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Counteractive evaluation: Asymmetric shifts in the implicit value of conflicting motivations

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ABSTRACT

Four studies investigate asymmetric shifts in the implicit value of goal and temptation that pose a self-control dilemma. We find that accessible goals reduce the implicit positive valence of tempting alternatives, whereas accessible temptations increase the implicit positive valence of goal alternatives. We observe these asymmetric shifts across two self-regulatory domains: healthful food consumption (vs. indulgence) and the pursuit of academic excellence (vs. leisure). These findings suggest that two conflicting motivations can exert opposite influence on each other's implicit evaluation.

Self-control dilemmas pit goals that offer long-term and global benefits against tempting alternatives that offer short-term, local benefits and interfere with the attainment of the goals. For example, for dieters to achieve their ideal weight, they must forgo culinary delights, and to do well academically, students must pass up opportunities to socialize. Self-control processes serve to secure the attainment of long-term goals when tempting alternatives are available (Baumeister, Heatherton, & Tice, 1994; Baumeister & Vohs, 2004; Gollwitzer & Moskowitz, 1996; Kuhl & Beckmann, 1985; Loewenstein, 1996; Metcalfe & Mischel, 1999; Rachlin, 1997). The question we examine in this article is how self-control processes change the value individuals assign to activities that pertain to goals and temptations. Do cues for temptation alter the evaluation of the goal? Correspondingly, do cues for the goal change the evaluation of interfering temptations? Can these evaluative changes occur outside conscious awareness? We hypothesize an asymmetric pattern of change in the value of goal- and temptation-related alternatives: Whereas goal-related cues decrease the value individuals assign to tempting alternatives, temptation-related cues increase the value they assign to goal-related alternatives. We further hypothesize that these asymmetric shifts in value can be implicit and require no conscious awareness of the self-control response.

Counteractive control

Self-control conflicts arise when temptations threaten people's ability to adhere to their goals. According to counteractive control theory, perception of such threats elicits explicit and implicit processes designed to counteract or offset the influence of the temptations (Fishbach & Converse, in press; Fishbach & Trope, 2005, 2007; Myrseth & Fishbach, 2009; Trope & Fishbach, 2000). These counteractive processes are asymmetric; that is, they undermine the strength of temptations and bolster the strength of the goal. As a result, the likelihood that the individual will resolve the self-control dilemmas in favor of the goal increases.

Counteractive control processes can alter the availability of choice alternatives as well as their mental representation, and they can take an explicit as well as an implicit form. Thus, people may decrease the strength of tempting options by decreasing their availability. For example, they may skip purchase opportunities and maintain only a small supply of cigarettes, alcohol, or fattening food, in order to secure pursuit of their health goals (Ainslie, 1992; Schelling, 1984; Thaler & Shefrin, 1981; Wertenbroch, 1998). Correspondingly, people may also increase the strength of the goal by increasing the availability of goal items. For example, people might maintain a large supply of healthy products and take advantage of purchase opportunities of such items.

Counteractive control processes modulate the representation of the choice situation through selective attention, encoding, and interpretation of the choice alternatives. For example, research shows that people form "cool," abstract, or psychologically distanced representations of temptations that serve to attenuate

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the impact of appetitive temptations on choice (Fujita, Trope, Liberman, & Levin-Sagi, 2006; Kross, Ayduk, & Mischel, 2005; Metcalfe & Mischel, 1999; Mischel & Ayduk, 2004). In addition, people may refrain from temptations by forming a psychologically close representation of goal-related items in order to increase the impact of those items on choice.

Counteractive control processes may also have an implicit mode of operation that acts to increase the strength of the goal or decrease the strength of temptations (Amodio et al., 2004; Fishbach, Friedman, & Kruglanski, 2003; Fishbach & Shah, 2006; Gollwitzer, Bayer, & McCulloch, 2005; Moskowitz, Gollwitzer, Wasel, & Schaal, 1999). These implicit processes differ from other more explicit self-control processes, which require deliberation, depend on processing resources, and characterize the conscious exertion of will (Mischel, 1996; Muraven & Baumeister, 2000; Trope & Neter, 1994; Vohs, Baumeister, & Ciarocco, 2005). For example, Fishbach et al. (2003) find that people automatically activate the representation of goal constructs in response to cues for temptations. In their studies, a subliminal presentation of temptation-related cues (e.g., the word *chocolate*) facilitated lexical decisions for concepts related to a more important goal (e.g., *diet*). If counteractive control is asymmetric, then people may also automatically inhibit competing motivations when they wish to focus on a particular goal pursuit. Indeed, in their research on goal shielding, Shah, Friedman, and Kruglanski (2002) observed that a subliminal presentation of goal-related cues interferes with lexical decisions for concepts related to competing motivations. Approach and avoidance tendencies may serve the same implicit counteractive control function. Consistent with this idea, Fishbach and Shah (2006) show that individuals in a self-control dilemma are faster to respond to goal-related words (e.g., *study*) by pulling, hence approaching (vs. pushing), and they are faster to respond to temptation-related words (e.g., *television*) by pushing, hence avoiding (vs. pulling). Thus, people can increase the motivational strength of the goal relative to temptation by implicitly approaching goal items and avoiding temptation items.

Asymmetric counteractive evaluation

The present research explores a new implicit counteractive control process, namely, implicit counteractive evaluation. Past research on implicit counteractive control has examined implicit counteractive changes in the accessibility of goals and temptations (Fishbach et al., 2003) and the approach and avoidance tendencies they elicit (Fishbach & Shah, 2006). In contrast, implicit counteractive evaluation changes the valence of goals and temptations. Importantly, the present research provides a more direct test of the asymmetry hypothesis, which requires systematic manipulation of the presence of goal- and temptation-related cues and assessment of their opposite effects on each other's valuation.

