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“Instant Success”: Turning Temptations Into Cues for Goal-Directed Behavior

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and Denise T. D. De Ridder¹

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Abstract

Contrary to lay intuition, counteractive control theory posits that tempting food cues can help individuals to act in accordance with their long-term dieting goal. However, studies have shown that temptations trigger goal-directed behavior only in successful but not in unsuccessful self-regulators. The aim of the present study was to test whether it is possible to create facilitated temptation–goal associations in unsuccessful dieters using implementation intentions (e.g., “If I see or smell chocolate then I will follow my goal to diet”) and whether this indeed stimulates more successful self-regulation. It was found that implementation intentions linking a temptation to a dieting goal lead to self-perceived improved resistance to (Study 1) as well as reduced consumption (Study 2) of tempting snacks compared to a control condition. Moreover, Study 2 revealed that the reduced snack consumption was indeed related to facilitated temptation–goal associations in participants who had formed implementation intentions.

Keywords

counteractive control, temptations, diet, implementation intentions, goals

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Whether or not someone will be successful at long-term goal attainment is largely dependent on his or her ability to deal with interfering temptations (e.g., resisting a tempting chocolate cake when trying to lose weight). By definition, temptations are in conflict with a long-term goal while at the same time hedonically appealing (e.g., Kroese, Evers, & De Ridder, 2011). Ample literature has documented how the presence of temptations can frustrate goal attainment, especially in cases where self-control resources are reduced (e.g., Baumeister & Heatherton, 1996; Muraven & Baumeister, 2000). For example, the goal conflict model (Stroebe, Mensink, Aarts, Schut, & Kruglanski, 2008) suggests that food temptations activate the hedonic eating goal and simultaneously inhibit the dieting goal, for activation of one goal inhibits other conflicting goals. Given that food temptations are omnipresent in our Western obesogenic environment (French, Story, & Jeffery, 2001), dieters seem to face difficult challenges when trying to stick to their goals.

However, an opposing line of evidence based on counteractive control theory (Trope & Fishbach, 2000), paints a different picture by suggesting that temptations may assist, rather than inhibit, long-term goal congruent behavior. In their counteractive control theory, Trope and Fishbach (2000) propose that temptations, signaling a threat toward long-term goals, automatically activate goal-directed behavior to avert the threat. A classic example of a study in support of

counteractive control theory for example showed that when individuals are presented with tempting food items, such as chocolate or cookies, their long-term goal to diet becomes more strongly mentally accessible compared to a neutral control condition (Fishbach, Friedman, & Kruglanski, 2003). In a similar vein, other studies in support of counteractive control theory have shown that temptations boosted goal importance and intentions to diet (Kroese, Evers, & De Ridder, 2009) as well as actual goal-congruent behavior (Fishbach et al., 2003; Kroese et al., 2009).

Yet despite their obvious adaptive value, counteractive control processes are rather counterintuitive. It is clear from both research and practice that temptations do not in all cases trigger goal-directed behavior but, in line with the goal conflict model, often yield indulgence. Indeed, counteractive control processes have been found to be moderated by several factors. For example, exposure to temptations was found to lead to goal activation only for certain temptations: only when temptations were strong (e.g., very attractive looking chocolate cakes—Kroese et al., 2011; or temptations that

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were available for consumption—Geyskens, Dewitte, Pandelaere, & Warlop, 2008) and not when temptations were weak (e.g., not so attractive looking chocolate cakes, or temptations that were not available for consumption) did they trigger the long-term goal to diet. In addition to qualities of the temptations, personal qualities also moderate counteractive control processes: It was found that successful dieters but not unsuccessful dieters showed a facilitated mental association between food temptations and dieting goals (Fishbach et al., 2003; Papies, Stroebe, & Aarts, 2008).

As the quality of temptations people encounter is not very amenable to change, the latter moderating factor (i.e., weight watching success) is interesting in light of a search to help individuals improve their resistance of temptations. The relation between successful self-regulation and a facilitated mental association between temptations and goals renders an interesting starting point for self-regulation interventions. Specifically, as for unsuccessful dieters temptations appear to trigger indulgence (in support of the goal conflict model) rather than restraint (as would be predicted by counteractive control theory), this is a population in which trying to create counteractive control processes would be particularly worthwhile.

