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The Role of Self-Control in Resistance to Persuasion

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Four studies investigated a self-control theory of resistance to persuasion. This theory asserts that resistance to persuasion requires and consumes self-control resources. Study 1 showed that resistance to a persuasive message reduced the ability to engage in a subsequent self-control task. Studies 2 and 3 showed that self-control depletion leads to increased persuasion. Study 4 showed that self-control depletion increased persuasion, particularly under effortful resistance (i.e., strong arguments). Together, these findings suggest that self-control plays a vital role in the process of resistance to persuasion. People must have self-control resources to fend off persuasive appeals; without them, they become susceptible to influence.

Keywords: *self-control; ego depletion; self-regulation; resistance; persuasion; attitude change*

It is easier to resist at the beginning than at the end.

Leonardo da Vinci

Resisting a persuasive influence is often hard work. One must have not only a desire to resist but also the willpower to hold fast in the face of a potentially tempting alternative—giving in. Thus, in many circumstances, it may be easier to allow oneself to be persuaded than it would be to resist. This suggests that resistance to persuasion is a goal-directed action and, more specifically, that it requires self-control resources (Baumeister, Bratslavsky, Muraven, & Tice, 1998; Muraven, Tice, & Baumeister, 1998). The following studies test the hypothesis that *self-control resources* serve a vital role in the resistance process. When people lack self-control resources, their ability to resist persuasion will be diminished and their attitudes will be open to change.

Self-Control as a Limited and General Resource

Often people do not want to be persuaded. This fact has prompted researchers to explore the means by which people resist (e.g., Petty & Cacioppo, 1986a) and the strategies that can increase resistance (e.g., McGuire, 1964). Valuable insights have been gained from these lines of research, but a very basic fact at times has failed to shine through: Resistance to persuasion can be effortful. Resistance is not simply a cognitive process that occurs under specified conditions. Resistance to persuasion is also a response that occurs when a person is sufficiently motivated to work against an agent of influence. If resistance is an effortful, goal-directed action, it likely requires self-control.

Self-control is commonly viewed as the active inhibition of unwanted responses that might interfere with the achievement of desired goals (Baumeister & Vohs, 2005). Research clearly indicates that the ability to exert self-control acts as a limited resource (Baumeister et al., 1998; Muraven et al., 1998). Thus, a person who exerts self-control in the pursuit of a goal may be less able to exert self-control a short time later. Consider a man who is dieting. Suppose he finds chocolate cake tempting, and so it would require some restraint to resist eating a piece

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of cake. Research on self-control predicts that this individual would have a more difficult time refusing this cake if he recently exerted self-control by reluctantly eating an undesired salad (thereby depleting self-control resources; Vohs & Heatherton, 2000).

More germane to the current research, an individual who has exerted self-control in the pursuit of one goal might be less able to inhibit unwanted responses in the pursuit of another, seemingly unrelated goal. For example, Muraven et al. (1998) demonstrated that participants who were asked to refrain from expressing emotion as they watched a humorous video showed a performance decrement on a subsequent self-control task (holding a handgrip as long as possible). Those participants who had been “depleted” of their self-control resources while watching the film were less able to hold the handgrip for an extended period. This type of response led Muraven and Baumeister (2000) to posit that self-control resembles a muscle. If a person wears it out by “exercising” it on one task, this might lead to a loss of “self-control strength” on a subsequent task. Consistent with the notion of muscle fatigue, people who are depleted seem to become more passive and no longer work as hard to achieve their goals (Baumeister et al., 1998; Twenge & Baumeister, 2002).

When presented with a counterattitudinal message, people often prefer to resist the persuasive influence. In this context, the individual’s goal is either to retain a prior opinion or to resist the adoption of a new opinion. However, to achieve this goal, the individual must exert self-control to resist the temptation to give in. Thus, if resistance to persuasion requires self-control resources, and the ability to exert self-control is a limited resource that is general in nature, then it should be possible to lower a person’s resistance to persuasion through the exertion of self-control on an unrelated task. Consider again the dieter who just ate a bland salad. If the self-control analysis is correct, he would not only be less able to resist cakes or hold handgrips, he should also be more vulnerable to persuasion.

Depletion and Resistance to Persuasion

Research in the persuasion literature provides anecdotal support for the link between self-control and resistance to persuasion. For example, it has been shown that participants are more favorable toward an advertisement when it is presented late in a series of ads rather than if presented early (Knowles & Linn, 2004). This effect suggests that people may lose their ability to resist after repeated exposure to persuasive appeals. Interestingly, this effect bears a noticeable resemblance to self-control research, where earlier self-control tasks lead to poorer performance on subsequent self-control tasks.

More striking links to self-control failure can be found in studies of intense indoctrination. Brainwashing, police interrogations, and fraternity hazings all involve an initial “wearing down” phase that consists of food and sleep deprivation. The purpose of this technique is to fatigue targets so that they will become open to various forms of “re-education” (Hunter, 1960; Taylor, 2004). As one thought-reform victim described his experience, “You are annihilated, exhausted, you can’t control yourself. . . . You accept anything he says” (Lifton, 1961, p. 23). Empirical evidence suggests that this process does in fact lead to a heightened vulnerability to influence (Baron, 2000). Interestingly, fraternities also employ the use of unsavory foods in their hazing as a “wearing down” technique (Cialdini, 2001), a procedure that has been used to deplete self-control resources (Baumeister et al., 1998).

Collectively, these lines of work suggest that it takes energy to resist and that people become open to influence once they have been depleted. The current studies investigate forms of self-control depletion that are far less dramatic than those used to indoctrinate, interrogate, or initiate. Nonetheless, these large differences in the procedures employed belie a similar underlying theory about the nature of persuasion—that people become less resistant if they are first depleted.

Present Theory

It has been suggested that for attitude researchers, “the main analytical task becomes understanding the processes that enable resistance and the persuasive techniques by which resistance might be overcome” (Eagly & Chaiken, 1998, p. 310). As one possible answer to this mandate, I propose that resistance to persuasion (a) requires self-control resources and (b) consumes self-control resources.