We define counteractive evaluations as asymmetric changes in the evaluative meaning of choice alternatives due to their statuses as goals vs. temptations. Counteractive control systematically alters the subjective evaluation of the available options so as to increase the motivational strength of goal-related options relative to tempting alternatives: Exposure to temptation prompts attempts to bolster the value of the goal, and exposure to a goal prompts attempts to devalue the temptation. As an example of bolstering the value of goals, a dieter who faces an opportunity to indulge in tasty but fatty food may spontaneously focus on what makes having a slim figure emotionally gratifying or socially desirable and thus temporarily boost the subjective value of dieting. Exposure to temptation may thus increase the value of the opposing goal, such that making the person aware of the costs of adhering to a goal (e.g., foregoing pleasurable alternatives) will make the goal more (rather than less) valuable.

Corresponding to an increase in the value of goals when temptations are present, the asymmetry hypothesis suggests that reminding a person of a goal renders the value of tempting alternatives less positive. Thus, the dieter will discount the value of fatty food in response to cues for the dieting goal. Although in and of themselves temptations represent desirable outcomes that people would otherwise pursue, we predict that whenever the opposing goal is salient, these tempting activities will acquire negative valence.

We argue, then, that counteractive evaluation entails asymmetric shifts in the implicit subjective value of goal and temptation. That is, temptation-related cues augment the value of the goal, whereas goal-related cues undermine the value of temptation. As a result, counteractive evaluation may render adhering to the goal more attractive than yielding to the temptation, and the individual will be more likely to resolve the initial conflict between the two in favor of the goal. In line with earlier research on implicit counteractive control, we further predict that counteractive evaluation can occur outside conscious awareness. In short, in addition to changing the accessibility of and approach-avoidance tendencies toward goals and temptations, implicit counteractive control might also change their evaluative meaning, resulting in a more positive attitude toward goals and a more negative attitude toward temptations.

The goal dependency of counteractive evaluation

Previous research on implicit counteractive control is unclear as to whether the observed activation patterns reflect pre-existing associations in memory between goals and temptations or a self-control response to an active conflict. For example, in Fishbach et al.'s (2003) studies, the activation of goal by temptation (e.g., *chocolate* primes *diet*) could have reflected memory traces of previous self-control processes of resisting temptations by elaborating on an overriding goal. Alternatively, the activation of goal by temptation could have reflected an active response of resisting temptations by increasing the accessibility of the goal.

We suggest that asymmetric shifts in value are a counteractive self-control response to an active conflict rather than memory traces. Therefore, these shifts in values should occur only while the individual experiences a self-control conflict and not after the conflict is resolved. Because the self-control conflict ends after the goal is completed (Förster, Liberman, & Higgins, 2005), reminding a person of the goal should not result in a more negative evaluation of competing temptations, and exposure to temptations should not result in augmenting the value of the completed goal.

This analysis is consistent with research on goal-driven implicit evaluations (Brendl, Markman, & Messner, 2003; Custers & Aarts, 2005; Ferguson, 2007; Ferguson & Bargh, 2004), which shows that goals influence the implicit value of related objects or actions only when they have high priority for the individual. For example, Ferguson and Bargh (2004) observed that thirsty participants automatically evaluated words related to drinking (e.g., *water*, *juice*) as relatively more positive than goal-irrelevant words, but this positive evaluation persisted only as long as participants did not quench their thirst. Custers and Aarts (2005) find that such implicit positivity increases efforts toward goal completion. Participants who associated goal states with implicit positive evaluations were more likely to select objects related to satisfying these goals than were participants who established no such association. Notably, although participants in these studies were aware of their goal states, they were unaware of the implicit evaluative patterns that enabled them to regulate and ultimately reach these end states. Those in a self-control dilemma might similarly be aware of the goal they wish to achieve or the temptations they would need to resist to reach that goal, but the downstream evaluative patterns

that enable them to successfully regulate will remain outside of conscious awareness. In particular, we predict that regardless of whether a person is aware of the self-control problem, she will not be aware of the counteractive response that maintains the motivational strength of the goal when facing temptations.

To summarize, although temptations themselves are positively-valence motivational states, we expect them to acquire a negative implicit value in the presence of cues for conflicting goals. For example, watching television or going to a party are positive activities that will acquire negative implicit value when students are cued with more important academic goals. In addition, we expect goals to acquire a more positive implicit value in the presence of interfering temptations. For example, when students are cued to consider watching television or going to a party, they may boost the value of the more important academic goals. Although our focus is on the evaluative patterns of goals and temptations rather than the downstream consequences of these evaluations, we assume these evaluations are instrumental in steering behavior toward the more positively valued alternatives (see Petty, Fazio, & Briñol, 2008; Wittenbrink & Schwarz, 2007; for the implicit evaluation-behavior link).

The present research

We assess the implicit value of concepts related to goals and temptations using an evaluative priming paradigm (Bargh, Chaiken, Govender, & Pratto, 1992; Fazio, Jackson, Dunton, & Williams, 1995; Fazio, Sanbonmatsu, Powell, & Kardes, 1986). In this paradigm, the value of a mental construct is inferred by the extent to which related concepts facilitate response time to affective (positive or negative) concepts in a sequential priming procedure (Bargh, Chaiken, Raymond, & Hymes, 1996; Bargh et al., 1992; Fazio et al., 1986, 1995; Neely, 1977). Research on evaluative priming demonstrates that less time is needed to categorize a target stimulus as positive or negative when a concept with the same valence precedes the stimulus (Fazio et al., 1995). Thus, we can assess the implicit value of goal- and temptation-related concepts by observing the difference between the times individuals take for categorizing positive and negative target words after their subliminal presentation. Specifically, in our studies, we first manipulate the accessibility of either the goal (Studies 1–2 and 4) or the temptation (Study 3) and then measure the implicit value of concepts related to the goal and the temptation in an evaluative priming task.