Such an attempt is warranted not only from an applied perspective but also from a theoretical perspective. To date, previous research has focused almost exclusively on whether temptations trigger impulsive behavior or activate long-term goals and on the factors moderating these processes. Whether or not, under certain circumstances, indulgence or restraint was triggered was generally the end point of studies on temptations. However, research investigating how we may intervene in these processes and create mental temptation–goal associations among individuals for whom temptations generally undermined their self-regulatory processes is lacking. In other words, little has been done to investigate whether unsuccessful dieters can become successful dieters by creating mental temptation–goal associations, and thus counteractive control processes. In view of this lack of research, investigating the possibility of creating mental association between temptations and goals among unsuccessful dieters is the topic of the present studies.

A number of techniques that may strengthen mental associations between two constructs have been reported in the literature. In principle, we suggest that any such method (e.g., associative learning, [evaluative] conditioning, or implementation intentions) could be used to create an association between temptations and goals. For the current article, however, we chose to focus on implementation intentions, mostly because if this technique were successful, it would provide a very simple tool for promoting counteractive control processes among unsuccessful dieters.

Implementation intentions are known as simple action plans that link situation X to behavior Y through a predefined if–then format: “If situation X occurs, then I will perform behavior Y” (Gollwitzer, 1993, 1999). These specific plans

have been found to have robust and beneficial effects on promoting a wide range of health behaviors, such as increasing vitamin C intake (Sheeran & Orbell, 1999), exercising (Milne, Orbell, & Sheeran, 2002), performing breast self-examination (Orbell, Hodgkins, & Sheeran, 1997), and reducing unhealthy snack intake (Adriaanse, De Ridder, & De Wit, 2009).

Two underlying mechanisms that make this planning strategy effective have been identified. First, by specifying a critical situation in advance, this situation becomes highly accessible in memory and is more likely to be recognized as a good opportunity to act on one’s intentions when it is encountered (e.g., Parks-Stamm, Gollwitzer, & Oettingen, 2007; Webb & Sheeran, 2004). Moreover, by using an if–then format to link this situation to a goal-directed response, a strong mental association is created between situation X and behavior Y, such that situation X *automatically* triggers the desired behavior Y (e.g., Bayer, Achtziger, Gollwitzer, & Moskowitz, 2009; Cohen, Bayer, Jaudas, & Gollwitzer, 2008; Gawrilow & Gollwitzer, 2008; Webb & Sheeran, 2007, 2008). Making use of this underlying mechanism, we aim to apply the implementation intentions technique to our current objective of strengthening the mental association between temptations and goals.

The current research provides a relevant addition to the literature in two ways. First, to the best of our knowledge we are the first to try to strengthen counteractive control processes (i.e., temptation–goal associations) in such a direct manner. Previous research has assessed the mental accessibility of a long-term goal after being primed with temptations. No attempts have been made, however, to actively *create* these types of adaptive counteractive control associations. Second, we extend the work on implementation intentions by deviating from the regular content of the plans specifying a *situation* and a *behavior*. Instead, our participants formulated plans specifying a *temptation* and a *goal*. As previous research has indicated that implementation intentions that specify which goal-directed behavior to perform are effective only among individuals who are motivated to attain the overarching goal (Sheeran, Webb, & Gollwitzer, 2005), our approach of activating *goals* would be particularly effective in cases where temptations would normally inhibit the goal (and general implementation intentions thus would not be effective).

Overview of Studies

We conducted two studies to test our hypotheses that temptation–goal implementation intentions specifying “If I see or smell [a food temptation], then I will follow my goal to diet” would lead to facilitated temptation–goal associations (i.e., counteractive control mechanisms) and reduced temptation consumption. The aim of Study 1 was to show that temptation–goal implementation intentions, incorporating idiosyncratic temptations, yielded improved resistance to the

specified temptation during the following week. Moreover, we tested the prediction that this particular technique would be most beneficial to those who had previously been unsuccessful dieters. In Study 2, then, we aimed to test the cognitive effect underlying the behavioral outcomes. That is, we predicted that temptation–goal implementation intentions would yield a facilitated mental association between temptations and the goal to diet, as assessed using a primed lexical decision task. In addition, we aimed to relate the cognitive effects to self-reported behavioral outcomes. Both studies were conducted with young female college students, as this is a group known to have bad snacking habits (e.g., Gores, 2008) and to be concerned about their weight (e.g., Wardle, Haase, & Steptoe, 2006). The goal “to diet” in our studies refers to the reduction of unhealthy food intake, without necessarily involving the intention to lose weight.