To be clear, this is not to say that all forms of resistance require self-control. Undoubtedly, some forms of resistance are more effortful than others. However, with some persuasive appeals (particularly appeals with strong, cogent arguments), an individual must exert effort and thus self-control to successfully resist.

Furthermore, I assert that regulatory depletion affects resistance in a manner independent of cognitive responses. This is not to say that depletion will never influence attitude-relevant thoughts (e.g., Wheeler, Briñol, & Hermann, 2007); however, the point of the present work is to demonstrate that depletion can lead to persuasion independent of thoughts and thus directly influence one’s ability to resist persuasive messages. For example, when people fail at their diets, it is not because they are unable to generate the thought “the dessert is bad for me and will ruin my diet.” People generate these thoughts and eat the dessert anyway. This is because it is not enough to hold these thoughts in their mind; they

must also exert self-control (willpower) to actually implement these thoughts into behavioral change. I propose that this is also the case for persuasive situations. When people agree to help their friend move into an apartment, it is not because they are unable to generate unfavorable thoughts about moving. They generate these thoughts and help anyway. Even when unfavorable thoughts are generated, it takes some resource-dependent work to implement those thoughts and thereby actively resist. To summarize, self-control is asserted to be an underlying component of the resistance process, both required and consumed, and as such it plays a fundamental role in persuasion.

Four studies tested predictions derived from this theory. Study 1 examined the effect resistance has on self-control resources. I predicted that those who resisted a persuasive appeal would exhibit fewer self-control resources on a subsequent task that was not related to persuasion. Studies 2 and 3 explored the effect that self-control exertion has on resistance to persuasion. I predicted that those who had their self-control resources depleted would be less successful at resisting a persuasive appeal. Study 4 extended these findings and examined effortful versus noneffortful forms of resistance via argument quality. Because strong arguments are more difficult to disregard and should require more resources to resist, I predicted that depletion would increase vulnerability to strong as opposed to weak arguments. Furthermore, this study relied on mediational analyses to assess whether the impact of self-control on resistance to persuasion occurs independent of message-relevant thoughts.

STUDY 1

The purpose of Study 1 was to examine how resistance to a persuasive message affects participants' self-control resources. According to the present theory, resistance to persuasion consumes self-control resources; therefore, greater resistance should result in less self-control. To test this assertion, this study relied on the idea that people are more resistant toward counterattitudinal messages when the topic is likely to influence them personally. It therefore was predicted that participants who were given a persuasive message on a topic that would affect them personally would be more resistant and subsequently have fewer self-control resources than participants who were given a persuasive message that would not affect them personally.

Method

Participants and Design

Seventy-two students (mean age = 19) from the University of North Carolina at Chapel Hill (UNC) participated in the

study for course credit. Participants were randomly assigned to one of two conditions: a 2-year or 10-year university policy implementation (Petty, Cacioppo, & Goldman, 1981). The primary dependent variable was persistence on an unsolvable task.

Procedure

Attitude phase. Participants were presented with a cover sheet stating that the university wanted to assess students' responses to a policy change to shorten the summer vacation to 1 month (Insko, Turnbull, & Yandell, 1974; Zimbardo, Snyder, Thomas, Gold, & Gurwitz, 1970). For half of the participants, the cover sheet indicated that the policy would be implemented in 2 years and therefore would take effect while they were students (personally relevant). For the rest of the participants, the cover sheet stated the policy would be implemented in 10 years (not personally relevant). Next, participants were presented with an essay containing arguments for shortening the summer vacation to 1 month (e.g., "earlier graduation for students," "reduction in student fees"). Pretest participants ($N = 12$) rated this essay as moderately strong in terms of argument strength ($M = 1.64$, $SD = 1.29$) on an 11-point scale ranging from -5 (*extremely weak*) to $+5$ (*extremely strong*).

After reading the essay, participants completed a five-item semantic differential scale that assessed attitudes regarding the policy (bad/good, unfavorable/favorable, negative/positive, against/in favor, and harmful/beneficial; Tormala & Petty, 2002). Responses were made on an 11-point scale ($-5 = \textit{extremely bad}$, $-3 = \textit{bad}$, $0 = \textit{neutral}$, $3 = \textit{good}$, $5 = \textit{extremely good}$). Overall, the five questions had high internal consistency ($\alpha = .95$). They were combined to obtain an overall mean composite score that served as an index of a participant's attitude toward the policy.

Self-control phase. To assess self-control resources, participants were given a list of unsolvable anagrams and their time spent persisting on the task served as a measure of self-control. Persistence on unsolvable anagrams is a common way to assess self-control resources (see Muraven et al., 1998). Participants were told that this task was a "filler" task and that when they had finished, were tired, or had worked on the anagrams long enough, they should open their door and alert the experimenter in the main room. The experimenter timed from the start of the anagrams task to the point when the participant opened the door. A maximum time limit of 10 min was given and those who did not finish within this time were stopped and given a score of 10 min.¹ During the debriefing, none of the participants reported being aware that the self-control task was related to the policy task and no one reported awareness that the anagrams were unsolvable.

Lastly, a standard task perception assessment, taken directly from Muraven, Shmueli, and Burkley (2006), was administered. Participants evaluated their mood and rated the anagrams task with regard to how difficult, boring, demanding, and frustrating it was perceived to be. These questions were rated on a 25-point scale ranging from *not at all* to *extremely* (e.g., “How much did your mood change as you were working on the task?” “How difficult was it to work on the task?” “How frustrating was that task?”).

Results

Task Perceptions

Responses across the two conditions were compared to ensure that the groups did not differ in terms of their mood and perceptions regarding the anagrams task. As predicted, there were no significant differences ($ps > .12$). Thus, it appears there were no mood differences between the two conditions and that all participants viewed the anagrams as equally difficult, boring, demanding, and frustrating.²

Attitude Ratings

Those who were told that the policy would be implemented in 10 years were significantly in more agreement with the policy ($M = -.15$, $SD = 2.80$) than were those who were told the policy would be implemented in 2 years ($M = -1.46$, $SD = 2.27$), $t(70) = -2.18$, $p < .05$. As expected, individuals in the 2-year condition were more resistant to the policy than those in the 10-year condition.