Four studies test for the counteractive evaluation hypothesis. Study 1 examines whether an increase in the accessibility of an achievement goal leads to a decrease in the implicit value of leisure temptations. Study 2 tests for a similar effect of a weight-watching goal, namely, whether its accessibility is associated with an implicit negative evaluation of fattening foods among dieters (vs. non-dieters). Study 3 examines the other side of the asymmetric pattern, namely, the effect of accessible temptations on bolstering the implicit positive value of concepts related to a conflicting goal. We study this effect in the domain of healthy eating and overcoming food temptations. Finally, Study 4 addresses the instrumental nature of counteractive evaluation by examining whether implicit counteractive evaluation depends on the goal being ongoing vs. completed.

Study 1: achievement goals render leisure temptations more negative

Study 1 examined whether college students with an accessible (vs. inaccessible) achievement goal evaluate leisure activities more negatively. We activated the achievement goal by supraliminally priming concepts related to academic achievement (vs. control concepts) in a scrambled-sentence task (Bargh & Chartrand, 2000). We then measured the implicit value of concepts related to academic goals and leisure temptations in an evaluative priming task.

Method

Participants

Participants were 58 University of Chicago undergraduate students (35 women, 23 men) who completed the study in an experimental lab for monetary compensation.

Procedure

This study used an achievement goal accessibility (high vs. low) × target of evaluation (academic vs. leisure) factorial design. The first factor varied between subjects, and the second factor varied within subjects. The dependent variable was response time on the evaluative priming task. Participants arrived in the lab for a "verbal reasoning" study, which consisted of two (presumably separate) parts: The first part required participants to complete a scrambled-sentence task, and the second part was a lexical categorization task. Each participant sat individually in front of a desktop computer used for both parts.

The first part of the experiment manipulated goal accessibility. A scrambled-sentence task temporarily increased the accessibility of the achievement goal outside of participants' conscious awareness (Bargh & Chartrand, 2000; Srull & Wyer, 1979). In each of 17 scrambled sentences, participants' task was to select four words from a set of five to form a coherent and meaningful sentence. Twelve sentences in the task contained achievement-related words (high accessibility) or corresponding control words (low-accessibility). For example, participants in the condition of high-achievement accessibility unscrambled sentences such as "they finally achieved liberty," "he seems very ambitious," and "she gives excellent speeches." Participants in the condition of low-achievement accessibility unscrambled sentences such as "they finally gained liberty," "he seems very shy," and "she gives mediocre speeches." The five filler sentences (e.g., "the sky is grey") were identical in both conditions.

After completing the task, participants moved onto the second part of the study, which constituted an evaluative priming task. In this part, we assessed the time for categorizing affective (positive and negative) targets following subliminal academic and leisure prime words. We used 17 academic primes: books, campus, classroom, college, degree, desk, graduate, lecture, library, paper, professor, project, reading, school, student, teaching and notebook, and 17 leisure primes: bar, beach, beer, chat, downtown, drinking, escape, movie, partying, playing, socialize, sunny, television, travel, trip, vacation and video. Each prime word was presented in four trials. The task included 136 experimental trials, preceded by four practice trials, half of which had academic primes and half of which had leisure primes. We used an equal number of positive and negative target words (e.g., love, peace, and flower vs. cancer, evil, ugly). Overall, the task presented an equal number of trials in each prime–target combination.

Each trial consisted of a fixation point (a plus sign) presented at the center of the screen for 300 ms. Participants were asked to focus their attention on this sign. The fixation point was then replaced by a prime word presented for 20 ms, which was then replaced by a masking string (a row of Xs) presented for 720 ms to ensure that the prime did not reach the threshold of conscious perception (Bargh & Chartrand, 2000). The target word was then presented and remained until participants responded (resulting in an SOA of 740 ms). Participants' task was to classify the target words as either good or bad, using the "Z" and "/" keys, respectively. Each response was followed by a 700 ms pause before the next trial began. Incorrect responses were followed by a red " × " sign that remained on

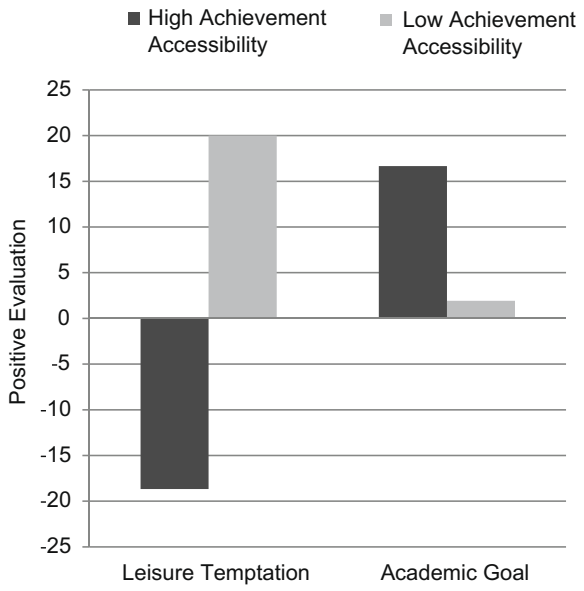

Fig. 1. Implicit evaluation of academic and leisure activities as a function of achievement accessibility (Study 1). *Note:* Positive evaluation scores indicate faster responses to positive targets compared with negative targets following a prime; a higher score reflects greater positivity toward the primes.

the screen until the participant provided a correct response (these responses were not included in subsequent analyses). Experimenters debriefed the participants upon completion of this task and probed them for possible suspicion. No participants reported recognizing the subliminal primes presented in the evaluative priming task.

Results and discussion

Participants committed few errors in making judgments about the target words.[1] Because the latency of incorrect responses would be difficult to interpret, we used only correct responses in all subsequent analyses (see Bargh et al., 1992; Fazio, 1990; Fazio et al., 1995). To lessen the influence of typical positive skew, we first transformed all individual reaction times using a natural log transformation; we excluded them if they exceeded more than three standard deviations from the cell mean (Bargh & Chartrand, 2000; Fazio, 1990). For the sake of clarity, we report the results in ms.

We computed participants' evaluative scores to reflect their automatic evaluations of the academic goal and the leisure temptation primes. Specifically, we subtracted participants' response times to the positive targets that followed the prime from their response times to the negative targets that followed the prime to obtain an evaluative score for the academic or leisure prime. This score indicates how quickly participants responded to positive targets compared with negative targets following a prime; a higher score reflects greater positivity toward the primes (see also Ferguson, 2007).