Study 1

Method

Participants. In total, 83 participants completed the study. Data from participants with a body mass index (BMI) lower than 18 ($N = 3$) or higher than 30 ($N = 1$) were excluded from all analyses because obesity and being underweight have been related to abnormal responses to food (e.g., Forman-Hoffman, 2004; Stice, Spoor, Ng, & Zald, 2009). The final sample consisted of 79 women with a mean age of 21.1 years ($SD = 2.2$) and a mean BMI of 21.7 kg/m^2 ($SD = 2.5$).

Design and procedure. Participants were randomly assigned to either the implementation intention condition or the control condition. The experiment consisted of four parts: (a) the listing of a personal temptation, (b) baseline questionnaires, (c) the experimental manipulation, and (d) follow-up questionnaires after 1 week.

On the recruitment flyers as well as on arrival at the lab, participants were told that the goal of the experiment was to help them eat healthier and that inclusion criteria involved being motivated to eat more healthily. Only individuals with the intention to eat healthily were recruited as previous research has indicated that this is a prerequisite for establishing counteractive control processes (Fishbach et al., 2003). Each participant was seated at an individual desk behind a desktop computer. All instructions for the listing of a personal temptation, the questionnaires, and the experimental manipulation were provided through a computer task.

After their completion of this part of the experiment, participants were instructed to keep track of their snacking behavior for the next 7 days, as they would get questions about it when they returned to the lab next week. This was done to further explicate that the goal of the present study was to eat more healthily in the coming week and to increase the reliability of the self-report follow-up measures. One week after the computer experiment participants came back to fill out a follow-up questionnaire in which they reported

how successful they had been in reducing the intake of their personal temptation. After this, participants were rewarded with either €12 or course credits.

Materials

Personal temptation. All participants were prompted to list a personal temptation, which was defined as “an unhealthy snack that you really like but that you would rather eat less of” (i.e., something that is attractive and in conflict with the dieting goal; Kroese et al., 2011). For participants in the implementation intention condition, the personal temptation was later used in the *if* part of their plan.

Intention. Four questions were asked to assess diet intentions of the participants: “I [am] determined/intend/want/expect to diet the next period of time.” The items were answered on a scale from 1 (*strongly disagree*) to 7 (*strongly agree*). Intention was assessed before (Cronbach’s $\alpha = .97$) and after (Cronbach’s $\alpha = .98$) the implementation intention manipulation to allow for ruling out the possibility that our manipulation had any motivational effects.

Self-regulatory success. Dieting success was assessed by three items asking to which extent participants (a) found it difficult to stay in shape (reverse coded), (b) were successful in losing weight, and (c) were successful in watching their weight (cf. Fishbach et al., 2003; Cronbach’s $\alpha = .64$).¹ The items were answered on a scale from 1 (*strongly disagree*) to 7 (*strongly agree*).

Temptation attractiveness. The attractiveness of temptations was assessed to make sure that the personal temptations provided by participants were considered equally tempting across conditions. Attractiveness of the personal temptations was assessed with three items (e.g., “To me, [personal temptation] is a temptation”; Cronbach’s $\alpha = .65$) that were answered on a scale from 1 (*strongly disagree*) to 7 (*strongly agree*).

Demographics. Age, height, and current and ideal weight were assessed by self-report.

Experimental manipulation. The experimental manipulation took place during the computer experiment. After filling out the baseline questionnaires, the intention “This week I will watch my weight!” was visible on the screen for both the experimental group and the control group. Participants were instructed to repeat this intention for themselves. This was done to make sure that the goal intentions did not differ across conditions and were strong in all participants. After this, the control group had completed the experiment, whereas the experimental group was instructed to create a specific plan to stick to their dieting goal by creating an implementation intention: “If I see or smell [personal temptation], then I will follow my dieting goal.” Participants were instructed to retype the plan on the screen. On the next screen the implementation intention was shown again and participants were instructed to mentally repeat the plan. After 30 seconds the next screen appeared, where participants

were asked to type in their implementation intention once more. Next, their motivation to act on the implementation intention was measured by the following statement, "I am motivated to follow my plan," to which participants could respond on a 7-point scale ranging from 1 (*not at all*) to 7 (*extremely*).