Persistence

The results indicated that there was a significant difference in persistence between the two groups, $t(71) = -1.96$, $p < .05$. Those in the 10-year condition ($M = 8.38$ min, $SD = 2.10$) persisted more than 1 min longer on the 10-min anagrams task than did those in the 2-year condition ($M = 7.12$ min, $SD = 3.25$). Cohen's $d = .47$, which is a medium effect size based on Cohen's (1988) conventions.

Discussion

Study 1 revealed that those who were more resistant toward a persuasive message had less self-control resources available to use on a subsequent unrelated persistence task. Participants who believed that the policy would take effect in 2 years were more against the policy and thus more resistant. Subsequently, these participants had fewer resources in reserve to apply to the persistence task. Because mood and task perceptions did

not differ across conditions, alternative explanations, such as participants giving up sooner due to frustration or anger, are unlikely.

STUDY 2

Although Study 1 suggests that resistance to persuasion consumes self-control resources, the role that these resources play in one's ability to successfully resist persuasion was not addressed directly. The purpose of Study 2 was to investigate the impact of self-control on resistance to a persuasive message. If such resistance requires self-control, then individuals who are depleted of their self-control resources should be less able to resist a subsequent persuasive message.

Method

Participants and Design

Twenty-two male students (mean age = 19 years) from UNC participated in the study.³ Participants were randomly assigned to a depletion or control condition. The primary dependent variable was level of agreement with a persuasive essay.

Procedure

Self-control phase. Participants were told that the study was investigating various cognitive processes assessed through multiple tasks. Half of the participants first completed a self-control task (depletion condition) and half (control condition) skipped this task and continued to the attitude phase of the study.

Participants in the depletion condition were required to exert self-control by squeezing a handgrip for as long as possible. This handgrip task is commonly used in studies of self-control (Muraven et al., 1998). The handgrip consists of two handles connected by a wound spring and is designed to build muscles in the forearm. Individuals grasp the handgrip, which brings the handles together and compresses the spring, thereby creating resistance. Maintaining a grip is tiring for the forearm muscles and once these muscles become fatigued, the grip relaxes. Thus, continuously squeezing the handgrip requires the individual to overcome the urge to relax the forearm and as such, self-control is required to inhibit this desire to let go. To measure how long participants gripped the handgrip as accurately as possible, a folded piece of paper was placed between the handles. Once a participant gripped the handles together with the paper in between, the experimenter began timing. When the participant's grip loosened and the handles opened enough so that the paper

dropped from the handgrip, the timing was stopped and recorded.

Attitude phase. During the attitude phase, all participants received the same persuasive essay used in Study 1. The key difference was that all participants were told that the policy to shorten the summer would be implemented in 5 to 6 years. This implementation was done to create a moderate degree of involvement and motivation. The concern here was that low involvement would not invoke resistance and that high involvement would motivate too much resistance and override the small self-control manipulation (see Muraven & Slessareva, 2003). Next, participants completed the same attitude measure used in Study 1. It was assumed that participants would generally disagree with this policy and so it would require persuasion to move their attitudes in the direction of endorsement. A pilot study ($N = 22$) confirmed this intuition, demonstrating that on average, participants rated the policy change negatively ($M = -2.08$, $SD = 2.02$) on a scale from -5 (*disagreement*) to $+5$ (*agreement*). Thus, the persuasive message was perceived as counterattitudinal.

After reading the essay, participants completed the five attitude questions used in Study 1 ($\alpha = .95$). Finally, participants completed the same task perception questionnaire used in Study 1 to assess differences in mood and perceptions of the attitude task.

Results

Task Perceptions

There were no significant differences in mood or perceptions of the task, $ps > .12$. This pattern again ensures that differences in attitude ratings are not attributable to differences in mood or task perceptions.

Attitude Ratings

As predicted, those who squeezed the handgrip for as long as possible and thereby exerted self-control were in less disagreement with the policy ($M = 0.16$, $SD = 2.41$) compared to those who did not exert self-control ($M = -1.90$, $SD = 2.10$), $t(20) = -2.12$, $p < .05$ (Cohen's $d = .91$).⁴

Discussion

Study 2 revealed that participants who were more depleted of their self-control resources were more persuaded by the counterattitudinal message. Because resistance to persuasion requires resources, those who exerted self-control through the handgrip task were more in agreement with the policy.

One limitation of Study 2 was that the handgrip was not held for an equal duration across all participants. Therefore, the purpose of Study 3 was to use a self-control manipulation that would more uniformly influence participants. A second limitation of this study was that participants in the control group did not complete a task before reading the essay, whereas those in the depletion condition did. It is possible that completing any task before the essay may have decreased resistance, regardless of whether the task involved self-control. Study 3 sought to address this possible alternative account by having half the participants complete a self-control task and the other half complete a task that does not require self-control. Finally, because self-control can be exerted in a number of ways (e.g., emotional, behavioral, cognitive), its effect on persuasion was explored using a different operationalization. Rather than using a behavioral manipulation of self-control, Study 3 used a cognitive manipulation.

STUDY 3

The design of this study was similar to Study 2 except that a new self-control manipulation was used. A common technique for distinguishing the effects of self-control from nonregulatory effects (e.g., cognitive fatigue) is to employ two tasks, both requiring exertion but only one involving self-control exertion. For example, previous research indicates that solving math problems is rated just as difficult and effortful as suppressing one's thoughts (Muraven et al., 1998); however, only thought suppression requires self-control. Thus, to assess the effect of self-control on resistance to persuasion in this study, a thought suppression task was used for the depletion condition and a math problem task was used for the control condition.

Method

Participants and Design

Seventy-eight students (29 men, 49 women; mean age = 19) from UNC participated in this study. Participants were randomly assigned to the depletion or control conditions. The primary dependent variable was level of agreement with a persuasive essay.

