Subgoals as Substitutes or Complements: The Role of Goal Accessibility

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The self-regulation process often involves breaking an ongoing goal (e.g., keeping in shape) into many individual, constituent subgoals that monitor actual actions (e.g., eating healthy meals, going to the gym). The article examines how pursuing each of these subgoals may influence subsequent goal pursuit. The authors show that when people consider success on a single subgoal, additional actions toward achieving a superordinate goal are seen as substitutes and are less likely to be pursued. In contrast, when people consider their commitment to a superordinate goal on the basis of initial success on a subgoal, additional actions toward achieving that goal may seem to be complementary and more likely to be pursued. These predictions were tested in four studies that explored the conditions under which subgoals attainment have a counterproductive versus favorable effect on further pursuit of similar actions.

Keywords: goal, subgoal, self-regulation, self-control, priming

Setting goals and monitoring progress toward goal achievement is fundamental to theories of self-regulation, and examining the properties of goals that enhance self-regulation has been a major focus of past research (e.g., Bargh & Barndollar, 1996; Carver & Scheier, 1998; Higgins, 1989). More recently, research has addressed the question of how individuals evaluate and choose among several different means or subgoals that are linked to the same overriding goal (Kruglanski et al., 2002; Shah & Kruglanski, 2003). For example, a student who has the goal to do well academically can pursue it through different means such as studying in the library and attending tutorials. A question that arises is the conditions under which prior pursuit of a means or a subgoal (e.g., attending a tutorial) might increase or decrease the likelihood of pursuing additional subgoals related to the same ongoing goal (e.g., spending time studying in the library). In general, the successful attainment of a subgoal may increase, decrease, or have no effect on the pursuit of other similar subgoals that are linked to the same goal.

The present article addresses the effect of successful subgoal attainment on subsequent self-regulation, depending on whether the individual focuses on the attainment of a specific subgoal or on the commitment to a superordinate goal. We expected an inhibitory relationship between subgoals to be connected to a superordinate goal when the focus is on subgoal attainment. The intuition behind this prediction is that subgoal attainment elicits a sense of accomplishment, which justifies temporary disengagement from the superordinate goal. We further predicted a reinforcing relation-

ship between subgoals when the focus is on one's commitment to the corresponding superordinate goal, because success in an initial task increases the subsequent commitment. As an illustration, consider the example of a person whose goal is to have an attractive figure. This goal might be pursued through several different subgoals (e.g., exercising, eating healthy food). If the individual focuses on subgoal attainment, a successful workout might temporarily lower the likelihood of consuming healthy food as it would be viewed as a substitutable activity for a goal that has progressed. However, if the individual focuses on the superordinate goal, a successful workout enhances the commitment to the goal of having an attractive figure, such that exercising complements rather than substitutes for the consumption of healthy food.

This article proposes a novel analysis of self-regulation by breaking a goal into subgoals. In what follows, we examine the process of self-regulation through subgoals, which leads to our prediction that subgoals can be seen as either complementary or substitutable, depending on the accessibility of a superordinate goal.

Self-Regulation Through Subgoals

A number of previous studies have examined the effect of setting subgoals on effective self-regulation (Carver & Scheier, 1998; Emmons, 1992; Locke & Latham, 1990; Vallacher & Wegner, 1987). For instance, Gollwitzer and his colleagues have shown that individuals who set subgoals, in the form of a mental link between situational cues and anticipated goal-related actions, are more likely to successfully pursue these actions in the face of situational obstacles (Gollwitzer, 1999; Gollwitzer & Brandstaetter, 1997). A limitation of past goal research is that it has been conducted under the assumption that the individual has a single goal that is connected to a single set of attainment means. However, in many real-life situations, people hold multiple ongoing goals, which are in turn connected to multiple, low-level subgoals

(Fishbach, Shah, & Kruglanski, 2004; Kruglanski et al., 2002). For example, high-level goals of attaining academic success and having an active social life may each be connected to a specific set of activities serving as its attainment means (e.g., studying in the library and attending classes to achieve academic success). In this configuration, the successful attainment of one subgoal may motivate further pursuit of similar actions, or it may also justify temporary disengagement to pursue competing goals.

We propose that on the basis of the initial goal-related action, a person can infer either *goal commitment* or *goal progress* (i.e., partial attainment). If one interprets one's subgoal achievement in terms of general level of goal commitment (e.g., Bem, 1972; Festinger, 1957), it is likely to increase one's motivation toward similar complementary actions and inhibit competing goals (Shah, Friedman, & Kruglanski, 2002). If, however, one interprets the same subgoal achievement in terms of general level of goal progress (e.g., Carver & Scheier, 1998), it serves as a justification for one to move away from the focal goal to pursue other goals. These two dynamics—goal commitment versus goal progress— were recently illustrated by Fishbach and Dhar (2005), who found, for example, that when initial academic success indicated greater commitment to academic goals, students were subsequently more interested in similar academic tasks and less interested in incongruent social activities. Yet, this same level of academic performance decreased interest in academic tasks and increased interest in social activities if students inferred that progress had been made on the academic goals.

Furthermore, a failure to pursue a subgoal can also indicate either lack of sufficient commitment or lack of progress to an already committed goal. If a person interprets initial failure in terms of low goal commitment, we expected this person to subsequently disengage from the goal (Soman & Cheema, 2004). If, however, a person interprets initial failure in terms of lack of progress toward a goal to which commitment remains intact, we expected this person to be motivated to work harder toward the goal by choosing compensatory subgoals or by perpetuating the same subgoal (Brunstein & Gollwitzer, 1996; Steele, 1988; Wicklund & Gollwitzer, 1982). Thus, for example, failing to study might decrease the subsequent motivation to pursue similar actions if it signals low commitment to doing well academically, but it might increase the motivation to study if it signals the absence of progress on the goal of academic excellence.

When Subgoals Lead to Disengagement or Reinforcement

The degree to which individuals interpret subgoal attainment in terms of progress or commitment depends on their attention to the relatively concrete subgoal in comparison to the corresponding, relatively abstract superordinate goal. When individuals consider the attainment of the subgoal itself, they may experience some of the benefits associated with goal fulfillment, which motivates moving temporarily away from a goal (Dhar & Simonson, 1999; Monin & Miller, 2001; Tesser, Martin, & Cornell, 1996). The adverse effect of initial success (vs. failure) on pursuing similar actions further reflects individuals' need to consider various goals, desires, needs, and aspirations (e.g., Emmons & King, 1988; Higgins, Strauman, & Klein, 1986; Markus & Ruvolo, 1989). In the course of pursuing multiple goals (e.g., weight loss and food enjoyment), partial fulfillment of a focal goal suggests to the

individual that other objectives are somewhat neglected, further motivating disengagement from that goal.