Follow-up questions: Self-perceived improvement. After 1 week, three items were used to assess self-perceived improvement, which constituted our main dependent variable (cf. Adriaanse et al., 2010; Cronbach's $\alpha = .67$). Participants were asked, "Compared to the week before you participated in the experiment, (a) how often did you succeed in resisting your personal temptation during the past week; (b) how well did you succeed in resisting your personal temptation during the past week; and (c) how often did you give in to the temptation during the past week [reverse coded]." Items could be answered on a scale from 1 (*never/not at all*) to 7 (*very often/very well*).

Control variables. Reflecting possible demand characteristics, we assessed participants' seriousness and dedication to reduce their personal temptation consumption (cf. Adriaanse et al., 2010): "How serious were you about reducing your intake of [personal temptation]" and "How dedicated were you to reduce your intake of [personal temptation]." These items could be answered on a scale from 1 (*not at all*) to 7 (*very much*).

Results

Descriptives and randomization check. Both before ($M = 4.1$, $SD = 1.9$) and after the manipulation ($M = 4.3$, $SD = 1.6$), participants reported to have moderately strong intentions to diet. A repeated measures ANOVA with condition and time as independent variables revealed no significant main or interaction effects ($ps > .20$), indicating that dieting intentions did not change for any condition after the manipulation.

The high mean scores for temptation attractiveness ($M = 5.8$, $SD = 0.9$) indicated that the instructions for specifying a temptation were successful. Furthermore, participants who made an implementation intention were strongly motivated to stick to their plan ($M = 4.9$, $SD = 1.7$).

To check whether randomization was successful, separate ANOVAs with condition (implementation intention vs. intention only) as the independent variable and age, BMI, intention, and temptation attractiveness as the dependent variables were performed. None of the effects reached significance ($ps > .11$).

Control variables. To rule out demand effects, separate ANOVAs were conducted to test the effect of condition on participants' reported seriousness and dedication to reduce the consumption of their personal temptation. None of the analyses yielded a significant effect of condition ($ps > .38$). However, it was found that self-regulatory success was marginally significantly correlated with dedication ($r = -.22$, $p = .06$), such that less successful dieters were more dedicated

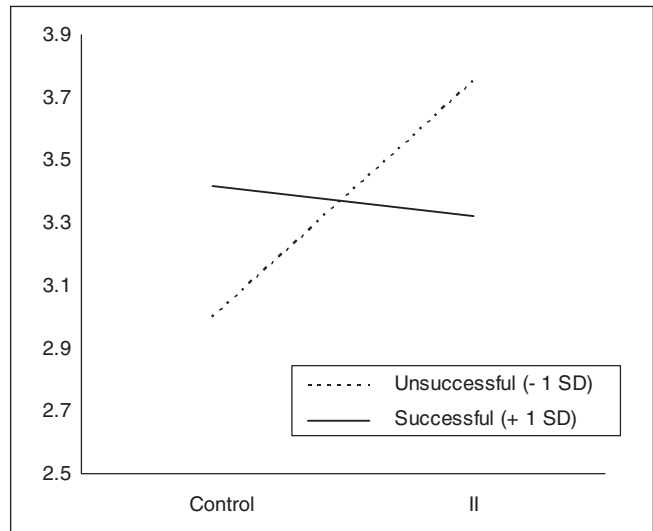


Figure 1. The effect of forming a temptation-goal implementation intention on self-perceived improvement for successful and unsuccessful dieters

to reduce their temptation consumption. In addition, dedication was significantly related to the outcome variable of self-perceived improvement ($r = .50$, $p < .001$). Hence, it was decided to include dedication as a covariate in the main analysis. Seriousness was not related to self-regulatory success ($p = .09$) nor to the outcome variable ($p = .45$).

Main analysis. A regression analysis was conducted with self-perceived improvement as the dependent variable and dedication to reduce snack intake, condition, self-regulatory success, and the interaction term of the latter two as predictors. Dedication was a significant predictor of self-perceived improvement, $\beta = .54$, $p < .001$. Condition had a marginally significant effect on self-perceived improvement, $\beta = .18$, $p = .07$, showing a trend for participants in the implementation intention condition to report higher self-perceived improvement compared to those in the control condition. The effect of self-regulatory success did not reach significance ($p = .10$). Most importantly, however, a significant interaction was found between condition and self-regulatory success; $\beta = -.32$, $p = .02$. Simple slopes analyses revealed that for participants scoring high on self-regulatory success (+1 SD from the mean), the effect of condition on self-perceived improvement was not significant ($p = .69$). For participants scoring low on self-regulatory success ($-1 SD$), however, the effect of condition on self-perceived improvement was significant ($p = .004$). The interaction is depicted in Figure 1, showing that for participants who scored low on self-regulatory success, those in the implementation intention condition reported higher perceived improvement compared to those in the control condition.

