What do you think these studies were about? (List separately if applicable)”, and students were given about 1/3 sheet of paper to write their possible suspicions.

### *Results*

*Preliminary analyses.* The goal treatment checks were examined to ensure all participants did indicate that school success was an important goal. All responses were either a “6” or “7”, indicating high importance. The suspicion checks were also examined to see if any participants mentioned concerns that the “separate” studies were not in fact unrelated or if thinking about school was expected to influence price estimates in any way. Additionally, if a student indicated he/she had taken this (or a similar) study before, this was also grounds for exclusion from the final analysis. In all, 37 of the 237 participants were excluded from the final analysis for one of these

three reasons. While this number looks large, it is not surprising seeing as some participants had likely participated in one of the other 6 studies in this package, while students in the research methods course appeared to be suspicious of the unrelated-experiments cover story at a higher rate (not statistically tested) than the other two classes. 200 participants were retained for the final analysis.

*Score transformation.* The final goal of this analysis was to combine the school-relevant and school-irrelevant items into a two mean indices which could be subjected to a repeated-measures ANOVA. However, simply combining the raw scores generated by participants would be problematic for two reasons. First, some products would have far more influence on the index than other products (a notebook whose predicted price averaged barely over a dollar compared to a \$20-30 alarm clock) due to their higher price variability in dollars. Second, outliers within the dataset for each product would also enjoy outsized influence on the mean relative to more typical responses. To mitigate both of these problems, prices for each product were sorted and rank-ordered in a stepwise fashion (so if \$5.99 was the 8th-highest price for an item and 4 people listed \$5.99, all participants who listed \$6.00 would get a ranking of 9 as opposed to 12).

*Primary analysis.* The rank-ordered scores for the four school-relevant items and the four school-irrelevant items were combined into separate indices. These two indices were examined using a 2(condition: goal desirable/undesirable) X 2(item: goal relevant/irrelevant) factorial ANOVA. An insignificant interaction was found,  $F(1, 198) = .569, p < .452$  ( $\Delta\text{BIC} = 4.97$ ), suggesting strongly that the pattern of

means did not differ as a function of condition, and the experimental hypothesis was not supported.

*Secondary analyses.* To fully investigate this 200-participant sample, a number of additional exploratory analyses were run. First, the pattern of relationships as a function of condition for all the individual products' ratings were examined using a Spearman correlation with the condition variable. No significant differences found between condition for any product individually ( all  $\rho < .1$ , with  $p > .3$  for one and  $p > .5$  for all others). Second, a “Strength” of desirability variable was computed by effect coding the condition (as a -1 or +1) and multiplying it by the number of positive/negative consequences or implications of the goal listed by the participant. This analysis assumed that those who wrote a greater number of things about why the goal was (un)desirable would find the goal more (un)desirable overall. This strength variable was then used instead of the condition as the predictor in a correlation with all the individual products. The results were the same as those found for the dichotomous condition variable:  $\rho < .1$  for all 8 products, with no  $p < .26$ . Post-hoc analyses were not performed on the 37 participants excluded due to suspicion, because many of them had an idea of what the study's hypothesis was and thus any conclusions drawn from such data could not be experimentally valid.

### *Discussion*

Study 7 attempted unsuccessfully to provide evidence that reducing the desirability of a goal would lead to goal deactivation and subsequent devaluation of objects related to the goal. Unlike Study 6, the lack of success in this endeavor cannot be attributed either to an insufficiently believable manipulation of goal

desirability (participants generated their own examples of (un)desirability in this survey) or to a lack of statistical power (the final analysis used 200 participants' entries). Furthermore, post-hoc analyses found that the number of desirable/undesirable implications of the goal listed did not predict any differences by condition. However, it is not clear that the experimental manipulation actually did cause a meaningful change in the goal's desirability, since including a manipulation check would have likely alerted participants to the true nature of the study. Future research on this topic could use a different goal that is not so uniformly and highly desirable to college students as an operationalization of the independent variable (such as dieting or exercise). This study did not support the theory that reducing a goal's desirability would lead to a decrease in the price valuation of goal-relevant (but not goal-irrelevant) items.