On the other hand, when the focus is on the superordinate goal, the same level of successful attainment highlights commitment to that overall goal. By drawing attention to the superordinate goal, the success (vs. failure) toward reaching a subgoal thus alters a person's self-identity and provides evidence for a person's higher (vs. lower) commitment to the superordinate goal more than it indicates goal progress. For example, when the goal to have an attractive figure is highly accessible, an initial success at losing weight strengthens the commitment to this goal as well as related activities toward that end (e.g., working out). An initial failure to lose weight, however, signals low commitment to the overall goal of having an attractive figure, further impairing the dieter's commitment to other actions toward this goal.[1]

Several factors might underlie whether individuals process any subgoal at a more concrete level, focusing on the subgoal itself, or at a more abstract level, focusing on the link to the superordinate goal. First, although certain superordinate goals might chronically be more accessible, the interpretation of any subgoal in terms of a higher order goal might also be elicited directly through priming of the corresponding superordinate goal. Second, the relative focus on the superordinate goal can also be elicited by referring to subgoal pursuit in the distant (vs. proximal) future. Because actions that are scheduled in the distant future are represented in more abstract terms (e.g., Liberman & Trope, 1998; Trope & Liberman, 2003), considering the pursuit of subgoals in the distant future (e.g., several months from now) should have similar effects as focusing on a primed superordinate goal. That is, it should lead to inferences of commitment, which increase the motivation to pursue complementary subgoals after initial success. However, considering the pursuit of subgoals in the proximal future (e.g., tomorrow) leads to more concrete processing, which has similar effects as focusing on subgoal attainment. Hence, it encourages temporary disengagement with similar subgoals after initial success.

Abstract Framing Versus Goal Priming

We propose that contextual cues for a superordinate goal increase the focus on overall goal commitment, which may or may not lead to greater choice of goal-related actions, depending on a person's initial performance. Thus, for example, an achievement prime (e.g., the words *achieve* or *success* presented in an unrelated task) increases the focus on one's general achievement motivation while performing a cognitive test. Those who succeed on the test, in turn, would infer high commitment and be more interested in similar achievement tasks, whereas those who failed initially

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[1] This analysis concerns situations in which individuals infer commitment on the basis of goal performance (e.g., self-perception theory; Bem, 1972) and should be distinguished from situations in which individuals succeed or fail in accomplishing goals to which they are already committed (e.g., when a professional dancer performs poorly). In line with self-completion theory (Brunstein & Gollwitzer, 1996; Wicklund & Gollwitzer, 1982) and self-affirmation theory (Steele, 1988), we predicted that if commitment is already established, failure (more than success) should increase the motivation to seek complementary subgoals to a goal because it indicates low progress.

would infer lower commitment, which further impairs their subsequent motivation to choose similar achievement tasks.

Whereas previous goal research finds that contextual cues for a superordinate goal (through priming) increase choice of congruent means (e.g., Aarts & Dijksterhuis, 2000; Chartrand & Bargh, 1996), the present research addresses subsequent self-regulation after initial performance on the same goal. The effect of goal priming in successive choice situations depends on a person's initial performance, such that failure decreases the likelihood of subsequently choosing similar actions because it indicates low commitment, whereas success increases the likelihood of subsequently choosing similar actions because it indicates high commitment. In general terms, the focus on an accessible superordinate goal promotes behavioral consistency between initial success (vs. failure) and subsequent choice of congruent (vs. incongruent) subgoals. It further implies that initial success facilitates choice of complementary means in the presence of an accessible superordinate goal when it signals commitment, but initial failure to meet a subgoal is more motivating in the absence of a superordinate goal when it signals the absence of progress.

Research Overview

Four studies tested whether, when the focus is on subgoal attainment, initial success has a counterproductive effect on further pursuit of complementary actions, whereas initial failure has a favorable effect on pursuing these actions. In contrast, situations that focus on a superordinate goal were expected to be more likely to elicit consistency in the choice of initial and subsequent actions. Under these conditions, initial success was expected to have a favorable effect on pursuing complementary actions, and initial failure was expected to have a counterproductive effect on pursuing these actions.

These studies manipulated the pursuit of an initial subgoal and the focus on a superordinate goal and then assessed participants' interest in complementary subgoals. Specifically, Study 1 tested the general assertion that subgoals inhibit each other when the focus is on subgoal completion but reinforce each other when the focus is on the superordinate goal. Studies 2 and 3 directly manipulated success and failure on the initial subgoal task. Thus, Study 2 used a field setting, which involved actual self-regulation toward the goal of keeping in shape. Study 3 tested for the time and effort that participants invested in attempting to work on an academic test after completing another test of the same ability. Finally, Study 4 assessed whether subgoals that are scheduled in the distant future signal commitment to a superordinate goal, whereas subgoals that are scheduled in the proximal future signal their own attainment, and whether these inferences (of commitment vs. progress) mediate subsequent choice of additional actions to the same superordinate goal.

Study 1: Substitute and Complement Subgoals

Participants' initial choice was thought to influence their subsequent choice of similar actions, such that initial subgoal attainment would substitute for similar actions when the focus was on one's initial action but would reinforce the choice of similar actions when the focus was on a superordinate goal. We tested for this prediction across different goal domains (e.g., preventing sun damage) and using several subgoals (e.g., wearing a sun hat and applying sunscreen).

Method

Participants

Ninety-nine University of Chicago undergraduates (57 women and 42 men) participated in the experiment in exchange for $4. The gender of participants did not yield any effects here and in subsequent studies and is therefore omitted from further consideration.

Procedure

The study used a 2 (superordinate goal prime: present vs. absent) $\times$ 2 (subgoal: present vs. absent) $\times$ 3 (vignette: preventing sun damage vs. keeping in shape vs. studying). The first two factors varied between subjects, and the third factor varied within subjects. On the basis of our pilot data that University of Chicago undergraduates stated that they pursued goals pertaining to doing well academically, preventing sun damage, and keeping in shape (see also Fishbach & Dhar, 2005), we presented scenarios corresponding to these three goals. Participants completed a series of supposedly unrelated experimental tasks that manipulated the accessibility of the superordinate goal by means of a scrambled-sentence task (cf. Bargh & Chartrand, 2000) and the completion of an initial subgoal to this goal, in a seemingly unrelated manner. We then assessed interest in pursuing subsequent subgoals.