Discussion

The results from Study 1 confirmed our hypothesis that unsuccessful dieters who formed a temptation-goal imple-

mentation intention indicated that they were better able to resist their personal temptations during the following week compared to controls. This study thus provides the first evidence that by means of a rather simple tool—implementation intentions—relatively unsuccessful dieters can be turned into more successful dieters according to their own perceptions. Although we propose that the underlying mechanism for this beneficial effect is that the implementation intention helped to create facilitated temptation–goal associations, the present findings do not provide empirical support for this conclusion. Therefore, the next step was to specifically test the cognitive effects of temptation–goal implementation intentions by showing that implementation intentions yielded facilitated temptation–goal associations, which in turn promoted self-regulatory improvement.

Study 2

Like in Study 1, participants were randomly assigned to either an implementation intention or a control condition. It was hypothesized that implementation intentions would lead to facilitated temptation–goal associations and that any behavioral effects could be predicted by these cognitive effects. The cognitive temptation–goal association was assessed using a primed lexical decision task. To be able to keep the word length of primes equal in the critical and neutral trials (see the materials section), it was deemed unfeasible to use idiosyncratic temptations in this study. Instead, we specified chocolate as the temptation for all participants. This temptation was chosen as previous research has indicated that chocolate is a favorite snack for many women and is also considered bad for one's diet (e.g., Rozin, Levine, & Stoess, 1991). Another advantage of specifying chocolate as a temptation was that our behavioral measure could now be more specific: Rather than assessing self-perceived improvement, we assessed the self-reported number of chocolate portions consumed. Furthermore, now having theoretical as well as empirical support (see Study 1) that temptation–goal implementation intentions were particularly helpful for people who had previously been unsuccessful, we decided to recruit unsuccessful dieters only (i.e., those who feel unable to resist chocolate as much as they would like).

Method

Participants. We recruited 57 female participants who would like to eat less chocolate but who were generally unsuccessful in diminishing their chocolate consumption. For similar reasons as in Study 1, we excluded 1 participant who was underweight (BMI < 18). The final sample consisted of 56 participants with a mean age of 20.7 ($SD = 2.4$) and a mean BMI of 22.0 ($SD = 2.3$).

Procedure and design. Participants were recruited through flyers asking for “women who would like to eat less chocolate but find it difficult to do so.” On their arrival at the lab,

each individual was seated behind a desktop computer on which all instructions were provided. The experiment consisted of four parts: (a) baseline questionnaires, (b) the implementation intention manipulation, (c) a lexical decision task, and (d) a follow-up questionnaire that was filled out after 7 days.

Materials

Baseline questionnaires. Dieting intentions before and after manipulation (Cronbach's $\alpha = .97$ and $.98$, respectively), self-regulatory success (Cronbach's $\alpha = .57$), and temptation attractiveness (Cronbach's $\alpha = .78$) were assessed similarly to in Study 1. However, this time temptation attractiveness items focused on chocolate specifically. Furthermore, participants were asked “how many portions of chocolate did you consume on average per day during the past week,” to function as a baseline measure in our analyses. This question was open ended.

Implementation intentions. Instructions for implementation intentions were the same as in Study 1, except that personal temptations were replaced by chocolate.

Primed lexical decision task. The lexical decision task consisted of 42 trials comprising a fixation cross (1,000 ms), a prime word (50 ms), a backward mask (“XXXXXXXX”; 500 ms), and a target letter string. The target letter string stayed on the screen until participants pressed the z or m button to indicate that the target was a word or a nonword, respectively. Half of the 42 targets were nonwords, 18 were neutral words (e.g., *hanging*, *pen*, *bell*), and 3 were diet-related words (i.e., *dieting*, *slim*, *thin*). The temptation prime was the word *chocolate*, which was presented before each of the three diet-related targets. All other targets were preceded by neutral prime words that appeared three times during the task (just like *chocolate*, which appeared prior to each of the three diet-related words). The temptation and neutral primes were matched on word length, as were the diet-related and neutral targets. For the analyses, mean reaction times to diet-related words and to neutral words were computed, including only trials that participants responded to correctly. Extreme reaction times ($> 3 SD$ from the mean) were set to missing. Furthermore, to correct for a nonnormal distribution, natural log-transformed reaction times were used in all analyses. For the ease of interpretation, however, nontransformed means are reported.