## Chapter 5: General Discussion and Implications

### General Discussion

Seven studies attempted to provide evidence that deactivating a background goal would cause devaluation of objects that were relevant to the goal, even though they were being ostensibly evaluated based on a criteria unrelated to the goal. The theoretical rationale behind this prediction was based on an application of the multifinality principle to the task of price estimation: a background goal (such as the motivation to affiliate with an important group) can unconsciously influence the evaluations of items that are potentially relevant (means) to the goal's accomplishment, even when the item's evaluation is supposed to be based on a different, focal goal (making an accurate, unbiased judgment in this case). The case was further made that not only should the *activation* of a background goal cause an increase in the item's price valuation, but that the *deactivation* of that goal would result in the loss of this valuation premium. Three mechanisms were suggested that should cause goal deactivation: *attaining* the goal, making the goal appear *unattainable*, and making the goal appear *undesirable*. Support for the theory under investigation provided by these studies was mixed, although not equally so for each of the mechanisms; the evidence for each mechanism will be reviewed in order following the general review of studies. Study 1 obtained evidence that attainment of an affiliation goal caused devaluation of a goal-relevant sweatshirt (but not a neutral, goal-irrelevant sweatshirt) relative to those those who had not attained the affiliation goal and thus had it still active. Study 2 was a successful conceptual replication of Study 1, replicating its procedure using a reaction-timed lexical decision task replaced

consumer product valuations. Study 2 demonstrated greater activation (and thus faster reaction times) for goal-relevant words when the goal had not been attained vs. after it had been attained. The hypothesis was supported using both conventional and Bayesian statistical methods. Study 3 attempted to provide further evidence for goal attainment causing devaluation of goal-relevant items using the person goal of success and stocks of companies that were expected to differ in their future success; however, Study 3 failed to provide support the experimental hypothesis. Study 4 obtained evidence consistent with the hypothesis that perceiving a goal as unattainable caused goal-relevant (but not goal-irrelevant) mutual funds to be devalued relative to those who had the goal still attainable and active. Furthermore, evaluations from those whose background goal had been deactivated were nearly identical to those who had not had the goal primed in the first place, offering further evidence for the theory. Study 5 was a conceptual replication of the successful Study 4, replicating Study 4's procedure until the sector mutual fund valuation task was replaced by the reaction-timed lexical decision task. It was predicted that those in the goal-attainable condition would respond to goal-related words (but not goal-unrelated) faster than those whose goal had been presented as unattainable. This hypothesis was not supported by the data obtained. Study 6 attempted unsuccessfully to demonstrate that lowering the desirability of a goal (getting good grades in college) would lead to devaluation of goal-relevant school supplies but not goal-irrelevant entertainment and leisure items. Analysis of the manipulation check, considered with a pretested earlier version of the study, suggested that the null result may have been a result of an insufficiently believable experimental manipulation. Study 7 attempted

unsuccessfully to show what Study 6 could not: that lowering the desirability of the goal of school success would cause decreased valuations of products related to school success, but not products unrelated to school success. An analysis of over 200 participants in this study did not reveal any statistically significant trends whatsoever, failing to support the hypothesis.

*Deactivation and devaluation as a function of goal attainment.*

Three studies investigated the hypothesis that attainment of a background goal would cause a devaluation of goal-relevant items but not goal-irrelevant. Study 1 was successful in demonstrating this, that attainment of an affiliation goal led to devaluation of a University of Maryland sweatshirt (vs. goal unattainment), but not a neutral sweatshirt. Study 2 conceptually replicated this finding, using a reaction time task to demonstrate that goal-relevant words were recognized faster (relative to neutral word baseline) by those who had not attained the goal than those who had attained the goal; this is evidence that attainment of the goal had in fact lowered its cognitive activation, further supporting the predicted model of goal systems theory. In addition, these studies provide evidence consistent with the existing literature suggesting that even vicarious goal fulfillment can lead to goal deactivation (Orehek, 2006; Wilcox, Vallen, Block, & Fitzsimons, 2009). Studies 1 and 2 together offer strong converging evidence that background goal attainment does in fact lower its cognitive activation, resulting in the valuation advantage of goal-consistent means to be lost or reduced.