The study consisted of three vignettes, each corresponding to the three goals listed above. In each vignette, participants were first handed a scrambled-sentence task that was presented as being part of a lexical study on the evaluation of discrete words within a sentence. Participants were told that because of the length of the scrambled-sentence task, it was divided into three separate sessions to be administered at the beginning of each part of the experiment. The participant's task was to unscramble five word sets into coherent and meaningful sentences. Each scrambled-sentence task was followed by a short scenario describing the pursuit (or nonpursuit) of an initial subgoal before participants indicated their interest in pursuing another subgoal to an overall goal. The specific scenarios for preventing sun damage, studying, and keeping in shape goals are described below. The order of these vignettes was randomized.

Preventing sun damage vignette. In this vignette, participants who were assigned to the superordinate goal prime condition unscrambled five sentences containing health-related words (i.e., skin, cancer, gym, medical, and ultraviolet) and which included, for example, "she is going to medical school this fall" and "Cancer is one of 12 astrological signs." Participants in the no-prime condition unscrambled five neutral sentences including, for example, "she is going to business school this fall" and "Leo is one of 12 astrological signs."

After completing this task, participants were handed a survey titled "Product Usage." Half of the participants, who were assigned to the subgoal attained condition, read the following scenario: "On a bright sunny summer afternoon, you have to walk in the sun for 45 min. You are wearing a sun hat and have a bottle of sunscreen with you." The rest of the participants, in the subgoal absent condition, read a similar scenario that did not specify that they were already wearing a hat: "On a bright sunny summer afternoon, you have to walk in the sun for 45 min. You have a bottle of sunscreen with you." The dependent variable referred to participants' interest in applying the sunscreen, which constituted a second, complementary subgoal toward the focal goal of avoiding sun damage. They were asked to indicate on a 7-point scale how likely they were to use the sunscreen (1 = *not at all likely*, 7 = *very likely*). To conceal the purpose of the study, we embedded this item among other irrelevant items (e.g., "Do you enjoy walking in the sun?").

Academic performance vignette. Half of the participants in this vignette were asked to unscramble five sentences that contained academic concepts (i.e., honor, diligent, achieve, excellent, and hard) and were used to prime an academic achievement goal. These sentences included, for example, "most stores honor credit cards" and "we fight to achieve liberty." The rest of the participants unscrambled similar, neutral sentences, including, for example, "most stores accept credit cards" and "we fight to obtain liberty." Following this task, participants were handed a survey titled "Study Plans." The participants assigned to the subgoal attained condition were asked to imagine that "the final exam is a week away, and today you studied very hard during the day," whereas the rest of the participants in the absent subgoal condition were told to imagine that "the final exam is a week away, and today you studied as usual during the day." The dependent variable referred to participants' intention to study at night. They were asked to indicate on a 7-point scale how likely they were to study during the night (1 = *not at all likely*, 7 = *very likely*). This item was embedded among other irrelevant items.

Keeping in shape vignette. Half of the participants in this vignette were asked to unscramble five sentences, which contained concepts related to keeping in shape (i.e., slim, weighted, fat, fit, figure, and workout). These sentences included, for example, "I cannot figure out how it works" and "he has a fat investment account." The remaining participants unscrambled neutral sentences, including, for example, "I cannot tell how it works" and "he has an empty investment account." Following this task, participants were handed a survey titled "Meal Combination." Depending on experimental condition, half of the participants in the subgoal attained condition were asked to imagine that "on a random day you had a light lunch," whereas the rest of the participants in the absent subgoal condition were asked to imagine that "on a random day you had a regular lunch." The dependent variable referred to participants' plans to have a light and healthy dinner. They rated the likelihood of getting a light dinner on a 7-point scale (1 = *not at all likely*, 7 = *very likely*). This item was embedded among other irrelevant items. On completion of the survey, participants were debriefed and dismissed.

Results and Discussion

The ratings of the interest in pursuing the goal-congruent actions were analyzed as a function of Goal Prime × Subgoal × Vignette. An analysis of variance (ANOVA) of this index yielded a main effect for goal prime, $F(1, 95) = 4.27$, $p < .05$, indicating greater interest in pursuing the second subgoal when the superordinate goal was primed ($M = 4.14$, $SE = 0.19$) than not primed ($M = 3.63$, $SE = 0.19$), and a main effect for vignette, $F(1, 95) = 6.16$, $p < .05$, indicating that participants were more interested in studying ($M = 4.25$, $SE = 0.21$) than applying sunscreen ($M = 3.92$, $SE = 0.20$) or having a light dinner ($M = 3.52$, $SE = 0.17$). These main effects were qualified by the predicted two-way interaction between goal prime (present vs. absent) and the initial subgoal (present vs. absent), $F(1, 95) = 12.60$, $p < .001$. No other main effect or interaction (including the three-way interaction) emerged in this analysis ($Fs < 1$).

To explore the two-way interaction, we used planned contrasts to compare the effect of completing an initial subgoal on further self-regulation as a function of goal priming. The results are displayed in Figure 1. As shown, in the absence of the superordinate goal, completing an initial subgoal resulted in lower interest in pursuing another substitutable subgoal ($M = 3.25$, $SE = 0.21$, in the presence of an initial subgoal; $M = 4.12$, $SE = 0.21$, in the absence of an initial subgoal), $t(48) = 2.98$, $p < .01$. However, when the superordinate goal was primed, completing an initial subgoal increased interest in pursuing another subgoal toward the
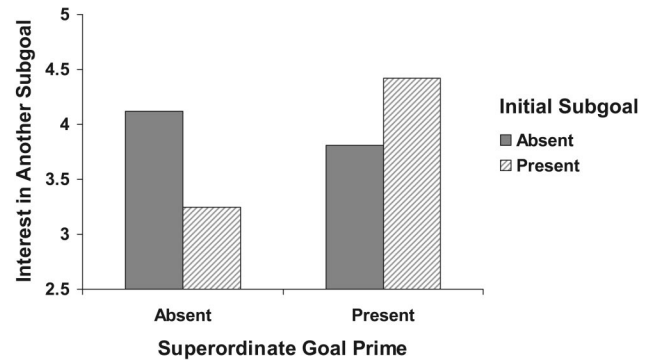

Figure 1. Interest in a subgoal as a function of superordinate goal prime and initial goal pursuit.

same goal ($M = 4.42$, $SE = 0.21$, in the presence of an initial subgoal; $M = 3.81$, $SE = 0.21$, in the absence of an initial subgoal), $t(47) = 2.05$, $p < .05$.