Follow-up questionnaire: Self-reported consumption of chocolate. After 1 week, participants were asked “how many portions of chocolate did you consume on average per day during the last week.” The question was worded similarly to the baseline measure of chocolate consumption and was open ended.

Control variables. Similarly to Study 1, we assessed how serious and dedicated participants had been to reduce their chocolate consumption to rule out demand effects. In addition, participants were asked “to what extent did you

feel the experimenter wanted you to reduce your chocolate consumption” and “to what extent was the number of reported portions of chocolate consumed truthful.” All questions could be answered on a scale from 1 (*not at all*) to 7 (*very much*).

Results

Descriptives and randomization check. Before the manipulation, participants reported having moderately strong intentions to diet ($M = 4.2$, $SD = 1.7$), and a repeated measures ANOVA with condition and time as independent variables revealed that this intention was somewhat further enhanced after the manipulation ($M = 4.6$, $SD = 1.5$), $F(1, 54) = 6.21$, $p < .02$, $\eta_p^2 = .10$. Importantly, the Condition \times Time interaction was not significant, indicating that this increase in intention did not differ between the two conditions, $p = .69$. Furthermore, chocolate was considered attractive, as expected ($M = 5.1$, $SD = 1.1$).

To make sure that any effect of condition could not be accounted for by coincidental differences between the two groups, separate ANOVAs were conducted on age, BMI, diet intentions, attractiveness of chocolate, baseline portions of chocolate consumed, and self-regulatory success. No differences between conditions emerged (all $ps > .15$), indicating successful randomization.

Control variables. To rule out demand effects, separate ANOVAs were conducted to test the effect of condition on all control variables (i.e., seriousness and dedication to reduce chocolate consumption, truthfulness of responses, and the extent to which participants felt the experimenter wanted them to reduce chocolate intake). None of the analyses yielded a significant effect of condition (all $ps > .38$). Moreover, correlation analyses showed that none of the control variables significantly correlated with the outcome variable (all $ps > .16$).

Temptation–goal association. To assess the effect of implementation intentions on the mental association between “chocolate” and the goal “to diet,” we conducted an ANCOVA with mean reaction times to neutral words as a covariate and mean reaction times on temptation–goal trials as the dependent variable. The covariate was significant, $F(1, 53) = 61.33$, $p < .001$. A significant difference between conditions was found, $F(1, 53) = 5.58$, $p = .02$, $\eta^2 = .10$. Participants who made an implementation intention ($M = 624$, $SD = 108$) were significantly faster to respond to diet-related words when primed with chocolate, compared to the control group ($M = 683$, $SD = 175$). A separate ANOVA testing the effect of condition on reaction times to neutral words revealed no significant difference between conditions, $F < 1$.

Cognitive and self-reported behavioral effects. As a first test of the behavioral effects of our manipulation, we conducted an ANCOVA testing the effect of condition on portions of chocolate consumed in the week following the manipulation, controlling for baseline portions of chocolate consumed.

The covariate was significant, $F(1, 53) = 18.82$, $p < .001$. A marginally significant effect of condition on portions of chocolate consumed during the following week was found, $F(1, 53) = 3.57$, $p = .06$, $\eta_p^2 = .06$, indicating that participants in the control condition consumed more portions of chocolate per day ($M = 1.1$, $SD = 1.0$) compared to participants in the implementation intention condition ($M = 0.7$, $SD = 0.7$). However, as we specifically expected behavioral effects for individuals in whom a temptation–goal link was successfully created, a stronger test of our hypothesis was to assess the relation between the cognitive effects and the behavioral measure. To do so, we conducted a regression analysis including portions of chocolate consumed during the baseline week prior to the experiment in Step 1 and reaction times to temptation–goal trials in the primed lexical decision task in Step 2. The dependent variable was self-reported number of portions of chocolate consumed during the following week. Baseline portions of chocolate was a significant predictor ($\beta = .52$, $p < .01$), explaining 27.7% of the variance. More importantly, however, reaction times to temptation–goal trials had an additional significant effect on chocolate consumption in the following week ($\beta = .28$, $p = .02$), indicating that lower reaction times (i.e., faster responses to diet-related words) were related to less chocolate consumption. The additional explained variance (R^2 changed) was 8.0%.