An ANOVA of participants' evaluative scores yielded the predicted achievement accessibility × target interaction, $F(1, 56) = 10.27$, $p < .01$. No other main effect emerged in this analysis (see Fig. 1). Subsequent contrast analyses revealed that high-achievement accessibility increased the negative valence of leisure concepts ($M = -18.69$) compared with low-achievement accessibility ($M = 20.00$), $t(56) = 2.62$, $p < .05$. Participants' evaluations of academic primes in the high-achievement accessibility ($M = 16.69$) and low-achievement accessibility ($M = 1.93$) conditions did not significantly differ; if anything, they were directionally more positive in the former condition, $t(56) = 1.30$ ns.

In support of our hypothesis, we find that when the goal of academic achievement is made accessible, the implicit value of leisure concepts decreases. This finding provides initial evidence for implicit counteractive evaluation in showing that individuals evaluate temptations more negatively when their overriding goal is made accessible, to protect their accessible goal. Notably, we also find that an accessible goal negatively impacts the value of conflicting temptations more than it positively impacts its own evaluation, as participants did not express a more positive evaluation of achievement-related concepts in the high (vs. low) accessibility condition. This result is consistent with previous research showing that devaluation of alternatives often exceeds the boost in valuation of a focal goal (Brendl et al., 2003).

In Study 1, we examined the effect of an unconscious goal on implicit devaluation of temptations. In the following study, we examine whether a conscious goal has similar effect on implicit devaluation of temptations. The goal domain in this study is weight-watching. The question is whether dieters who are committed to the goal of healthy eating implicitly devalue food temptations when reminded of their dieting goal.

Study 2: weight-watching renders food temptations more negative

Although fattening foods are often attractive and gain positive valence (Bargh et al., 1992; Fazio et al., 1986; Glaser & Banaji, 1999; Neumann & Strack, 2000), habitual dieters may nonetheless wish to avoid these foods, and may be able to do so, in part, by activating negative evaluations when prompted with these stimuli. In the current study, dieters and non-dieters with an accessible dieting goal completed an evaluative priming task that measured their implicit evaluation of concepts related to fattening foods (e.g., *candy*, *cake*) and weight-watching (e.g., *diet*, *slim*). We predict an implicit more negative evaluation of food stimuli (but not of weight-watching stimuli) among dieters compared with non-dieters.

Method

Participants

Seventy-three University of Chicago undergraduate students (39 women and 34 men) participated in the study for monetary compensation. We recruited only those who reported in a screening survey that their actual weight was above their ideal weight. Therefore, they could potentially be committed to a dieting goal.

Procedure

This study used a commitment to dieting (dieters vs. non-dieters) × target of evaluation (fattening food vs. weight-watching) factorial design. The first factor varied between subjects, and the second factor varied within subjects. The dependent variable was the response time on the evaluative priming task. The study consisted of two allegedly unrelated parts that were completed on desktop computers.

The first part assessed commitment to dieting while increasing the accessibility of the goal for everyone. Participants completed a subscale of the restrained-eating scale (Polivy, Herman, & Warsh, 1978). This scale assesses commitment to dieting and weight fluctuations. We administered only the subscale that measures commitment to dieting (e.g., "How conscious are you of what you are eating?" "How often are you dieting?"). Completion of these items further activated the weight-watching goal. As in previous studies,

[1] The average error rate for the evaluative priming tasks' trials was 6.7% in Study 1, 5.5% in Study 2, 4.4% in Study 3, and 2.7% in Study 4.

we classified respondents as committed dieters vs. non-dieters on the basis of a median split (e.g., Boon, Stroebe, Schut, & Ijntema, 2002; Polivy et al., 1978), though we also analyze the continuous scores.

The second part of the experiment included an evaluative priming task similar to the one Study 1 uses. Participants read that this was an unrelated "category judgment task." We measured the time for sorting positive and negative targets following subliminal food and diet primes. The prime stimuli were either five words related to high-calorie food (*chocolate*, *cake*, *cream*, *chips*, and *sweet*) or five words related to weight-watching (*slim*, *diet*, *thin*, *fitness*, and *exercise*). The target stimuli included positive and negative words (similar to those used in Study 1).

The task included 40 trials preceded by six practice trials and used an equal number of food and weight-watching primes (each appeared four times) and an equal number of positive and negative targets. Each trial consisted of a fixation point presented for 300 ms, a prime word presented for 30 ms, a masking string presented for 720 ms, and a target word remaining until participants responded (resulting in an SOA of 750 ms). Each response was followed by a 700 ms pause before the next trial began. Incorrect responses were clearly marked until participants provided a correct response. In their debriefing, none of the participants reported recognizing the subliminal primes presented in the evaluative priming task.

Results and discussion

We followed the procedure Study 1 describes in computing evaluative scores; they reflect the positivity toward the fattening food primes and toward the weight-watching primes. An ANOVA of the evaluative scores yielded the predicted dieting orientation × target of evaluation interaction, $F(1, 71) = 11.33$, $p < .01$. No main effect emerged in this analysis. Fig. 2 displays the results.

Contrast analyses revealed that dieters evaluated fattening food more negatively ($M = -30.62$) than non-dieters ($M = 35.56$), $t(71) = 3.88$, $p < .001$. In contrast, dieters evaluated weight-watching similarly to and slightly more positively ($M = 17.85$) than non-dieters ($M = -2.64$), $t(71) = .83$ ns. In support of our hypothesis, an accessible dieting goal was associated with a more negative implicit evaluation of fattening food stimuli among dieters compared with non-dieters. Hence, only those who are committed to an accessible goal protect its motivational strength by devaluating temptations. Consistent with our previous results, holding a dieting goal resulted in negative evaluation of tempting foods more than a boost in the evaluation of the weight-watching goal, which was similarly positive for dieters and non-dieters.