Study 3 did not work as predicted, although it is far from clear that its results should be interpreted as evidence against the theory in question. Study 3 attempted to

demonstrate that vicarious goal attainment (listing a time when one was personally successful vs. unsuccessful at an important goal) would reduce the premium placed on the stock shares of companies that were expected to be highly successful (large growth) in the near future relative to companies that were not expected to be successful (no growth or negative growth). While this result did not materialize, the lack of any significant interaction term obtained, in combination with the overwhelming effect size of the stimulus type main effect (almost 66% of the variance explained in the experiment vs. less than 1% for the nominal interaction), suggest that there was likely little room for a motivational bias to manifest itself in this experiment. Just as no (group affiliation) motivational bias was found in Chun & Kruglanski's (2005) cola taste test experiment when one cola clearly tasted better than the others, the success background goal in this experiment may not have been able to make an impact when the criteria of future growth expectations (which is a highly applicable criteria for stock valuation under the focal accuracy goal) was so unambiguous. Furthermore, since no manipulation check was used in this study (due to it being a survey packet which could be flipped backward), it is not clear that the goal manipulation was successfully manipulated or was sufficiently strong to cause the desired effect.

In summary, two of the three studies yielded the results predicted by the theory, while the third showed a very strong main effect that (consistent with prior research on this theory) could have precluded the influence of a motivational bias from manifesting. Overall, these results are supportive of the theory in general and the

mechanism in particular: that attainment of a background goal causes its deactivation, and thus potential means to the goal are devalued.

*Deactivation and devaluation as a function of goal unattainability*

Two studies investigated the hypothesis that presenting evidence of a goal's unattainability would lead to goal deactivation and thus devaluation of goal-relevant items but not goal-irrelevant ones. Study 4 was successful in demonstrating this: those who had the goal of doing something great and innovative with their lives appear unattainable did not overvalue (relative to those to whom the goal was attainable) stock funds of industry sectors that had been pretested as highly innovative. This difference was not due to a main effect of overvaluation; funds of non-innovative sectors did not differ between conditions. Furthermore, a third condition who had never had the innovativeness goal primed in the first place did not differ in either prediction from the goal unattainable condition, but differed from the goal attainable condition only in that the innovative sectors were valued less (see Figure 4). This was the strongest evidence supporting the theoretical predictions that could be obtained from this experiment. Study 5 was intended to be a conceptual replication of Study 4, using its exact methodology up until the point when stock sector funds were about to be valued. In its place, participants in Study 5 completed a lexical decision task that was designed to measure the activation of “innovative” words relative to neutral baseline words. It was predicted that those in the goal unattainable condition would deactivate the goal, leading to slower reaction times for the innovative words (relative to the neutral word baseline) compared to those in the goal attainable condition. This prediction was not actuated empirically; no significant

differences (interaction  $p < .11$ ) were found between the two conditions, and an analysis of the condition\*stimulus type means found that those in the goal unattainable condition responded to the innovative words nominally *faster* than those in the goal attainable condition (compared to neutral word baseline). This means that the experimental hypothesis did not fail to be supported due to a lack of statistical power.