Discussion

The results were in line with our hypothesis that temptation–goal implementation intentions, compared to goal intentions only, lead to a facilitated mental association between, in this case, chocolate and the dieting goal. Moreover, this mental association was found to be related to self-reported chocolate consumption such that more facilitated temptation–goal associations were related to fewer portions of chocolate consumed during the following week.

General Discussion

Two studies provided empirical support for our hypothesis that, compared to a control condition, using implementation intentions can yield facilitated temptation–goal associations, which in turn stimulate successful self-control. It was shown that temptation–goal implementation intentions yielded effects on a cognitive (Study 2) as well as a behavioral level. Notably, our behavioral measures tapped into participants’ subjective evaluation of improvement (Study 1) as well as a more concrete outcome (i.e., self-reported portions of chocolate consumed; Study 2). Being, to the best of our knowledge, the first attempt to create temptation–goal associations in unsuccessful dieters, the current findings are promising and have important theoretical as well as practical implications.

Activation of the long-term goal on confrontation with temptations is an adaptive self-control mechanism, as described by counteractive control theory (Trope & Fishbach,

2000). Prior research has identified an important individual difference factor (i.e., self-regulatory success; Fishbach et al., 2003; Papies et al., 2008) as a determinant of facilitated or inhibitory temptation–goal associations: Only successful self-regulators appeared to demonstrate counteractive control processes. It was still unclear, however, whether counteractive control processes were reserved for these “lucky few” who were successful self-regulators or whether temptation–goal associations were amenable to change within individuals. Our results suggest that facilitated temptation–goal associations not only are determined by individual differences but also can actually be acquired through simple cognitive interventions. This implies that unsuccessful self-regulators are not doomed to fail: Using implementation intentions, they can become successful self-regulators.

Yet although the current research may imply a causal direction for the relation between facilitated temptation–goal association and self-regulatory success (i.e., temptation–goal associations lead to success), we cannot rule out the possibility that this relation may be bidirectional. In other words, it may well be the case that repeated successful resistance of temptations leads to facilitated temptation–goal associations.

The current research also provides a relevant addition to the implementation intentions literature. Typically, implementation intentions have been applied to link a situational cue to a behavioral response. Although an impressive amount of literature supports the efficacy of this type of plan, the current approach of linking a temptation to a goal has two advantages. First, temptation–goal implementation intentions could be particularly useful in situations where the goal would normally not be active. For example, research on goal conflicts has shown that people tend to temporarily abandon their goal when they are confronted with temptations (Stroebe et al., 2008). Knowing that “regular” implementation intentions are no longer effective when the goal is abandoned (Sheeran et al., 2005), reactivating the long-term goal in these situations is a promising way to achieving successful self-control.

Second, specifying a goal rather than an alternative behavior in the *then* part of the implementation intention has the possible advantage of implementation intentions being more frequently applicable. That is, classic replacement implementation intentions tend to include a specific behavioral alternative to replace the unwanted response (e.g., “If I am watching television, then instead of a candy bar I will eat an apple”; Adriaanse et al., 2009). Although their specificity may help people to automatically perform the “wanted” behavior, an obvious disadvantage of replacement implementation intentions is that the plan will fail if the behavioral alternative is unavailable (e.g., you ran out of apples). In the case of temptation–goal implementation intentions, however, this problem would not occur as people can make multiple behavioral choices as soon as their long-term goal is activated.

The current studies have some important methodological strengths. First, studies combining cognitive and behavioral measures are relatively rare. Mental associations and (presumably) related behavior are usually assessed in separate studies. The fact that the present research findings were not restricted to behavioral or cognitive effects but concerned self-reported snack intake as well as the mental accessibility of the long-term goal is an improvement to other studies that reported either implicit measures or overt behavior. A second methodological strength was the use of predefined temptations (Study 2) to allow for investigating the underlying mechanism as well as idiosyncratic temptations (Study 1) to enhance the ecological validity of our studies. Last, the inclusion of strict control questions in both studies (e.g., intentions, seriousness, and dedication to reduce unhealthy snack intake) allowed for the elimination of the possibility that the effects were driven by motivational differences between conditions.