Procedure

Self-control phase. This experiment used a bogus two-study procedure. The experimenter explained that the first study was investigating various cognitive processes. During this phase, participants completed a self-control depletion task or control task for 5 min.

Participants in the depletion condition completed a thought suppression task. They were instructed to list any thoughts that came to mind on a blank paper but were told to actively avoid thinking of a white bear during this task. Whenever they had unwanted thoughts of a white bear, they were told to place a check mark on the page for each occurrence (see also Wegner, 1992; Wegner, Schneider, Carter, & White, 1987). Those in the control condition were instructed to work on a list of moderately difficult math problems (Muraven et al., 1998).

Following this initial task, participants completed the task perception questionnaire used in the previous studies. However, unlike the previous studies where this measure was used to assess mood and perceptions regarding the final task, in this study it was used to assess mood and perceptions regarding the self-control task. The task perception measure therefore assessed the effectiveness of the self-control manipulation. This is consistent with how this measure is typically used in the self-control literature (see Muraven et al., 2006). In addition, two questions regarding self-control exertion were added (i.e., "How hard did you work at controlling your thoughts?" and "How much did you have to inhibit your thoughts?"). These two questions were significantly correlated with one another ($r = .59, p < .001$) and were averaged to form a composite measure of self-control exertion. Unlike the other assessment items, differences between the two conditions were expected because they were thought to represent self-control resources used.

Attitude phase. Next, participants completed the attitude phase of the study. A different experimenter was introduced and presented the cover story from Study 1. A packet was given that contained a new consent form, a cover sheet, the persuasive essay (same one used in Studies 1 and 2), and questions assessing the student's attitude toward the policy change ($\alpha = .93$). As in Study 2, all participants were told that the policy to shorten the summer would be implemented in 5 to 6 years. During the debriefing sessions, no participant reported awareness that the two studies were related.

Results

Task Perceptions

As in the previous studies, and consistent with Muraven and colleagues (Muraven et al., 1998; Muraven et al., 2006), there were no significant differences in mood or perceptions of the task ($ps > .31$). Nevertheless, the two conditions did differ in their reported exertion of self-control, $t(76) = -2.45, p < .05$. Those in the depletion condition reported exerting more self-control ($M = 12.76, SD = 5.88$) than those in the control condition

($M = 9.80, SD = 4.39$). These findings offered reassurance that the manipulation targeted self-control and not more general cognitive or affective states.

Attitude Ratings

As predicted, those who were told to inhibit their thoughts were in less disagreement with the policy ($M = -0.43, SD = 2.02$) than those who worked on solving math problems ($M = -1.40, SD = 2.25$), $t(76) = -2.01, p < .05$ (Cohen's $d = .45$). Indeed, those in the math problems condition tended to show an attitude level ($M = -1.40$) much like that shown in the pilot study ($M = -2.08$), $t(54) = 1.15, p = .26$.

Discussion

Study 3 provided a conceptual replication of Study 2 by showing that participants who exerted self-control through thought suppression were more persuaded by the counterattitudinal message. This study also ruled out a possible confound in Study 2 by showing that only the task requiring self-control impaired resistance to persuasion. Importantly, the findings cannot be explained by cognitive fatigue because both tasks required cognitive exertion but only the thought suppression task required regulatory exertion. Finally, this study extended the previous findings by demonstrating this effect with a different manipulation of self-control.

As previously stated, I predicted that this effect of depletion on resistance to persuasion, as a regulatory process, should occur independent of cognitions. The assertion is that self-control exertion impairs one's willpower to stand against an agent of influence and that it does so in a direct manner. However, an alternative explanation is that self-control leads to changes in cognitions and that these cognitive changes lead to changes in attitudes. For example, it could be that the thought suppression in Study 3 led to a "rebound" effect. That is, when individuals inhibited thoughts on the first task, this led to more thorough thinking about the message on the subsequent task. If this were the case, the increased persuasion found in Study 3 would be due to increased message scrutiny and not impaired self-control. Although this suggestion may seem plausible, the research on rebound effects, as well as the present theory, suggests it is an unlikely explanation.

Thought rebound is defined as the propensity for thought suppression to lead to increased intrusions of the *previously forbidden thought* (Wegner et al., 1987). This effect does not necessarily imply that inhibition of thoughts in one domain will lead to greater thinking in another domain. Rebound effects have only been found to be domain specific. For example, suppression of stereotypes about a skinhead led to greater stereotypic thoughts

about skinheads on a subsequent task (Macrae, Bodenhausen, Milne, & Jetten, 1994), but it has not been found to result in greater thinking overall. If this were the case, stereotype suppression would likely result in more individuated and *less* stereotypic responses on a subsequent task. Thus, the suppression of a white bear may lead to a rebound of greater thoughts of a white bear, but there is no evidence to suggest that it would lead to greater overall thinking about the persuasive message. Nevertheless, this alternative account was explored in Study 4.

A second purpose of Study 4 was to assess the impact of depletion on effortful versus noneffortful forms of resistance. Although the concept of resistance denotes an effortful quality, clearly not all forms of resistance are extremely effortful. For example, it should take a great deal of effort to resist a message that contains strong, cogent arguments, but it should not take much effort to combat weak, spurious arguments. Thus, by examining argument strength from a regulatory perspective, Study 4 explored the use of effortful and non-effortful resistance in relation to self-control resources.

STUDY 4

The purpose of Study 4 was twofold. First, this study examined the impact that self-control resources have on resistance to weak and strong persuasive messages. It was expected that participants would be motivated to resist both weak and strong arguments. However, weak arguments can be easily disregarded (i.e., less effortful) and therefore should not tax self-control resources. Strong arguments cannot be easily dismissed and should require active resistance. As such, I predicted that for strong arguments, depletion would impair resistance compared to the control condition. For weak arguments, depletion should have little or no effect on resistance.