This pattern of results provides initial support for our hypothesis that in itself, subgoal attainment leads to disengagement with similar actions unless the superordinate goal is the focus, in which case subgoal attainment increases interest in pursuing similar means. Importantly, we find this pattern with compensatory subgoals (i.e., sunscreen and sun hat, which both serve a health goal) as well as with persistence on similar activities (i.e., study during the morning and at night or having a light lunch and a light dinner), which yielded similar patterns of substitution or reinforcement as a function of overall goal prime. We infer that the same action implies that other actions are needed when one focuses on one's commitment to an overall goal but that more actions are redundant when the focus is on the attainment of a specific subgoal.

This initial demonstration is limited to hypothetical choices and to scenarios that manipulate the presence versus absence of subgoals. Because people's actual behavior may deviate from their responses to these questions, a second study was conducted to test for the effect of subgoal attainment on subsequent choice of action in a real-life setting involving actual self-regulation. A second objective of the next study was to examine how failures in subgoal pursuit may influence subsequent self-regulation. We predicted that in the presence of contextual cues for a superordinate goal, the focus is on commitment. Ergo, failure hurts subsequent performance by indicating lower commitment. However, when the superordinate goal is not primed, the focus is on goal progress, and therefore failure increases interest in other similar actions by indicating lack of progress.

Study 2: Working Out and Eating Healthy: Substitutes or Complements?

This study tested for the effect of exercising at the gym on subsequent interest in pursuing a healthy diet as well as repeating the exercising behavior (i.e., compensation on a different subgoal and perpetuation on same subgoal). We first conducted a pretest to confirm that working out and consuming low-fat food are often stated as two possible subgoals for pursuing the goal of keeping in shape; therefore, a successful workout may influence one's subsequent interest in consuming low-fat food. The specific effect of

working out (either increase or decrease in healthy eating and exercising) was expected to vary as a function of contextual cues for the superordinate goal of keeping in shape.

A sense of subgoal accomplishment was manipulated through social comparison. We assumed that when subgoals are subjectively defined, individuals often obtain valuable feedback regarding their attainment through comparison to others (e.g., Mussweiler, 2003). Specifically, a comparison to a low social standard suggests that one has successfully pursued a subgoal, whereas a comparison to a high social standard suggests that one has not yet accomplished the subgoal. A standard of social comparison that attests to the merit of one's own workout was therefore expected to provide a greater sense of subgoal attainment, which should influence interest in healthy eating as well as perpetuation of exercising, as a function of contextual cues for the superordinate goal.

Participants in this study were specifically asked to list the amount of time that they have spent working out at the gym over the past week, and they listed this information on a survey form that had been previously filled out, presumably by another participant, and partially erased. Following a procedure developed by Simonson, Nowlis, and Simonson (1993), in this "partially filled-out" survey a fictitious participant listed either a small or a large amount of exercising time, which induced downward and upward social comparison, respectively. When the superordinate goal was contextually cued, making downward social comparison (i.e., success on a subgoal) was expected to increase interest in similar subgoals more than upward social comparison (i.e., failure on a subgoal), because downward social comparison indicates high commitment. Conversely, when the superordinate goal was not cued, making upward social comparison was expected to increase the motivation to pursue similar subgoals more than downward social comparison, because upward social comparison indicates lack of progress.

Method

Participants

Eighty-four University of Chicago undergraduates (45 women and 39 men) volunteered to participate in the experiment. They were all approached at the exit of the university's gym facilities after completing their workout.

Procedure

The study used a 2 (fitness prime: present vs. absent) × 2 (social comparison: high vs. low) between-subjects design. An experimenter, who was unaware of the purpose of the study or the specific hypotheses, approached each participant at the exit of the university's gym facility and handed him or her an experimental survey. Depending on experimental condition, the survey was either clipped to a hardcover book titled "Fitness and Health," featuring two (male and female) joggers on its front page, or to a hardcover phonebook. These different books, which participants used as clipboards, unobtrusively primed the superordinate goal of keeping in shape and the control condition. To ensure that participants saw the book covers, the experimental surveys were placed between the cover and the first page.

At the beginning of the experimental survey, participants were asked to specify the amount of time that they spent exercising over the last week. They completed their answers on a survey form that was partially filled by

a fictitious participant. They were told that because that person only completed the first item, we could save paper by using this survey again. On the basis of our pilot data that gym members work out on average about 5 hr per week, the fictitious respondent listed either 1 hr (low standard) or 10 hr (high standard), depending on experimental condition. These responses were crossed out but were clearly visible.

After providing their estimated times, participants were further asked to assess the amount of time that they were planning to spend exercising in that particular week, and then they were thanked for their participation.

Next, in a supposedly unrelated survey regarding students' food consumption habits, participants were asked to rate the extent to which they were interested in consuming each of the following low-fat food items during that day: (a) fresh fruits, (b) green vegetables, (c) a bottle of mineral water, and (d) pizza (the last item was reverse coded). They provided their ratings on 7-point scales (1 = *not at all*, 7 = *very much*). After completing their ratings, participants were fully debriefed and dismissed. None of them expressed any suspicion regarding the priming manipulations or the purpose of the study.

Results and Discussion

In support of the manipulation, participants in this study reported having spent 5.46 hr a week on average at the gym ($SD = 3.08$). The low versus high comparison standards (1 vs. 10 hr) were therefore calibrated for the tested population.

To test our hypothesis, we collapsed participants' ratings of interest in consuming healthy foods across the different items and analyzed them as a function of Fitness Prime × Social Comparison. An ANOVA of this index yielded the predicted Fitness Prime × Social Comparison interaction, $F(1, 80) = 9.05$, $p < .01$. As shown in Figure 2, in the absence of fitness prime, comparison to a low standard (and the resulting sense of subgoal attainment) elicited lower interest in healthy eating ($M = 4.73$, $SE = 0.26$) than comparison to a high standard ($M = 5.60$, $SE = 0.25$), $t(37) = 2.63$, $p = .01$. But in the presence of the fitness prime, comparison to a low standard elicited greater interest in healthy eating ($M = 5.36$, $SE = 0.24$) than comparison to a high standard ($M = 4.77$, $SE = 0.24$), $t(43) = 1.68$, $p < .05$ (one-tailed). No main effects were obtained in this analysis.