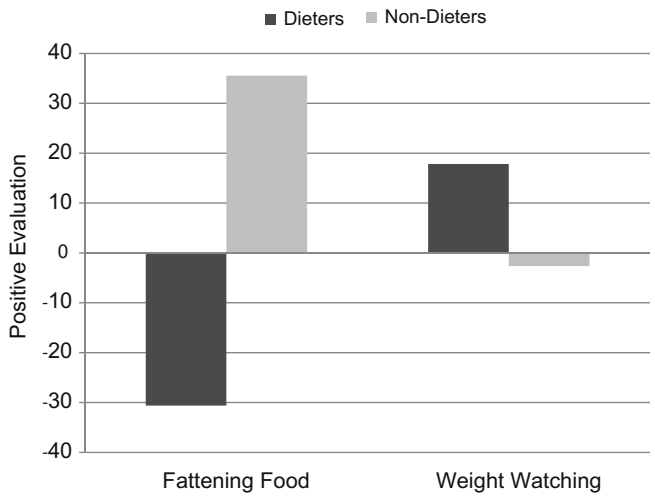

Fig. 2. Implicit evaluation of fattening food and weight-watching stimuli as a function of dieting orientation (Study 2).

Further analysis tested the relationship between the continuous score on the commitment to dieting scale and (a) the implicit evaluation of fattening food and (b) the implicit evaluation of weight-watching. A regression of the dieting score on these two variables revealed a significant effect for fattening food, $\beta = -.31$, $t(1, 72) = 2.69$, $p < .01$, and a directional effect for weight-watching, $\beta = .18$, $t(1, 72) = 1.60$, $p = .11$. Thus, commitment to an accessible dieting goal is associated with an implicit negative evaluation of fattening food and, to a lesser extent, with an implicit positive evaluation of weight-watching.

The results of Study 2 conceptually replicate Study 1 in a different goal domain. We believe that the finding that dieters, compared to non-dieters, show more negative implicit evaluations of tasty but fattening food reflects counteractive evaluation. That is, food temptations threaten to thwart dieters' chronically accessible weight-watching goal. Exposure to these temptations, therefore, elicits counteractive undermining of the value of these otherwise positive stimuli. However, it should be noted that unlike Study 1, the present study did not experimentally manipulate participants' goals. Dieters' negative evaluation of food temptations might therefore be the cause rather than the effect of their motivation to diet. We think this interpretation is not plausible because individuals who do not like fatty foods are likely to be less concerned rather than more concerned about watching their weight. Individuals who do like fatty foods are more likely to become overweight, and their negative implicit evaluations of those foods might reflect the counteractive control process they engage in when reminded of their goal to lose weight.

Taken together, the first two studies establish the effect of accessible goals on counteractive undermining of the value of interfering temptations. The second part of our counteractive evaluation hypothesis concerns the effect of temptations on the evaluation of goals. We predict that reminding individuals of interfering temptations will render the conflicting goals more positive. To test this hypothesis, the next study examines whether increasing the accessibility of food temptations leads to an increase in the positive value of healthy eating.

Study 3: food temptations render healthy eating more positive

We examined the effect of accessible temptations on counteractive evaluation of goals in the domain of healthy eating and resisting food temptations. All the participants in Study 3 wanted to lose weight. We manipulated the accessibility of food temptations by presenting images of fattening foods (vs. neutral images) before assessing participants' implicit evaluation of concepts related to healthy and unhealthy eating. We expected that accessible food temptations would result in a more positive evaluation of concepts related to healthy eating (but not unhealthy eating).

Method

Participants

Thirty-nine undergraduate students from the University of Chicago (27 women, 12 men) completed the study for monetary compensation. We only included participants who indicated on a screening survey that they would like to lose weight.

Procedure

This study used an accessibility of unhealthy food (high vs. low) × target of evaluation (healthy vs. unhealthy eating) factorial design. The first factor varied between subjects, and the second

factor varied within subjects. Similar to the previous studies, the dependent variable was response time on the evaluative priming task. Participants were invited to an experiment comprised of two separate tasks delivered on desktop computers.

The first task manipulated the accessibility of food temptations. For this purpose, we presented unhealthy food images as part of a task that presumably examined "color perception." In this task, participants saw 18 pictures depicting various objects and were instructed to judge how difficult differentiating the target object from its background in each presented picture was (7-point scale, 1 = *very easy*; 7 = *very difficult*). In the high accessibility condition, 9 of the 18 presented pictures depicted unhealthy but tempting food items (these included chocolate, thin cut steak with potato, pieces of fried chicken, coffee with whipped cream on top, grilled meat and shrimp, pepperoni pizza with cheese, juicy steak with wine, three-ball ice-cream, and layered chocolate cakes). The corresponding pictures in the low-accessibility condition showed control items that were irrelevant to food or health (e.g., hammers, lamp). The remaining pictures featured neutral items unrelated to food or health and were identical for both conditions.

Participants then moved to a second, supposedly unrelated experiment on "verbal reasoning." They completed an evaluative priming task. Similar to previous studies, their task was to categorize affective (positive and negative) targets following subliminal primes. We used 17 healthy primes (apple, broccoli, cabbage, carrot, celery, cereal, fruit, grain, grape, healthy, lean, lettuce, orange, salad, tomato, vegetable and yogurt) and 17 unhealthy primes (bacon, burger, butter, candy, cheddar, cheese, chips, chocolate, coke, cookie, cream, fries, ice-cream, meat, pizza, soda and steak). The task included 136 experimental trials and had an equal number of healthy and unhealthy primes and an equal number of positive and negative targets. Each trial consisted of a fixation point presented for 300 ms, a prime word presented for 20 ms, a masking string presented for 720 ms, and a target word that remained until participants responded (resulting in an SOA of 740 ms). Each response was followed by a 700 ms pause before the next trial began. In their debriefing, none of the participants reported recognizing the subliminal primes in the evaluative priming task.