Another purpose of this study was to assess whether depletion, as a regulatory process, can affect attitudes independent of cognitions. Recall that it is not enough to hold message-relevant thoughts in our mind; we must also exert self-control to actually implement these thoughts into resistance. If depletion affects attitudes independent of cognitions, it should not influence message-relevant thoughts. Furthermore, the impact of depletion on attitudes should occur directly and therefore should not be mediated by changes in message-relevant cognitions. To test these issues, participants' message-relevant thoughts were directly assessed and compared across conditions. Also, mediational analyses were used to see whether the effect of depletion on persuasion occurred independent of cognitive responses. Thus, I predicted that with strong arguments, self-control depletion would impair resistance, but for weak arguments it would

have little or no effect. I also predicted that there would be no effect of depletion on participants' message-relevant thoughts and that depletion would affect attitudes directly (i.e., independent of thoughts).

METHOD

Participants and Design

One hundred and twenty students (23 men, 95 women, 2 failed to report gender; mean age = 19) from UNC participated for course credit. Participants were randomly assigned to one of four conditions in a 2 (self-control: depletion vs. control) \times 2 (argument strength: strong vs. weak) factorial design. The primary dependent variable was level of agreement with a persuasive essay.

Procedure

The procedure of Study 4 was similar to Study 3, with one addition. After rating their attitude, participants completed a thought listing task that followed the format used by Petty and Cacioppo (1986b).

Self-control phase. For greater precision in the manipulation of self-control, it is common to hold the task constant across conditions, where one group is instructed to exert self-control and the other group does not receive these instructions (Muraven et al., 1998). For example, all participants may be asked to freely list their thoughts on paper, with only half of them instructed to inhibit the thought of a white bear. In this instance, suppressing thoughts requires greater regulatory effort than not suppressing thoughts. Unlike two tasks that are perceived to be similar on effort and difficulty and seemingly differ only in the exertion of self-control (e.g., math vs. thought suppression), the same task performed with or without the exertion of self-control is expected to differ in the amount of perceived effort and difficulty (Muraven et al., 1998).

For this reason, Study 4 had participants in the control condition freely list their thoughts instead of working on math problems. Thus, half of the participants suppressed the thought of a white bear (depletion condition) when listing their thoughts on a blank piece of paper and the other half freely wrote down their thoughts (control condition; Muraven et al., 1998). Five minutes were given to work on this task. Next, participants completed the same task perception questionnaire used in Study 3 that included the two self-control exertion questions ($r = .68, p < .001$).

Attitude phase. For the attitude phase of the study, a new persuasive topic was adopted and the procedure followed that of Petty and Cacioppo (1986b). After the

self-control phase, the experimenter informed participants that the next task was about impression formation and that they were to read an essay and form an impression about the author. All were then presented with an essay that consisted of weak or strong arguments for a mandatory senior exam policy (Petty & Cacioppo, 1986b). After reading the essay, participants rated their attitude toward the senior exam policy. These questions were taken from Petty and Cacioppo (1986b) and were similar to those used in the previous studies. Specifically, they consisted of four questions (bad/good, unfavorable/favorable, harmful/beneficial, and foolish/wise) on an 11-point semantic differential scale ranging from -5 to $+5$. The four questions had high internal consistency ($\alpha = .94$) and they were combined to obtain an overall index of a participant's attitude.

Thought listing task. After rating their attitudes, participants completed a thought listing task. This task is commonly used to assess how much participants are thinking about the persuasive message (e.g., Cacioppo & Petty, 1981; Insko, Lind, & LaTour, 1976; Tormala, Brinol, & Petty, 2006). Participants were given a sheet of paper with blank boxes and were asked to list their thoughts regarding the policy they just read. After listing their thoughts, participants then classified each thought as positive (*in favor of the policy*), negative (*opposed to the policy*), or neutral (*irrelevant*).

Results

Task Perceptions

As in the previous studies, there was no significant difference by condition in mood or perceptions of the task in general ($ps > .33$). However, consistent with prior self-control findings using this manipulation (see Muraven et al., 1998), participants in the depletion condition rated the task as more effortful ($M = 13.20$, $SD = 6.61$) than did participants in the control condition ($M = 9.63$, $SD = 6.49$), $t(118) = -2.98$, $p < .01$, and they rated the task as more difficult ($M = 9.07$, $SD = 6.31$) than did participants in the control condition ($M = 5.62$, $SD = 5.41$), $t(118) = -3.22$, $p < .01$. As in Study 3, the two tasks differed in their ratings of self-control required, $t(118) = -3.59$, $p < .001$, with those in the depletion condition reporting that they exerted more self-control ($M = 12.86$, $SD = 5.82$) than those in the control condition ($M = 9.16$, $SD = 5.45$). These results supported the contention that the two conditions differed primarily in the amount of self-control resources required.

Dependent Measures

Attitude ratings. The composite attitude score was subjected to a 2 (condition: depletion vs. control) \times 2 (argument: strong vs. weak argument) ANOVA. The

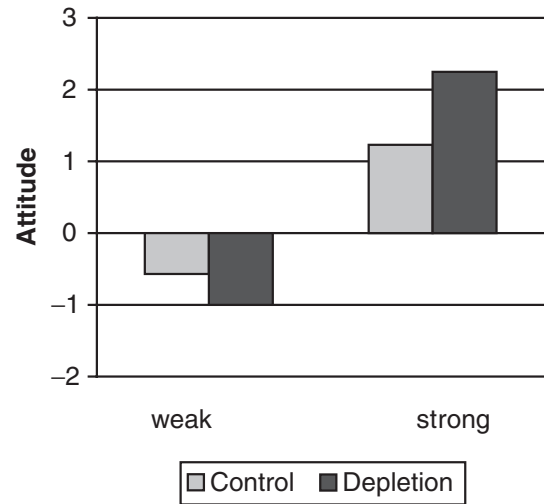


Figure 1 Attitude regarding senior exam policy by self-control and argument quality conditions.