To further test whether activation of a superordinate goal motivates behavioral consistency, including greater interest in additional subgoals following success and lower interest after failure, we next compared the effect of goal primes in each social comparison condition. In support of the hypothesis, we found that goal
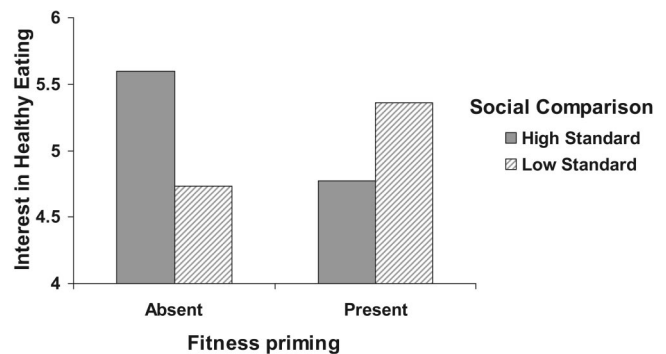

Figure 2. Interest in healthy eating as a function of fitness priming and social comparison standard.

priming (vs. no priming) increased interest in a subsequent subgoal in the low-standard (subgoal attainment) condition, $t(43) = 2.22$, $p < .05$. However, the goal priming (vs. no priming) decreased interest in another subgoal in the high-standard (subgoal nonattainment) condition, $t(37) = 2.05$, $p < .05$. Focusing on the superordinate goal apparently increases behavioral consistency, and in particular, under this condition initial success increases interest in other actions that favor this goal, but initial failure decreases interest in similar actions that favor this goal.

Our theory predicted a similar pattern for compensation on different subgoals and perpetuation on the same subgoal. In line with this prediction, we observed similar effects on participants' subsequent interest in repeating the focal subgoal (i.e., exercising later that week). On the basis of participants' reported workout times, a difference score was calculated, representing the amount of change in workout time between the previous and upcoming week for that particular person. High scores on this index indicated greater interest in exercising. ANOVA of this index yielded a Fitness Prime × Social Comparison interaction, $F(1, 80) = 12.78$, $p < .01$. In the absence of fitness prime, comparison to a low standard (subgoal attainment) elicited less interest in exercising ($M = -0.38$ hr, $SE = 0.30$) than comparison to a high standard (subgoal non-attainment; $M = 1.20$ hr, $SE = 0.30$), $t(37) = 4.23$, $p < .001$. However, in the presence of fitness prime, comparison to a low standard elicited directionally more interest in exercising ($M = 1.00$ hr, $SE = 0.28$) than comparison to a high standard ($M = 0.45$ hr, $SE = 0.28$), $t(43) = 1.16$, $p = .25$. No other effects emerged in this analysis. This suggests that when a single activity is broken down into subgoals that are repeated over time (e.g., exercising on different days), the pursuit of one action may affect one's interest in repeating this activity in the immediate future (see also Camerer, Babcock, Loewenstein, & Thaler, 1997).

Study 2 indicates that a comparison to a low (vs. high) social standard and the resulting positive (vs. negative) feedback regarding a person's own performance on a subgoal have opposite effects on the choice of other subgoals as a function of the accessibility of a superordinate goal. In support of our hypotheses, a comparison to others provided valuable feedback regarding one's own level of goal attainment as well as one's overall commitment to the corresponding superordinate goal. The relative focus on either the attainment of a subgoal or commitment to a superordinate goal, in turn, determined whether participants chose to disengage subsequently from similar goal-related actions.

This study further extends the results of Study 1 to a field setting involving real goal-related activities and actual experience of success at self-regulation. However, in light of the current results there are still some remaining questions: First, the studies thus far did not manipulate the direct success versus failure feedback on self-regulation through subgoals. Ergo, it is yet unclear whether providing such feedback would have similar effects on the choice of subgoals. Second, it is also unclear whether participants' subsequent intentions are reflected in their actual behavior, including persistence on subgoals. To further address the dynamics of self-regulation through subgoals, our next study tested for actual persistence on a subgoal after an initial (successful or failed) pursuit of similar actions and as a function of contextual cues for a superordinate goal.

Study 3: Initial Achievement and Subsequent Persistence

People persist more on academic tasks when they experience greater commitment to the superordinate academic goal but persist less if they experience greater academic accomplishment. Therefore, the effect of initial academic success on subsequent pursuit of similar academic tasks should vary as a function of the inference of commitment versus progress that is made on the basis of initial goal pursuit, which depends on contextual cues for an overall academic goal during the initial performance.

To test this hypothesis, we gave participants in Study 3 an opportunity to work on two independent verbal ability tests that represented subgoals to an academic achievement goal. The first test had correct solutions, whereas the second test was unsolvable. We predicted that success feedback on the first test would decrease participants' motivation to persist on another unsolvable test unless the overall achievement goal was primed. When the achievement goal was primed, success feedback was expected to increase the motivation to persist on the second test.

Method

Participants

Sixty-five University of Chicago undergraduates (34 women and 31 men) participated in the experiment in exchange for $7.

Procedure

The study used a 2 (achievement prime: present vs. absent) × 2 (success on an initial test: high vs. low) between-subjects design. It was completed on desktop computers. The first part of the experiment included the first academic test, which either included contextual cues for the overall academic achievement goal or not. Participants read that in this study they were going to take "verbal reasoning" tests that were described as reliable tests of college students' verbal ability, which pertains to academic success. The first test was said to include a set of scrambled sentences, which participants were to unscramble into coherent sentences. Participants then read that they would be presented with several sets of five words, and their task was to pick exactly four words that form a sentence out of each set. They were further informed that their performance was based on their total number of correct solutions as well as their reaction times for each problem.

The first test had sixteen problems. Following a procedure developed by Bargh and his colleagues (cf., Bargh & Chartrand, 2000), participants assigned to the achievement prime condition were asked to unscramble sentences that included words related to academic achievement (e.g., "firm the door *succeed* must," "orange the he *master* was" and "*accomplished* pianists very lot are"; italics have been added to indicate achievement-related primes). Participants in the control prime condition completed a set of similar sentences that did not include achievement-related concepts (e.g., "firm the door open must," "orange the he color was," and "musical pianists very decide are"). On completion of the first test, participants received computational feedback on their test performance. Depending on experimental condition, the computer program announced that on the basis of an analysis of their response times and number of correct solutions they have performed very well compared with others or that on the basis of these data they have performed below average on this test. Participants were then handed a short filler task before moving to the second test.