There are a number of possible reasons why Study 5 did not replicate the results of Study 4 as predicted. The first reason is that the finding of Study 4 was merely a Type 1 error, and would not have been replicated had the procedure been followed exactly. While acknowledging that this is a possibility, the mean differences obtained would only happen very infrequently due to chance alone ( $p < .015$ ), and the BIC criteria strongly supported inclusion of the interaction term in question ( $\Delta\text{BIC} = -4.12$ ). Furthermore, the results of Study 5, while not statistically significant, were actually trending in the opposite direction of that predicted, suggesting the failure to support the experimental hypothesis was not a lack of power. Thus, it appears unlikely that the results obtained for both experiments were statistical noise that need not be dealt with; the more plausible conclusion is that the (nearly) identical experimental procedure affected the price valuation dependent variable and reaction time variable in different ways or to different extents. These studies had been run assuming that goal activation was the direct cause of the valuation bias demonstrated in Studies 1 and 4, but none of the studies conclusively demonstrated this (although the evidence obtained from the replication of Study 1, Study 2, was supportive of this mechanism). In order to test whether the experimental manipulation (goal

unattainability) affected goal activation and valuation to different extents, a future replication would need to be run combining both Studies 4 and 5 (run simultaneously, drawing from the same sample pool) in order to establish that valuation and activation were in fact differentially affected. If it was found that valuation and activation were (once again) differentially affected, future experiments could test the possible reasons for why this was.

One possible explanation for the discrepant findings is that the unattainability manipulation caused frustration and negative affect toward the innovativeness goal while increasing the activation of the goal construct itself in the near term. A similar motivational mechanism has been observed in the animal learning literature on operant extinction. When a previously reinforced behavior ceases to be reinforced (operant extinction), eventually the behavior will be reduced; the near-term consequences of extinction, however, are an “extinction burst” (a sharp increase of reinforcement-seeking behavior) and frustration (see Lerman & Iwata, 1995; Harris, Pentel, & LeSage, 2007). Furthermore, this behavior has been observed not only in rats but in human participants in clinical trials (Lerman & Iwata, 1995). Thus, if participants were given evidence that a goal they held was unattainable, they could experience negative affect toward the goal itself (which would be responsible for the devaluation of innovative sector mutual funds) while the goal itself would experience a “burst” of high activation for a short time before eventual deactivation. To test this possible explanation, research would have to be conducted that would exactly replicate Study 5 (the RT study) while varying the amount of time elapsed from the unattainability manipulation to the reaction time task. If there was evidence of an

“extinction curve” of goal activation for the goal unattainable condition but not for the goal attainable condition, the explanation proposed in this paragraph would be supported.

Another explanation for the discrepant findings of Studies 4 and 5 is simple reactance. Under this hypothesis, participants in the goal unattainable condition did initially deactivate their innovativeness goal after receiving evidence of its unattainability. Those in Study 4 went on to evaluate sector funds that did not blatantly prime their recently-deactivated goal, resulting in an evaluation of those sectors that was not upwardly biased (compared to those in the goal-attainable condition). Those in Study 5, on the other hand, completed a lexical decision task where words that were very similar to the goal they had been told was not attainable (“Innovative”, “Pioneer”) were the focal stimuli that they were being asked to respond to. It is possible that those in Study 5 experienced psychological reactance (Brehm, 1966) regarding the goal (that was only considered unattainable because some experiment had produced historical evidence suggesting an unfavorable comparison). This perceived attack on personal freedom would have caused a vigorous re-adoption of the goal at a much higher level of activation than it had been prior to the unattainability manipulation, which manifested itself in faster recognition of goal-relevant words for those in the unattainable condition vs. attainable. To test this possible hypothesis, the lexical decision task of Study 5 could be constructively replicated. Half of the participants would be assigned to conditions exactly mirroring those of Study 5. The other half would replicate the first half of the experiment, but participate in a lexical decision task that had been modified in order to make the goal

words more subtly presented and thus less likely to cause reactance. This lexical decision task would supraliminally present only nonwords and neutral words, instead of the nonwords, neutral words, and goal words that had been shown originally. However, half of the neutral words would be preceded by a subliminal goal word, while half of the neutral words would be preceded by other neutral words. If those in the goal unattainable condition responded faster to the goal-primed words than the neutral-primed words (relative to those in the attainable condition) *only* when the goal words were presented supraliminally, this would be evidence of a reactance effect.