Results and discussion

We followed the procedure Study 1 describes in computing evaluative scores for healthy and unhealthy foods. An ANOVA of these evaluative scores yielded the predicted temptation accessibility (accessible vs. control) × target of evaluation (healthy vs. unhealthy eating) interaction, $F(1, 37) = 8.97$, $p < .05$. No main effect emerged in this analysis.

As shown in Fig. 3, participants expressed a more positive evaluation of concepts related to healthy eating when the accessibility of unhealthy foods was high ($M = 44.60$) compared with low ($M = 3.92$), $t(37) = 2.00$, $p = .05$. In addition, participants expressed a more negative evaluation of concepts related to unhealthy foods when the accessibility of this category was high ($M = -4.29$) compared with low ($M = 23.63$), $t(37) = 2.14$, $p < .05$.

In Study 2, dieters expressed a more negative evaluation of food temptations in response to accessible dieting goals. In the present study, dieters expressed a more positive evaluation of healthy eating in response to accessible food temptations. Together, these studies demonstrate the asymmetry of counteractive evaluation, namely, a devaluation of temptations in response to goals and a more positive evaluation of goals in response to temptations. It is worth pointing out a potentially interesting difference between the effect of accessible temptation and goals. The present study shows that accessible temptations both boost the implicit value of the goal and undermine the implicit value of temptations. By contrast, Studies 1 and 2 show that accessible goals undermine temptations but only slightly boost the goal. Accessible temptations might therefore promote counteractive evaluation more than accessible goals. We elaborate on this possibility in the General Discussion.

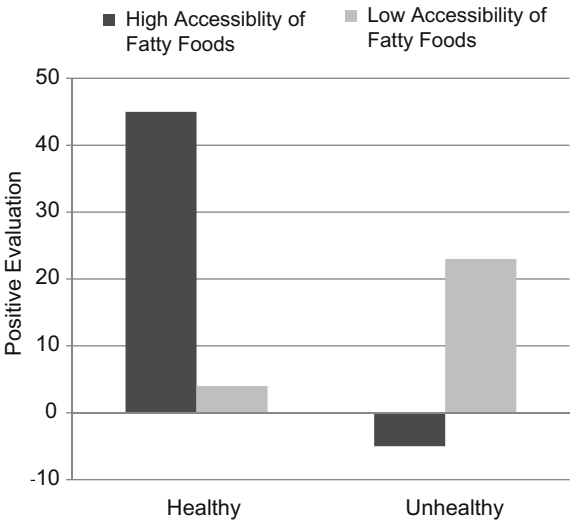

Fig. 3. Implicit evaluation of concepts related to healthy and unhealthy eating as a function of accessibility of fattening foods (Study 3).

Thus far, our studies document asymmetric changes in implicit evaluation as a result of activating goals or temptations. We assume these asymmetric evaluative patterns represent a self-control response, designed to secure the motivational strength of the goal rather than representing memory traces of a previously formed association. It follows that once the goal is completed and counteractive evaluations cease to have an instrumental role, the observed evaluative patterns should diminish. To test this prediction, in the next study, we assess whether only ongoing goals (vs. completed goals) are associated with devaluation of temptations. Specifically, we seek to demonstrate that college students devalue leisure activities when they are reminded of their ongoing academic goals but not when they are reminded of their completed academic goals in high school.

Study 4: ongoing vs. completed goals

We manipulated the accessibility of ongoing vs. completed goals by asking college students to elaborate on their present academic goals in college vs. academic goals they held in high school. We then assessed their implicit evaluation of concepts related to academic and leisure activities. In this design, the status of the accessible goal varied across conditions but the object of evaluation (academic and leisure) was constant. We predicted that accessible ongoing academic goals will result in more negative evaluation of leisure temptations (but not of academic goals) compared with accessible completed academic goals.

Method

Participants

Ninety-two undergraduate students from the University of Texas (47 women, 45 men) completed the study for extra course credit. We only included participants who indicated on a screening survey that their current grade point average was above 2.0. We employed this criterion to ensure that participating students were at least moderately skillful at adhering to their academic objectives, partially due to the operation of self-control.

Procedure

This study used a status of accessible academic goals (ongoing vs. completed) × target of evaluation (academic vs. leisure) factorial design. The first factor varied between subjects, and the second factor varied within subjects. Similar to the previous studies, the dependent variable was response time in the evaluative priming task.

An experimenter informed participants that they would be completing two separate tasks on desktop computers. The first task manipulated the status of the academic goals. Because participants were all undergraduate college students, we used present college classes to activate an ongoing academic goal and high school classes to activate a completed academic goal. Participants in the ongoing goal condition received a survey on their coursework this semester. They read that the researchers examine classes that are popular on campus. They were asked to list two classes they were taking this semester and the names of the professors teaching these classes. They then selected one of these two classes and described (1) the content and (2) the importance of the class. Participants listed contents such as "words and grammars of Latin," "basic principles of financial accounting," and "introduction to marketing and advertising management." In terms of class importance, they wrote, for example, "because it is required for my major," "it is needed for other classes," and "it is required for my desired job." The rest of the participants in the completed goal condition completed a survey on their coursework in high school. They read that the researchers examine classes students took in high school. They were asked to list two classes they took in high school and the name of the teachers who taught the classes. The participants then described (1) the content and (2) the importance of one of these classes. They listed content such as "integrated math" and described this class as important because it was "required to get into college." As a result of this manipulation, participants who were all pursuing a college degree either considered ongoing academic goals or completed ones.

After completing the survey, participants moved to a second, supposedly unrelated study on "verbal reasoning." They competed an evaluative priming task, similar to the one Study 1 describes, although this task included academic and leisure primes that are equally part of students' experience in college and in high school. Specifically, we used the following academic primes: *books, campus, classroom, exam, degree, desk, graduate, lecture, library, paper, professor, project, reading, school, student, teaching* and *notebook*; and the following leisure primes: *beach, chat, downtown, fun, game, movie, music, partying, playing, pool, relax, socialize, sunny, television, travel, trip* and *video*. Participants' task was to categorize affective (positive and negative) targets following subliminal academic and leisure primes. Again, the task included 136 experimental trials with an equal number of academic and leisure primes and an equal number of positive and negative targets. Each trial consisted of a fixation point presented for 300 ms, a prime word presented for 20 ms, a masking string presented for 720 ms, and a target word remaining until participants responded (resulting in an SOA of 740 ms). In their debriefing, none of the participants reported recognizing the subliminal primes in the evaluative priming task.