Our main dependent variable referred to the time spent on the second test. This test comprised a set of eight scrambled sentences that had no correct solutions. Participants were asked to pick exactly seven words from each set of eight words to form a complete sentence (e.g., "ball the hoop

tosses normally iron often bounce"). Because these sentences had no correct solution, performance was indicated by the time participants persisted on this frustrating task (e.g., Muraven, Tice, & Baumeister, 1998). On completion of this test, participants were thoroughly debriefed and probed for possible suspicion. None of them reported having been aware of the achievement priming manipulation.

Results and Discussion

An ANOVA of the time participants spent on the second test yielded the predicted Superordinate Goal Prime × Success interaction, $F(1, 61) = 8.60$, $p < .01$. As shown in Figure 3, in the absence of achievement priming, participants were less likely to persist on the second test after receiving high ($M = 6.34$ min, $SE = 1.06$) compared with low ($M = 9.96$ min, $SE = 1.06$) success feedback on the first test, $t(32) = 2.06$, $p < .05$. By contrast, with achievement priming participants persisted more on the second test after receiving high ($M = 9.97$, $SE = 1.12$) compared with low ($M = 7.24$ min, $SE = 1.10$) success feedback on the first test, $t(29) = 2.28$, $p < .05$. No main effect emerged in this analysis. These results support our prediction that, in itself, initial success decreases the motivation to persist on a similar task, unless the superordinate goal is highly accessible.

The studies thus far manipulated the experience of an initial action (in terms of its own attainment or commitment to a superordinate goal) by changing the relative focus on the action itself or its relationship with the corresponding goal. We assumed that contextual cues for a superordinate goal rendered the self-regulatory outcome as evidence for a person's general level of goal commitment. However, we have not yet tested directly for the inference that is made on the basis of subgoal attainment and which may refer to either greater goal progress when the focus is on subgoal attainment or greater goal commitment when the focus is on the superordinate goal. In addition, the first studies focused on one variable that determines the relative focus on attainment versus commitment (i.e., contextual cues for an overall goal). Another such variable refers to the temporal distance from subgoal pursuit: When people consider the pursuit of a subgoal in the proximal future, they focus on the concrete action, whereas when they consider the pursuit of this subgoal in the distant future, they focus on its higher order essence (e.g., Trope & Liberman, 2003). The pursuit of a subgoal in a proximal future should therefore highlight its concrete features (i.e., the how), which leads to

inferences of subgoal attainment, whereas the pursuit of this same action in the distant future should highlight its abstract characteristics (i.e., the why), which corresponds to overall goal priming and leads to inferences of goal commitment.

Another final study was set to test for these possibilities. This study tested whether individuals frame proximal actions in terms of subgoal attainment (i.e., goal progress) but frame distant actions in terms of commitment to a superordinate goal. These framings in terms of progress or commitment were expected to influence the subsequent interest in complementary subgoals.

Study 4: Subgoals in the Proximal and Distant Future

This study tested whether the greater focus on commitment to a superordinate goal when utilizing a distant (vs. proximal) framing of initial subgoal pursuit encourages the pursuit of additional subgoals that contribute to the same overall goal. Unlike previous studies, the focus on a superordinate goal versus specific subgoals was manipulated through temporal distance. Those in the proximal condition were asked to consider pursuing subgoals in the proximal future, whereas those in the distant condition considered pursuing these same actions in the distant future (Liberman & Trope, 1998; Trope & Liberman, 2003). We predicted that subgoal completion in the distant future would signal greater commitment to the superordinate goal, whereas subgoal completion in the near future would signal greater progress on subgoals themselves. Participants' inferences (of commitment vs. progress), in turn, were expected to mediate their interest in additional subgoals to the overall goal.

Method

Participants

One hundred thirty-nine University of Chicago undergraduates (75 women and 64 men) participated in the experiment in return for $2.

Procedures

This study used a 2 (temporal distance: proximal vs. distant) × 2 (goal vignette: workout vs. study) between-subjects design. Following research on temporal distance, each participant read one of the two scenarios that described subgoal pursuit in either the proximal or the distant future.

Study vignette. The study vignette instructed participants to imagine studying in the library for two unrelated exams for two courses. In the proximal future condition, participants were asked to imagine that they have two exams coming up tomorrow and were told that "you are now studying in the library for the first exam and have studied for four hours." In the distant future condition, participants read that these two exams are scheduled to take place a month from tomorrow, and they are now one day before the exams. The rest of the instructions were identical.

The framing of the first activity (i.e., studying for the first exam) was then determined by the extent to which participants agreed with eight framing statements, four of which described subgoal attainment, that is, they focused on progress from subgoal pursuit (e.g., "Studying that much means I am getting closer to my academic objectives" and "Studying that much would really improve my academic performance"). The other four statements described goal commitment, that is, they focused on the experience of commitment from subgoal pursuit (e.g., "Studying that much, I am committed to doing well academically" and "Studying that much, I must really care about my academic performance"). All ratings were given on 7-point scales (1 = *strongly disagree*, 7 = *strongly agree*), and the
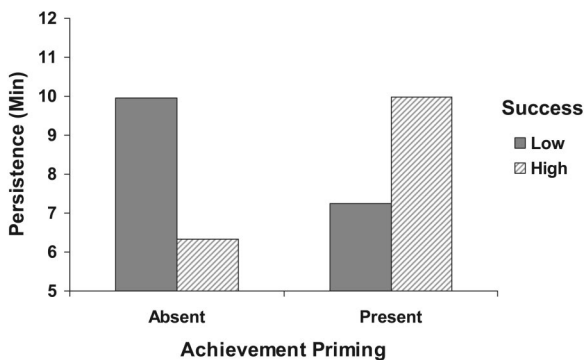

Figure 3. Persistence on the unsolvable test as a function of success on an initial test and achievement priming.

order of statements was mixed to avoid possible ordering effect on subgoal framing.

After rating the extent to which they agreed with framing statements, participants indicated the number of hours they would spend studying for the second exam. Three filler questions preceded this question, and they were added to conceal the purpose of the study (e.g., "Do you prefer to take exams in the morning or in the afternoon?").

Workout vignette. The workout vignette was similar to the study vignette, except it instructed participants to imagine working out in the gym for 3 hr during next week (proximal condition) versus during a week that is 3 months from today (distant condition). The framing of the subgoal was then determined by the extent to which participants agreed with eight statements, which were similar to those in the studying vignette. Four statements described subgoal attainment or progress (e.g., "Working out that much means I am making progress to my health objectives" and "Working out that much would really improve my health"), and four statements described goal commitment (e.g., "Working out that much, I am committed to my health objectives" and "Working out that much, I must really care about my health"). All ratings were given on 7-point scales ($1 =$ *strongly disagree*, $7 =$ *strongly agree*), and the order of statements was mixed.