One final explanation for the results obtained in Studies 4 and 5 involves the role of goal progress and commitment in goal pursuit. Research on self-regulation has discovered that when multiple goals are active, progress on any one goal can result in either decreased or increased activation of that goal based on whether the progress is interpreted as mere progress (partial goal attainment) or as commitment to the goal (see Fishbach & Dhar, 2008, p.618-9 for a discussion). A similar interpretative mechanism could be at work in Studies 4 and 5; it was noted in the Results sections of both Studies 4 and 5 that the manipulation check of perceived goal progress did find that those in the attainable condition reported higher progress toward their goal. How progress was interpreted may not have factored heavily into the results of Study 4 because the attainability manipulation was strong enough to cause the predicted effect. This scenario would have been initially repeated in Study 5, however, the presentation of the goal words *during the reaction time task* may have caused a new increase in goal construct activation that was interpreted differently across conditions. For those in the goal unattainable condition, an higher level of activation for a goal

that less progress had been made on could be interpreted as commitment to the goal, subsequently raising the activation of the goal enough to show a faster reaction time for goal words on the remaining trials. For those in the goal attainable condition, activation of a goal that progress had been made on (at least comparatively) could have been interpreted as sufficient progress to pursue another goal, causing goal deactivation and slower reaction times for goal words on the remaining trials.

In summary, it is not clear at this time why the results of Studies 4 and 5 diverged. Study 4 did produce results that were consistent with goal systems theory, but the results of Study 5 call into question the psychological mechanism that produced these Study 4's results. Several possible explanations exist that can explain this discrepancy, and a substantial future program of research will be required to satisfactorily determine its true cause.

#### *Deactivation and devaluation as a function of goal undesirability*

Two studies investigated the hypothesis that undesirability of a goal would lead to deactivation of the goal and thus devaluation of goal-relevant (but not goal-irrelevant) items. Studies 6 and 7 sought unsuccessfully to demonstrate this effect using the goal of school success for the independent variable and consumer product pictures (from Amazon.com) of items that were or were not instrumental to success in school. Study 6 manipulated goal desirability by presenting a (bogus) research finding to students whose main conclusion was that school success was/was not correlated with long-term happiness. While no significant differences were found between the conditions on how goal-relevant or goal-irrelevant products' prices were estimated, a treatment check of self-reported surprise did suggest that a large number of students in the goal

undesirable condition may not have believed the experimental manipulation (this was a problem that had been identified during pretesting and attempts had been made to mitigate this problem for the actual study). As a result, Study 7 was run using similar methodology but this time allowing participants to generate positive or negative implications of being successful in school. This manipulation was intended to cause the desired end-state of the goal to be associated with more vs. less positive affect when it was considered (evidence of goal desirability), while also solving the believability problem from the previous version of the experiment. Unfortunately, Study 4b did not produce significant effects or even meaningful but insignificant trends in the data for even any single product, despite having 200 participants' responses for the final analysis. Both studies failed to produce statistically significant results of any kind, and thus failed to support the experimental hypothesis.

The most logical criticism to make of these studies is that their methodology did not lend itself to obtaining significant results. Most prominently, the goal of school success is likely not a good candidate when searching for a goal to render less desirable. While this is a goal that all of our participants apparently shared, the fact that they were students at a major university suggests that they have a successful history of defending this goal's desirability when confronted with temptations. A more malleable goal, or a laboratory-task specific goal, may be more useful in future attempts to demonstrate this effect. Future research investigating this phenomenon may benefit from using a modified evaluative conditioning framework (DeHouwer, Thomas, & Bayens, 2001) in the laboratory to render a goal more or less desirable. The present research sought to maximize ecological validity by convincing students

through arguments that a long-term goal was less desirable than had been earlier thought; given the lack of success of this manipulation, however, a simple laboratory conditioning task may allow for the most powerful experimental test. Furthermore, the lack of a manipulation check in the final in-class survey study (an attempt to minimize the possibility of participants guessing the nature of the experiment) leaves open the possibility that the manipulation was not successful at all. Due to the difficulty in conclusively interpreting null results, making a firm theoretical conclusion for or against the theory being tested on the basis of these results is not warranted. It should be noted that, as with the results of Study 3, failure to demonstrate a motivational bias in one context is not strong evidence that it does not or cannot exist.