One limitation of the current studies concerns the generalizability of our findings, as we included only participants with BMIs between 18 and 30, with a majority of participants having BMIs in the healthy range (i.e., between 18 and 25 kg/m²). Hence, our findings cannot be generalized to overweight or obese women. In fact, it is plausible that obese participants would yield different effects, as they are known to differ from normal-weight individuals in their responses to food cues (Stice et al., 2009), which was exactly the reason for excluding this group in the current studies. Furthermore, our samples consisted of young, highly educated women only. This population was deemed particularly suitable for the current research context, as the struggle with dieting goals is known to be particularly relevant to women (Wardle et al., 2006). Yet theoretically we have no reason to suspect that the underlying principles of our research would not apply to other populations. That is, creating associations between temptations and goals could be applicable to all different contexts in which self-control conflicts occur, such as being offered a cigarette when trying to stop smoking or walking past the pub when having a pile of work to do.

Another limitation is the self-reported consumption of chocolate during 1 week, which could suffer from biases compromising its reliability. Research has shown that retrospective self-reported food intake may especially suffer from social desirability biases, such that participants who score high on social desirability measures tend to report lower than actual food intake (Hebert, Clemow, Pbert, Ockene, & Ockene, 1995). In our studies we explicitly controlled for social desirability or demand effects. In addition, we tried to minimize the effect of potential bias by controlling for baseline measures (e.g., cancelling out participants’ general tendencies to over- or underestimate chocolate consumption) and showed that intentions and motivation did not differ between conditions. So although it cannot be ruled out that participants may have underreported their unhealthy snack

intake (nor, for that matter, that all participants already slightly reduced their unhealthy snack intake as a result of monitoring their own behavior), we can be quite confident that underreporting did not differ between conditions. The obtained differences in unhealthy snack intake were therefore especially noteworthy. Yet it would be interesting to investigate the effects of our manipulation on more objective behavioral measures.

In addition, future research is necessary to examine the long-term effects of temptation–goal implementation intentions to more thoroughly test the idea that unsuccessful self-regulators can be turned into successful ones. As the current behavioral effects were driven by automatic mental associations rather than willpower or other effortful processes, we would predict that our results would hold in the long run. That is, whereas willpower is known to be limited and depleted after multiple instances of successful resistance of temptations, automatic mental associations are not susceptible to such effects and instead are more likely to develop into habits. However, it should be noted that long-term self-regulatory success in the context of healthy eating is for many a complex and lifelong process.

A final remark is to be made with regard to the specificity of the effect. According to counteractive control theory (Trope & Fishbach, 2000), confrontation with a temptation leads to enhanced self-control, but not only with respect to that particular temptation. For example, when people are exposed to pictures of a chocolate cake as compared to a flower, they not only are necessarily better at resisting chocolate cake per se but also are more likely to choose a healthy over an unhealthy cookie on a subsequent occasion (e.g., Kroese et al., 2009). Thus, temptation exposure produces mental activation of the conflicting long-term goal, yielding enhanced self-control in any situation in which the goal is subsequently threatened. In the current studies, we examined subjective resistance and consumption of one specific temptation (i.e., a personal temptation in Study 1 and chocolate in Study 2), but theoretically the effect should generalize to other unhealthy snacks. For example, when you see a candy bar ad on the train, you may be less likely to buy a cookie once you arrive at the station because you have been reminded of your dieting goal. This theoretical suggestion has not received much specific attention in empirical work, though. If it is indeed found that the behavioral effects of temptation–goal implementation intentions are generalizable to unhealthy snacking in general, this simple intervention would be especially valuable from a practical point of view, adding onto “regular” implementation intention interventions of which the specificity may compromise their applicability.

To conclude, the current studies are among the first to demonstrate that facilitated temptation–goal associations (i.e., “counteractive control processes”) can be created and in turn help unsuccessful self-regulators to become more successful at resisting temptations. Our findings are theoretically interesting but also promising from a more practical point of

view: It is hopeful to see that unsuccessful dieters are not doomed and that an easy intervention as such can yield actual “instant success.”

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Note

1. As a confirmation of the validity of our measure of self-regulatory success, Pearson’s correlations between self-regulatory success and BMI revealed a significant negative association between the two; $r = -.44$, $p < .01$, indicating that successful self-regulators indeed had lower BMIs compared to unsuccessful self-regulators.

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