After rating the extent to which they agreed with those statements, participants listed the number of additional hours they intended to spend in the gym working out during the specified week, among three other filler questions (e.g. "Do you prefer to drink water during or after the workout?"). On completion of the experimental survey, participants were debriefed and dismissed.

Results and Discussion

The statements of subgoal framing were averaged across vignettes into two composite indices of goal progress (i.e., the extent to which participants focused on the attainment from a subgoal, $\alpha = .79$) and goal commitment (i.e., the extent to which participants focused on commitment to the superordinate goal, $\alpha = .78$). These separate indices were moderately, positively correlated ($r = .42, p < .01$).

An ANOVA of Index (goal progress vs. goal commitment) $\times$ Time (proximal vs. distant) $\times$ Vignette (workout vs. study) yielded the predicted two-way Index $\times$ Time interaction, $F(1, 135) = 33.77, p < .001$, indicating that participants focused on the progress from subgoals in the proximal future ($M = 4.72, SE = 0.16$) more than in the distant future ($M = 4.12, SE = 0.16$), $F(1, 135) = 7.16, p < .001$. In addition, participants focused on the commitment to superordinate goals in the distant future ($M = 4.94, SE = 0.15$) more than in the proximal future ($M = 4.28, SE = 0.15$), $F(1, 135) = 9.60, p < .001$. No other effect emerged in this analysis and, in particular, there was no effect for vignette ($Fs < 1$).

These results demonstrate that subgoals that are scheduled in the near future signal their own attainment, whereas subgoals that are scheduled in the distant future signal commitment to a superordinate goal. Next, we tested for the effect of time frame on interest in additional subgoals to the superordinate goal. The amount of time participants intended to invest on additional subgoals (i.e., study for an unrelated exam and work out again during the assigned week) was analyzed as a function of time frame and vignette. An ANOVA yielded the predicted main effect for time frame, $F(1, 135) = 12.17, p < .01$, indicating a greater intention to pursue additional subgoals in the distant ($M = 4.01$ hr, $SE = 0.23$) than in the proximal ($M = 2.94$ hr, $SE = 0.23$) future. There

was also a main effect for vignette, $F(1, 135) = 5.05, p < .05$, indicating greater intention to invest time in working out ($M = 3.83$ hr, $SE = 0.24$) than studying ($M = 3.17$ hr, $SE = 0.22$); however, as expected, framing (commitment vs. progress) and vignette did not interact ($Fs < 1$).

Next, to test whether the framings of subgoals mediated the effect of temporal distance on participants' interest in pursuing additional subgoals, we created a composite measure of subgoal framing, which reflects the simple contrast of framing (i.e., the difference between commitment and progress ratings). A higher score on this variable represents a general tendency to focus on commitment to a superordinate goal than on progress on specific subgoals.

As shown in Figure 4, temporal distance directly increased participants' interest in pursuing additional subgoals, $\beta = .27$, $t(137) = 3.25, p < .01$. However, indirectly, temporal distance increased participants' tendency to focus on the commitment to subgoals rather than on goal progress, $\beta = .45, t(137) = 5.89, p < .01$, and this focus in turn enhanced the interest in pursuit of additional subgoals, $\beta = .31, t(137) = 3.85, p < .01$. Most crucial to the current analysis, controlling for the focus on commitment versus progress, the path from temporal distance to interest in pursuing additional subgoals became nonsignificant ($\beta = .16$, *ns*). The Sobel test statistic found that the focus significantly mediated the interest in pursuing additional goals ($z = 3.22, p < .01$). This analysis confirms the hypothesis that people's interest in pursuing additional subgoals in the distant future stems from their general tendency to focus on the commitment to subgoals rather than to goal progress.

Taken together, the results of this study suggest that people construe their subgoal attainment as commitment to a superordinate goal when the subgoal is temporally distant but as progress toward the subgoal when the subgoal is temporally proximal. Moreover, the framing of successful subgoal pursuit as commitment accounts for the tendency to choose additional subgoals in the distant versus proximal future. In other words, temporally distant plans are more motivating than proximal plans after initial success. Further analysis revealed that both vignettes, if analyzed separately, produced the same mediational relations. This suggests that an abstract framing of goal pursuit in the distant future facilitates both the pursuit of several different subgoals (i.e., studying for unrelated exams) as well as perpetuation of the same subgoal (i.e., working out on different days).
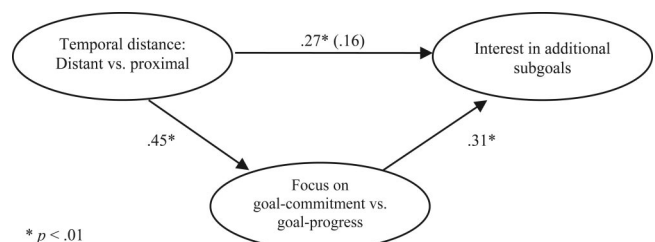

Figure 4. Path model of the influence of temporal distance on interest in additional subgoals. The number in parentheses is the zero-order standardized beta.

General Discussion

Past research has identified the importance of breaking a goal into subgoals as an adaptive means of self-regulation (cf., Carver & Scheier, 1990; Gollwitzer, 1999; Shah & Kruglanski, 2003; Vallacher & Wegner, 1987). The current investigation focused on the effect of initial subgoal pursuit on subsequent self-regulation. We proposed that the effect of subgoal attainment would change systematically when focusing on the subgoal versus the superordinate goal it is assumed to serve. When the focus is on subgoal attainment, the pursuit of the initial subgoal would hinder the selection of similar means, and failure on this subgoal would encourage selection of similar means. Conversely, when the focus is on a superordinate goal, the pursuit of an initial subgoal would increase commitment to similar means that favor the same overriding goal, whereas failure would decrease commitment to similar means. The focus on a salient superordinate goal thus would moderate the effect of subgoal attainment on subsequent self-regulation.

This self-regulatory process through subgoals was explored in four studies involving different goal domains (e.g., academic goals, health objectives) and with different experimental techniques, including hypothetical scenarios, field studies, and lab experiments. In these studies, we found consistent support for our hypothesis that, in itself, subgoals are substitutable, but they reinforce each other when the focus is on the commitment to a superordinate goal. Specifically, participants in Study 1 chose to disengage with a goal-related activity (e.g., applying sunscreen) after successfully pursuing an initial subgoal toward this aim (e.g., wearing a sun hat). This pattern was reversed when constructs representing the superordinate goal were primed outside of conscious awareness in a scrambled-sentence task.