pattern of results is shown in Figure 1. The main effect of argument strength was significant, with strong arguments being more persuasive ($M = 1.74$, $SD = 1.82$) than weak arguments ($M = -0.78$, $SD = 2.21$), $F(1, 116) = 47.49$, $p < .001$. The main effect of self-control condition was not significant, $F < 1$. Most important, there was a significant interaction, $F(1, 116) = 15.77$, $p < .05$. As predicted, those who read the strong argument essay and who were in the depletion condition showed greater agreement with the policy ($M = 2.25$, $SD = 1.36$) compared to those in the control condition ($M = 1.23$, $SD = 2.09$), $F(1, 116) = 3.85$, $p < .05$ (Cohen's $d = .59$). However, for those who read the weak argument essay there was not a significant difference between those in the depletion ($M = -1.00$, $SD = 2.23$) and control ($M = -0.57$, $SD = 2.22$) conditions, $F(1, 116) = .70$, $p > .40$.⁵

Thought assessment. To determine whether depletion influenced participants' cognitions, the number of positive (favorable) and negative (unfavorable) thoughts listed by participants were separately analyzed in 2 (condition: depletion vs. control) \times 2 (argument: strong vs. weak) ANOVAs. For positive thoughts, only a main effect of argument strength was significant, such that there were more positive thoughts for strong ($M = 1.12$, $SD = .94$) than for weak ($M = 0.33$, $SD = 0.66$) arguments, $F(1, 116) = 27.94$, $p < .001$. For negative thoughts, once again there was only a main effect of argument strength, such that there were more negative thoughts for weak ($M = 2.87$, $SD = 1.44$) than for strong ($M = 1.60$, $SD = 1.28$) arguments, $F(1, 116) = 25.49$, $p < .001$. Importantly, there were no self-control main effects or interactions for positive or negative thoughts, $F_s < 1$. Finally, total number of thoughts (positive, negative, and irrelevant) showed no significant main effects or interaction.

In addition to a separate analysis of positive and negative thoughts, it is common practice to compute an index of thought favorability by subtracting the number of negative thoughts from the number of positive thoughts and dividing this difference by the total number of thoughts listed. This index was also computed and analyzed. Once again, only a main effect of argument strength was found, such that there was greater favorability toward strong ($M = -0.09$, $SD = 0.38$) than weak ($M = -0.53$, $SD = 0.37$) arguments, $F(1, 116) = 40.26$, $p < .001$. Importantly, self-control had no effect on thought favorability, $F_s < 1$, indicating that the thought suppression task did not lead participants to think more thoroughly about the message.

Mediational Analyses

For a more thorough examination of the findings, multiple mediational analyses were conducted. The cognitive response approach to attitude change states that thought elaboration fully mediates the relationship between argument strength and attitudes. As such, this pattern should clearly be seen in the control condition. However, this pattern should not occur in the depletion condition if something additional is influencing participants' attitudes (i.e., self-control). If self-control is having an influence on attitudes in this condition, thought elaboration should only partially mediate the relationship between argument strength and attitudes. This pattern would suggest that self-control is having an effect on attitudes above and beyond the typical cognitive response effect. Thus, I predicted that thoughts would completely mediate the effect of argument strength on attitudes in the control condition and only partially mediate this relationship in the depletion condition.

To assess mediation, the classic approach of regression-based causal models was used (Baron & Kenny, 1986). The model was assessed for participants in both the depletion and control conditions and the results are presented in Figure 2. The data were first analyzed to determine whether thought favorability mediated the effect of argument strength on attitudes. As can be seen in Part A of Figure 2, for those who were not required to exert self-control, argument strength significantly influenced thought favorability, $\beta = .54$, $t(58) = 4.85$, $p < .001$, such that stronger arguments led to more favorable thoughts. In turn, thought favorability significantly influenced participants' attitudes, $\beta = .55$, $t(58) = 5.03$, $p < .001$, such that greater favorability led to less negative attitudes toward the policy. Importantly, when thought favorability and argument strength were both added as predictors of attitudes, the direct effect between argument strength and attitudes became nonsignificant, dropping from $\beta = .39$, $t(58) = 3.23$, $p < .01$, to $\beta = .13$, $t(57) = 1.03$, $p = .31$.

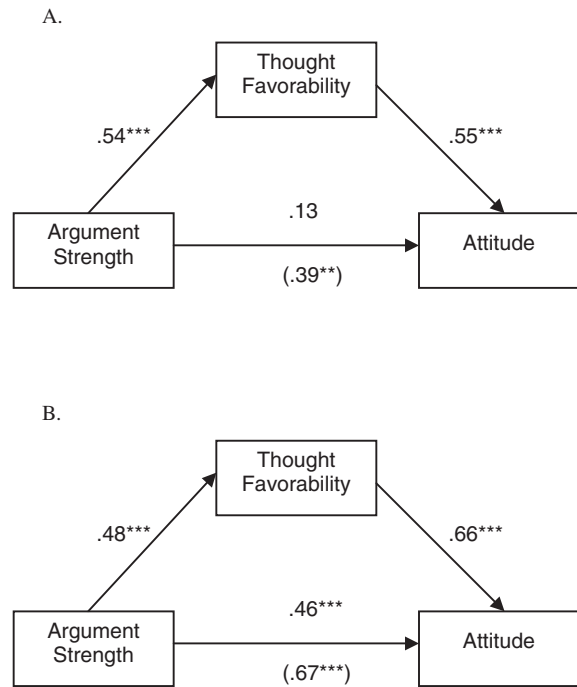


Figure 2 Thought favorability as a mediator of argument strength and attitudes in control (A) and depletion (B) conditions.

NOTE: Path coefficients are represented as standardized betas. The coefficient in parentheses indicates the direct effect of argument strength on attitudes without mediators in the model.

** $p < .01$. *** $p < .001$.

The Sobel (1982) test of mediation was significant ($z = 2.94$, $p < .01$). This pattern indicates that for those in the control condition, the effect of argument strength on attitudes was fully mediated by thought favorability, supporting a cognitive response model of attitude change (Petty & Cacioppo, 1986a).