Results and discussion

We followed the procedure Study 1 describes in computing evaluative scores for academic and leisure stimuli. An ANOVA of participants' evaluative scores yielded the predicted goal (ongoing vs. completed) × target of evaluation (academic vs. leisure) marginally significant interaction, $F(1, 90) = 3.65$, $p < .06$. No main effect emerged in this analysis. The means appear in Fig. 4.

Contrast analyses revealed that participants expressed a more negative evaluation of leisure temptations when the ongoing academic goal was accessible ($M = 6.69$) than when the completed academic goal was accessible ($M = 31.34$), $t(90) = 2.50$, $p < .05$. In contrast, participants' evaluation of academic primes was similar when the ongoing academic goal ($M = 18.16$) and the completed academic goal ($M = 20.32$) were accessible, $t(90) = .22$ ns, suggesting that evaluations of academic activities were similarly positive, regardless of the status of the goal (ongoing vs. completed).

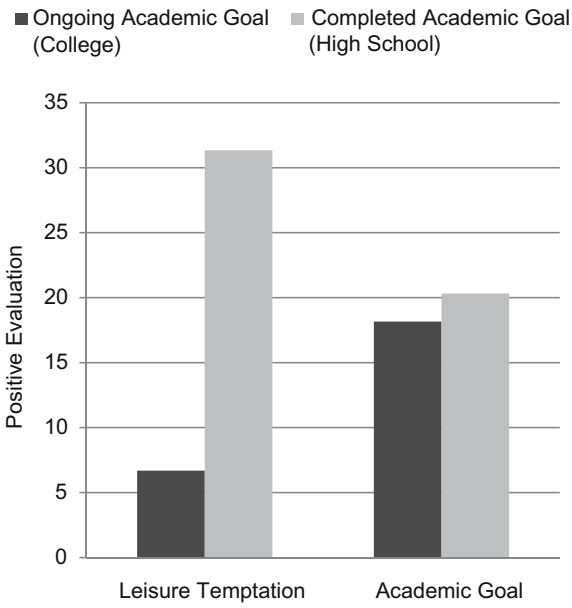

Fig. 4. Implicit evaluation of academic and leisure activities as a function of the status of academic goal: ongoing vs. completed (Study 4).

We find that an increase in the accessibility of an ongoing (vs. completed) academic goal leads to a more negative implicit evaluation of conflicting leisure temptations. These results demonstrate the instrumental nature of counteractive evaluations by showing that the value of targets is altered only when they pose a self-control problem. When the goal is completed and the targets no longer pose a self-control dilemma, counteractive evaluations cease.

General discussion

Self-control dilemmas are goal conflicts in which the pursuit of important goals comes at the expense of forgoing tempting alternatives (Ainslie, 1992; Loewenstein, 1996; Metcalfe & Mischel, 1999; Rachlin, 1997). In order to promote self-control success, individuals engage in asymmetric counteractive evaluation wherein cues for temptations increase the value of goals and cues for goals decrease the value of temptations. These evaluative shifts can take an implicit, non-conscious form. That is, regardless of whether individuals are aware of the self-control conflict, they are often unaware of their counteractive evaluations that facilitate success.

We find consistent support for asymmetric counteractive evaluation across four studies and in two self-regulatory domains: healthy eating and the pursuit of academic excellence. In Study 1, increasing the accessibility of concepts related to achievement resulted in a negative evaluation of concepts related to interfering leisure activities. Similarly, in Study 2, increasing the accessibility of weight-watching goals among dieters resulted in a negative evaluation of concepts related to fattening foods. In Study 3, increasing the accessibility of unhealthy foods resulted in a positive evaluation of concepts related to healthy eating. Finally, in Study 4, the activation of an ongoing academic goal produced more negative evaluation of leisure temptations than did the activation

of a completed academic goal. Together, these studies provide converging evidence for asymmetric counteractive evaluation—an evaluative pattern that enables people to maintain the motivational strength of a goal when facing temptation.

Related conceptualizations

We assume these asymmetric evaluations reflect a motivational, self-control response; alternatively, they might also reflect comparative judgments that are perceptual and non-motivational (Dijksterhuis et al., 1998; Hsee, Loewenstein, Blount, & Bazerman, 1999; Mussweiler, 2003; Simonson & Tversky, 1992). According to this alternative account, goals are a priori superior to temptations, and because of perceptual contrast, whenever people contrast goals against temptations, the goals seem relatively more valuable and the temptations relatively less valuable. However, such perceptual contrast interpretation would assume a greater change in the values of goals and temptations when the discrepancy between their initial values is relatively large. Contrary to this interpretation, our counteractive control analysis would assume a greater change in the values of goals and temptations when the difference in initial value between the two is relatively small, because similarly valued options pose a self-control dilemma. In support for the counteractive control prediction we found, for example, that when temptations are available they become less valuable (Myrseth, Fishbach, & Trope, 2009).

Furthermore, Study 4 supports the motivational nature of the changes in value by demonstrating that implicit counteractive evaluation depends on whether the activated goal is ongoing or completed. We find that activation of ongoing academic goals renders leisure temptations more negative, whereas the activation of completed academic goals does not have a similar effect. Therefore, the mere perceptual contrast between co-activated goals and temptations cannot account for our findings. Instead, we suggest that counteractive implicit evaluation is an instrumental response designed to maintain the motivational strength of an important goal when a person experiences a self-control conflict. Because completed goals do not conflict with temptations, no self-control operations will be activated and the pattern of counteractive evaluation dissipates.