### *Conclusions*

The purpose of the present research was to investigate an implication of goal systems theory, that deactivating a background goal would cause devaluation of objects that were relevant to the goal. Three mechanisms were suggested that should cause goal deactivation: goal *attainment*, perceived goal *unattainability*, and perceived goal *undesirability*. Evidence supporting the first mechanism, goal attainment, was obtained first using a consumer product pricing task, and second later conceptually replicated using a reaction time task to determine that price differences were in fact due to differences in goal activation. This tenet of the theory was supported. Evidence supporting the second mechanism, goal unattainability, was obtained in a sector mutual fund price estimation task; however both the manipulation check of attainability and the conceptual replication using a reaction time task failed

to support the theory, suggesting that while the motivational bias on pricing did exist, the mechanism proposed by this theory (evaluative bias due to goal deactivation) was not necessarily an accurate picture of what happened in the experiment. A considerable amount of future research (some ideas are proposed above) will be required in order to conclusively demonstrate how this mechanism works. Evidence supporting the third mechanism, goal undesirability, was not obtained. Two experiments attempted to demonstrate this effect using a school success goal and school-related consumer products; the first experiment had an insufficiently believable manipulation, while the second showed no experimental effects on price estimation whatsoever. These experiments likely failed due to methodological reasons, so no conclusion regarding the theory is warranted from these experiments.

### *Implications*

The results of these experiments have two very clear and important implications for contemporary society. The first implication is that the activation of background goals can influence “fair market” price estimations. This is an important point to make because the existing goals literature deals mostly with differences in *choice* of means as a result of goal activation, not means *valuation* as demonstrated here (see Fishbach & Ferguson, 2007, for a review). It is worth noting that in Study 4, not only were the (goal-relevant) innovative sector funds overvalued by those in the goal attainable condition relative to the goal unattainable condition, the funds were overvalued *relative to the no goal primed condition as well*. There is little reason to doubt that the mechanism behind this contrast was indeed the higher activation of the (recently primed) innovativeness goal for those in the goal attainable condition.

Given that a goal can be primed through any means to its accomplishment or any related cognitive construct, this finding introduces the possibility of variable fair-market price estimates for many different products. This finding has many possible applications in consumer psychology, including advertising (especially before or at the point of price evaluation) and flexible pricing plans (in some markets it is typical for purchases to be made well in advance of consumption, such as in the tourism and transportation industries). Future research in this vein could investigate not only customers' valuations of goal-consistent objects but their willingness to buy them, seeing as the present research did not address this question at all.

Many applications of this finding exist in markets where prices are flexibly determined in real-time through auctions as well (e.g., financial markets or eBay). In fact, the particular goal and means used in Study 4 (innovativeness goal and stereotypically innovative industry sectors) were an intentional attempt to illustrate a possible cause of a demonstrated market inefficiency: the “value premium”. The value premium refers to the finding that between the years 1926-2004, a portfolio of value stocks (those with large earnings relative to their “lower” current price) have outperformed growth stocks (those with low earnings relative to “higher” current price; see Fama & French, 1992). Conventional risk-based asset pricing models cannot account for this finding (Fama & French, 2006; Jegadeesh, 1992), nor can consumption-based conceptualizations of risk (value stocks perform as well or better than growth stocks during bear markets when cash is more likely to be needed; see Lakonishok, Schleifer, & Vishny, 2005, p.304). Much of this “value premium” can however be explained by behavioral (psychological) explanations such as

expectational errors for future corporate growth (Lakonishok et al., 2005) or the price “momentum effect” whereby price movement in the recent past is extrapolated into future price expectations (Lakonishok et al., 2005; see Jegadeesh & Titman, 2005 for a recent discussion on momentum effects).