However, as can be seen in Part B of Figure 2, this pattern was not evident for participants who were required to exert self-control. Once again, argument strength significantly influenced thought favorability, $\beta = .48$, $t(58) = 4.16$, $p < .001$, such that stronger arguments led to more favorable thoughts. In turn, thought favorability significantly influenced participants' attitudes, $\beta = .66$, $t(58) = 6.69$, $p < .001$, such that greater favorability led to less negative attitudes. However, when thought favorability and argument strength were both added as predictors of attitudes, the direct effect between argument strength and attitudes remained significant, only dropping from $\beta = .67$, $t(58) = 6.82$, $p < .001$, to $\beta = .46$, $t(57) = 4.74$, $p < .001$ (Sobel test: $z = 3.08$, $p < .01$). This mediational pattern indicates that for those in the depletion condition, the effect of argument strength on attitudes was only partially mediated by thought favorability. Importantly, this pattern establishes that in the condition where participants are made

to exert self-control, there is an additional effect on their attitudes *beyond* that of elaboration.

The preceding results indicate that the effect of argument strength on attitudes is fully mediated by thought favorability but that this is not the case when participants exert self-control, suggesting that self-control has an influence independent of thoughts. To explore the effects of self-control on these relationships, a second mediational analysis was conducted to determine whether the relationship between self-control exertion and attitudes was mediated by thought favorability. Because the effect of self-control exertion on attitudes is thought to occur independent of cognitive responses, I predicted that thought favorability would not mediate this direct effect.

The relationship among self-control, thought favorability, and attitudes was separately assessed for participants in the strong and weak argument conditions. However, given that the self-control manipulation was not found to affect attitudes regarding weak messages, only the analysis for the strong arguments is reported.⁶ These results are presented in Figure 3. As can be seen, when participants were exposed to strong arguments, thought favorability had a significant effect on attitudes, $\beta = .51$, $t(58) = 4.49$, $p < .001$, such that reporting greater thought favorability led to more favorable attitudes. Importantly, when thought favorability and self-control were both added as predictors of attitudes, the direct effect between self-control and attitudes remained significant, only dropping from $\beta = .28$, $t(58) = 2.23$, $p < .05$, to $\beta = .26$, $t(57) = 2.43$, $p < .05$. The Sobel test of mediation was not significant ($z = .26$, $p > .80$). In other words, after controlling for thought favorability, self-control exertion still had a significant direct effect on attitudes. Consistent with a self-control model of resistance to persuasion, the direct effect of self-control on attitude change was independent of participants' cognitive responses.

Discussion

The results of Study 4 clarify the role self-control plays in resistance to persuasion. These results revealed that resources are involved in the resistance of strong but not weak arguments. For participants who read strong arguments, those who exerted self-control on a previous task were more favorable toward the message than those who did not exert self-control. This result suggests that when individuals have their self-control resources intact they are better able to successfully resist strong arguments. Conversely, for participants who read weak arguments, there was no influence of self-control exertion. This is likely because weak arguments are easily disregarded, do not tax resources, and thus are unaffected by self-control exertion.

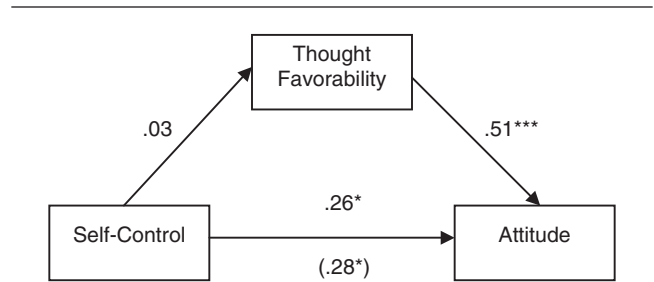


Figure 3 Thought favorability as a mediator of self-control and attitudes in the strong arguments condition.

NOTE: Path coefficients are represented as standardized betas. The coefficient in parentheses indicates the direct effect of self-control on attitudes without mediators in the model.

* $p < .05$. *** $p < .001$.

Study 4 also tested the alternative explanation that thought suppression led to thought rebound, which caused greater elaboration of the persuasive message. Contrary to a rebound account, thought suppression did not influence participants' thoughts (for or against) the persuasive message. Furthermore, the mediational analyses demonstrated that the effect of self-control on attitude change in the strong arguments condition was not mediated by thought favorability. Taken together, these results indicate that thought suppression did not lead to greater message elaboration. Importantly, the results of this study demonstrate that self-control depletion increases persuasion in a manner that does not influence the quantity or favorability of attitude-relevant thoughts.

Overall, this study provides further evidence that self-control plays an integral role in resistance to persuasion, particularly in the presence of strong persuasive arguments. In addition, this study revealed an important distinction between *effortful* and *noneffortful* forms of resistance. Although many forms of resistance require self-control resources, some forms are less effortful and therefore do not consume or require these resources. This distinction between forms of resistance that do or do not require self-control resources is an important addition to the persuasion literature and a fruitful area for future research.

GENERAL DISCUSSION

The present studies provide evidence that one must possess self-control resources to effectively resist persuasion. Successful resistance leads to an expenditure of these resources (Study 1), and depletion of these resources leads to diminished resistance (Studies 2 and 3), particularly in response to strong arguments (Study 4). Importantly, the effect of self-control on persuasion was demonstrated across these studies using different self-control manipulations

and different persuasive messages. Overall, these experiments offer strong evidence that self-control depletion reduces resistance to persuasion. Together, these studies suggest a cyclical relationship between self-control resources and resistance to persuasion. When one resists persuasive appeals, this act can expend self-control resources, thereby leaving one depleted and susceptible to future persuasive influences.

But this cycle is not inevitable. Although some forms of resistance to persuasion are effortful, it appears that others are not. The results of Study 4 show that individuals are able to resist weak efforts routinely without becoming depleted or vulnerable to future influence. In fact, many forms of resistance that have been studied in the persuasion literature appear to be noneffortful, such as source derogation (Tannenbaum, Macauley, & Norris, 1966) and avoidance of inconsistent information (Frey, 1986). However, when individuals are unable to easily dismiss or avoid persuasive messages in this manner, self-control resources are needed to successfully combat these influences.