Value might also reflect post-choice dissonance reduction (Aronson, 1997; Cooper & Fazio, 1984; Festinger, 1957). People might experience forgoing a tempting option as a costly consequence of goal adherence and therefore engage in dissonance reduction attempts. Thus, one could argue that evaluative bolstering in response to temptations reflects attempts to justify a costly course of action rather than counteractive self-control. Note, however, that dissonance reduction and counteractive evaluation differ in whether they refer to a process that precedes a course of action or follows a course of action. Whereas dissonance reduction is a post-action process of justifying a course of action that has already been enacted, counteractive evaluation is a proactive process that occurs before an action is undertaken. In our studies, participants altered their evaluations without committing to any specific options. They are therefore unlikely to have experienced any post-choice dissonance and were attempting to reduce it. Instead, participants altered the value of options to ensure that they resist temptations in favor of the goals. We further assume that after completing the goal, counteractive evaluation becomes unnecessary and therefore should diminish. Consistent with our view, we find in Study 4 that counteractive evaluations are less likely to be activated once the goal is completed and increasing its motivational strength no longer has any instrumental value.

Our findings are consistent with prior research showing that subjective value is context dependent and flexibly attuned to people's current motivational states (Brendl et al., 2003; Custers & Aarts, 2005; Ferguson, 2007; Ferguson & Bargh, 2004). For example, Ferguson and Bargh (2004) show that activating a goal enhances the value of goal-facilitating objects. The current studies on interfering goals (i.e., temptations) add to previous research by suggesting the effect of activating one goal depends on its relationship to another, potentially more important goal. If the activated goal conflicts with another, more important goal, and hence acquires the status of a temptation, counteractive evaluation will boost the evaluation of objects that are incongruent rather than congruent with the initially activated goal. For example, activating the motive to watch television enhances the value of facilitative activities such as reading the TV guide, unless another more important goal exists (e.g., studying for an exam), in which case activating the motive to watch television enhances the value of activities congruent with the overriding academic goal (e.g., reading a textbook). Similarly, activating the goal of eating a fattening snack can boost the evaluation of eating vegetables when a more important dieting goal is in place.

Behavioral implications

Although the focus of our investigation is on value and, specifically, on implicit evaluations, these implicit evaluations have repercussions for behavior as well (see Petty et al., 2008; Wittenbrink, 2007). People approach stimuli associated with positive evaluations and avoid those associated with negative evaluations (Aarts, Custers, & Holland, 2007; Custers & Aarts, 2005; Dijksterhuis, 2004; Ferguson, 2007). We recently applied these findings to the self-control domain by experimentally inducing an implicit positive evaluation of health-related primes (e.g., *diet*, *thin*, and *fitness*) and negative evaluation of unhealthy primes (*chocolate*, *cake*, and *chips*). As a result of this manipulation, participants were subsequently more likely to select a health-promoting hotel (which offered "state-of-the-art recreational facilities") over another hotel (which offered "three award-winning restaurants") for a vacation, and they further indicated greater intention to exercise than participants for whom such implicit associations were not induced (Fishbach, Zhang, & Trope, 2009). By increasing the value of goals relative to temptations, therefore, counteractive implicit evaluations may possibly act to increase the likelihood of adhering to goals.

Importantly, we do not suggest that exposure to temptation necessarily results in overall greater adherence to a goal by boosting its value. In itself, exposure to temptations decreases the likelihood of adhering to the goal, and only through the exercise of self-control can exposure to temptation increase the strength of the goal and goal adherence. Therefore, whether the net effect of exposure to temptation is enhanced or diminished goal adherence depends on whether the self-control temptations trigger is sufficient to offset the direct negative impact of those temptations on goal adherence. The greater the bolstering, the more likely exposure to temptation will result in goal adherence. Ironically, then, people may at times be better able to adhere to their goals when they confront temptations (vs. not), as long as the counteractive operations not only offset but further exceed the direct negative effect of the temptations.

The present research documents changes in the valence of both goals and temptations, which raises the question which one of the two counteractive processes, boosting the goal or devaluing the temptation, is more important for successful self-control. A counteractive control approach would suggest that increasing the valence of goals in response to temptation cues may be more important for effective goal adherence than decreasing the valence of temptations in response to goal cues, because temptations also increase the accessibility of the goals whereas goals decrease the accessibility of temptations (Fishbach et al., 2003). That is, given

that counteractive control renders the goal more accessible and the temptation less accessible, boosting the value of the accessible goal should occur more often and is more effective than devaluing the less accessible temptation.

Implicit and explicit self-control

The implicit counteractive evaluations we observed suggest that not all self-control operations are effortful and conscious. Although these implicit evaluations might be formed in response to an explicit and conscious self-control conflict, they enable people to exert self-control without conscious awareness, and possibly without depleting their processing and motivational resources. Exercising self-control is often conscious and effortful (Muraven & Baumeister, 2000; Trope & Neter, 1994; Vohs et al., 2005). However, the implicit mode of operation documented in the present research exemplifies a self-control process that requires relatively little mental resources. Investigating both modes of operation would provide a more complete view of self-control and would likely require a revision of the view that self-control is inherently difficult and bound to fail.

Our findings also shed new light on the relationship between implicit and explicit evaluations of the competing motivations in a self-control dilemma. Self-control is typically viewed as of overcoming the implicit value of temptations. In this view, goals have more positive explicit value but less positive implicit value than temptations. For example, healthy food (e.g., vegetables) has more explicit positive value but less implicit positive value than unhealthy food (e.g., chocolate). In this view, self-control increases the explicit value of the goal relative to the implicit value of competing temptations. In contrast with this view, we find that in the course of exercising self-control, goals (e.g., eating healthy) acquire implicit positive value and may even become implicitly more positive than temptations (e.g., eating unhealthy). Under these circumstances, the implicit value of the competing goals and temptations is congruent with individuals' global interests and would facilitate rather than hinder successful self-control. Investigating situations in which implicit evaluations serve a self-control function vs. situations in which self-control serves to overcome the impact of implicit evaluations on behavior promises to be a worthwhile direction for further research.

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