The present research illustrates the possibility of a motivational explanation for the value premium as well. Growth stocks are typically those companies seen as the most innovative in their fields (thus the expectation of future growth that warrants them having a higher price relative to current earnings). This can be due to either an innovative product (Apple's iPhone) or an innovative business process (Wal-Mart's highly-efficient supply and distribution network). This innovative quality could cause growth stocks to be *evaluated* as particularly attractive investments to those who have the (background) goal of being innovative or accomplishing something “groundbreaking”. If this were true, the prices on growth stocks would be chronically bid up above the market value that would justify their current earnings, relative to market value for the less-innovative value stocks; value stocks would thus generate a chronically better return on initial investment than growth stocks, matching the finding of Fama & French (1992).

Study 4 reports findings that match this predicted scenario. The 7 pretested “innovative” (growth) sectors were in fact generally less mature industries classifiable as growth sectors due to their high price-to-earnings (P/E) ratio (information technology, internet companies, biotechnology, entertainment, pharmaceuticals, computers, and consumer electronics). Similarly, the pretested “non-innovative” (value) sectors tended to be more mature industries with less room for growth and

thus lower P/E ratios in real life (banks, retailers, homebuilders, groceries, healthcare, insurance, and waste management). The results of Study 3 were as predicted; those with the goal of innovativeness active showed a greater valuation gap favoring the innovative/growth sectors over the non-innovative/value sectors than did those who had the goal deactivated or those who never had the goal active in the first place. If this experiment generalized to real-world markets, it would produce the chronic overvaluation and thus underperformance of growth stocks relative to value stocks.

The potential to find motivational biases in stock markets is not restricted to “non-innovative” value stocks. Researchers have known for some time the psychological benefits of being one of the “good guys” or being on the “winning” team (Cialdini, 1976); ownership of stock shares of innovative companies could confer this “reflected glory” benefit (another direction for future research). Indeed, research demonstrating a chronic devaluation of stocks from “shunned” industries (tobacco, alcohol, gambling, firearms, & defense; see Statman & Glushkov, 2008) raises the possibility that investors could avoid these companies in order to avoid “basking in reflected shame”.

The second implication of the present research is that not only can priming of a background goal cause its activation and thus price valuation biases, but that attainment of this goal will result in the deactivation of this goal, eliminating or attenuating the overvaluation that had previously existed. This is a genuine advance in the literature on motivation; it shows how motivated biases go away, adding to the existing literature explaining how they come in being. Applications for this finding are plentiful as well. One example in financial markets is that an investment analyst

could become hungry around lunchtime, causing a set of grocery or restaurant stocks to become overvalued in his/her estimation relative to how they would have been estimated had the goal not been active. According to this research, satiating the hunger should result in diminishing this overvaluation; an estimate prior to lunch at 11:45 may be higher than is typical, but the (lower) estimate at 1:00pm following lunch may not differ from an estimate at 9:30am following breakfast.. While the first implication discussed in this section opens the floodgates of goal-induced mispricing, this second implication contains a method to get rid of the bias.

A final noteworthy aspect of this implication is its re-affirmation of the power of vicarious goal attainment. Recent research has shown that the mere act of promising to complete a goal can result in its deactivation (Orehek, 2006), that the presence and momentary contemplation of a healthy food option on a restaurant menu can ironically increase indulgence in unhealthy entrees (Wilcox, Vallen, Block, & Fitzsimmons, 2009), and that merely making a choice that is seen as pursuing one goal can be a “license” to pursue a competing goal that undermines the original choice (Khan & Dhar, 2006). The present research has demonstrated a similar finding, that merely thinking about an important group can cause an affiliation goal to be vicariously attained and deactivated (Studies 1 and 2).

In summary, the findings of the present research on motivation, though in need of further investigations could have important implications for both motivational theory as well as consumer and market behavior. As such, it suggests incorporating recent insights into the psychology of goals into theories and research on consumer behavior.

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