Studies 2 and 3 extended the basic effect to real-life decisions, which involve actual success and failure at pursuing subgoals. In Study 2, participants who learned that they exercise more (vs. less) than others had a greater sense of subgoal attainment, and they were subsequently less interested in maintaining a healthy diet and exercising again. However, when the overriding goal of keeping in shape was primed, those who learned that they exercise more (vs. less) than others were more interested in maintaining a healthy diet as well as exercising again. Study 3 found that initial success (vs. failure) on a test decreased the motivation to persist on another test of the same cognitive ability, unless participants were primed with a superordinate achievement goal, which then led to greater persistence following initial success (vs. failure) on the test. These studies further found that success is more motivating when the focus is on the superordinate goal, that is, when it indicates commitment, but initial failure is more motivating when the focus is on subgoal attainment, that is, when it indicates low goal progress.

Finally, to address more closely the framing of subgoals in terms of partial goal attainment or commitment to a superordinate goal, we designed Study 4 to assess the framing of temporally proximal versus distant subgoals. Study 4 found a tendency to focus on the progress from a proximal subgoal attainment, which leads to moving away from similar subgoals, but to infer commitment from a distant subgoal attainment, which motivates pursuit of additional subgoals toward the superordinate goal.

Although previous research on cognitive consistency has documented a general tendency to choose actions that are similar to a person's previous actions (e.g., Bem, 1972; Cialdini, Trost, & Newsom, 1995), the current investigation provides evidence for both disengagement and reinforcement following initial choice. This investigation is therefore consistent with research in other domains, which provide evidence for both disengagement and reinforcement following initial actions. For example, our research is consistent with previous findings regarding the liberating effect of nondiscriminatory behaviors on subsequent discriminatory actions (e.g., Monin & Miller, 2001; Steele, 1988). In our terms, nondiscriminatory behaviors signal that the goal is met and therefore they justify incongruent, discriminatory actions. However, our analysis further implies that when individuals attribute the meaning of their initial behavior to their central values and beliefs, they are more likely to infer commitment to egalitarian values and avoid discriminatory actions. In general, our research provides a framework that can account for substitution as well as reinforcement in the regulation of multiple goals.

Implications for Research on Self-Regulatory Failures

Breaking a goal into subgoals is often an effective means of self-regulation. Relatively little is understood about subsequent behavior on actions relating to the same superordinate goal. The current research suggests that having subgoals may backfire and lead to poorer self-regulation in certain situations. For instance, we found that following initial success, students were less likely to persist on another similar academic test and that positive feedback regarding one's exercising habits reduced one's motivation to eat healthy food or exercise again that week. We believe however, that the mechanism of balancing between subgoals (cf. Dhar & Simonson, 1999; Fishbach & Dhar, 2005) allows multiple goals to be selected and pursued. Because many life situations involve striving toward multiple goals that may be inconsistent with each other (e.g., studying and traveling), it is adaptive to express a certain degree of balancing between different motivational tendencies. By making incongruent choices, individuals not only secure the pursuit of multiple personal goals but further maximize the successful pursuit of their entire goal set.

However, inconsistent actions can become maladaptive whenever individuals fail to attain important goals that are in conflict with some low-level desires or temptations (e.g., Fishbach & Trope, 2005; Loewenstein, 1996; Metcalfe & Mischel, 1999; Muraven & Baumeister, 2000). We find that in the absence of an accessible superordinate goal, individuals tend to move away from a superordinate goal following successful pursuit of a subgoal. Possibly then, when individuals naturally think in terms of subgoals attainment rather than focusing on the overriding goal, they tend to move away from a goal too quickly and in favor of immediate temptations. Such maladaptive self-regulatory patterns were documented before in research on choice bracketing (Camerer et al., 1997; Read, Loewenstein, & Rabin, 1999). For example, in one study cab drivers stopped working once they reached their subgoal for the day, even though their overall goal of making money would have been better served by working longer hours on these days (Camerer et al., 1997). This suggests that thinking purely in terms of subgoal attainment interferes with adequate self-regulation, in particular, when people mistake their subgoals

for an overriding goal such that they focus solely on the pursuit of separate actions (e.g., eating healthy today as opposed to leading a healthy lifestyle in general).

Patterns of Sequencing

This research suggests that voluntarily chosen actions can potentially elicit congruent or incongruent subsequent choices. In this respect, our findings support the notion that people seek consistency in choice sequences as well as the notion that people are driven by an inherent desire to appear flexible and variety seeking. Specifically, a number of previous studies have shared the underlying assumption that individuals are driven by a general desire to appear consistent, both in the eyes of others as well as in their own eyes (see Aronson, 1997; Bem, 1972; Cialdini, 2001; Cooper & Fazio, 1984; Steele, 1988). Moreover, researchers have assumed that behavioral consistency is desirable and rewarded by society; thus, people should prefer to pursue actions that mostly resemble their previously chosen actions. However, there are also other studies, which have attested to the inherent value of diversity or variety seeking, and these studies have found a general desire to make inconsistent choices to maximize choice variety, even in situations in which one choice alternative clearly dominates others (Loewenstein & Prelec, 1992; Thaler, 1991). On the basis of that research, people should prefer actions that are mostly different from their previously chosen actions.

Our research distinguishes between the conditions that facilitate consistency and inconsistency in choice sequences. We suggest that when the focus is on subgoal attainment, people believe that they should act differently, but when the focus is on the commitment to and identification with a superordinate goal, people believe that they should choose other consistent actions. It appears that the psychological meaning of choice matters. Rather than assuming a universal tendency to pursue consistency or diversity in choice sequence, our analysis suggests that initial actions can motivate a need for consistency as well as a need for diversity.

Finally, our research is also relevant to the study of the self-regulation of discrete actions that are spread over time from a standpoint of maximizing mental resources (e.g., Aspinwall & Taylor, 1997; Trope, Ferguson, & Raghunathan, 2001). We have explored the undermining versus motivating effect that an initial goal pursuit may have on subsequent pursuit of any action. However, it is further possible that goal pursuits influence the specific type of inconsistent actions that may follow. For example, as some goals (e.g., studying) are mentally depleting, pursuit of these goals is often followed by withdrawal and the choice of more relaxing activities (Muraven & Baumeister, 2000). On the other hand, some goal pursuits are resource fulfilling (e.g., watching a light comedy), and pursuing these goals may facilitate the pursuit of other, more effortful goals. Future research would have to examine the relationship between inconsistent goal pursuits in a sequence and their underlying principles.

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