This pattern of results bears some similarity to Gilbert's (1991) research on automatic acceptance. Gilbert suggests that people automatically accept information to be true, and the subsequent evaluation and then rejection of information are more effortful than acceptance. This may be the case for persuasive messages as well—people may automatically accept a persuasive request and then must exert effort to evaluate and then reject the message. Although this may be the case, Gilbert's analysis focused on cognitive resources (e.g., distraction, cognitive load) rather than regulatory resources. Thus, it is likely that Gilbert's effects do not completely dovetail with the processes described here. Nevertheless, the role that automatic processes play in the relationship between self-control and persuasion is a worthy area for future study.

One significant contribution the present findings offer is the demonstration that the self-regulation process, vis-à-vis depletion, affects attitude change independent of elaboration. The results of Study 4, particularly the mediational analyses, clearly show that the effect of depletion on attitudes is not caused by changes in cognitive responses. That is not to say that depletion may never influence attitude-relevant thoughts; recent research in independent labs has shown such an effect can occur under certain circumstances (e.g., Gitter, Maner, & Tice, 2006). Wheeler et al. (2007) recently showed that depletion can impair the ability to generate counterarguments, and this in turn influenced attitudes, but only in response to weak messages. Wheeler et al. suggest that depletion merely moderates the counterargument process. The present work shows that self-regulation plays a more fundamental role in the resistance process—even when counterarguments have been generated, it

takes some resource-dependent work to implement those arguments into active resistance. Identifying when self-control does and does not influence attitudinal cognitions is a worthy endeavor for future research, but it is beyond the scope of this article.

The distinction between the influence of self-control on counterarguments and its influence independent of thoughts also offers unique predictions for future work. If depletion disrupts the generation of counterarguments (Wheeler et al., 2007), depletion effects should occur in conditions where counterarguments are likely to occur. For example, counterarguments are more likely to occur for strongly held preexisting attitudes, such as attitudes toward abortion (Petty & Krosnick, 1995). Thus, depletion effects would be stronger with firmly held attitudes than with new or weakly held attitudes. The present theory, based on the self-regulatory literature, predicts the opposite pattern. Because self-control acts as a limited resource, we are likely to conserve it to use as needed (Muraven et al., 2006). When we encounter situations that are important to us (e.g., beliefs about abortion) we often choose to devote those resources to that endeavor (Muraven & Slessareva, 2003). Thus, depletion effects would be stronger for weakly held or newly formed attitudes than for firmly held attitudes because people would put all their resources into defending these self-important beliefs.

Although depletion may influence thoughts, the present work is important because it demonstrates that changes in thoughts are *not a necessary requirement* for attitude change to occur. Even when the exertion of self-control does not affect message-relevant thoughts, it still can have a direct effect on persuasion nonetheless. Thus, the present studies offer the first demonstration of the effects of self-control depletion on attitude change, independent of thoughts.

The present research is also important because it offers one of the first demonstrations connecting the self-regulation literature with the attitude literature. Other topics in our field have recently benefited from a self-regulation perspective, including stereotypes (von Hippel, Silver, & Lynch, 2000), aggression (DeWall, Baumeister, Stillman, & Gailliot, 2007), and self-presentation (Vohs, Baumeister, & Ciarocco, 2005). The present research clearly shows that a regulatory perspective can facilitate in the understanding of attitude change by offering a unique way of viewing persuasion and by providing a burgeoning area for future research (see also Cesario, Grant, & Higgins, 2004; Lee & Aaker, 2004; Wheeler et al., 2007).

When Do We Resist?

The self-control model provides an account for why people are less able to resist multiple persuasive

attempts that occur over time (e.g., Knowles & Linn, 2004). It also suggests that people may be more vulnerable to persuasion later in the day because the expenditures of self-control resources might accumulate as the day progresses. Furthermore, people who are actively pursuing self-improvement (e.g., dieting, quitting smoking) may be particularly vulnerable to persuasive influences. Finally, it seems likely that those with chronically low self-control resources should be most persuadable, whereas those with chronically high self-control should be able to resist persuasion even in the face of self-control demands (Tangney, Baumeister, & Boone, 2004).

Just as this model offers insights into the factors that might diminish resistance, it also offers suggestions on how to increase it. The two primary ways of increasing resistance to persuasion are forewarning (Freedman & Sears, 1965) and inoculation (McGuire, 1964). Both techniques work by sensitizing an individual to the arguments that might appear in an upcoming appeal. A self-control approach to resistance differs from these in that resistance is raised through actions that are unrelated to the approaching arguments. By engaging in self-control "exercises," such as regulating one's mood or improving one's posture, people may develop a reservoir of stronger self-control resources to draw on (Muraven, Baumeister, & Tice, 1999) and thus may become more able to resist persuasion even after sustained self-control demands. Current work in my lab is exploring these issues.

Conclusion

The current research offers a clear demonstration of the connection between self-control and resistance to persuasion. It points out that a person must work to thwart persuasive appeals and that, without the means of doing so, one can become susceptible to influence. Like erosion wearing away at a piece of stone, people can be worn down over time and succumb to influences that they would have otherwise been able to resist. Indeed, this effect was intuited by Leonardo da Vinci long ago: That it is easier to resist at the beginning than at the end.

NOTES

1. Thirty-three participants exceeded this maximum time limit of 10 min.
2. Across all four studies, none of the correlations between the task perceptions items and the outcome variables reached significance.
3. For a self-control manipulation to be effective, the individual must exert self-control for a sustained period of time. Female participants were also included in this study; however, most women were unable to maintain their grip for very long. On average, the women held for little over 30 s ($M = 44.18$ s), whereas the men were able to hold for over 2 min ($M = 125.78$ s), $t(18) = -2.34$, $p < .05$. Thus, the self-control manipulation was only effective for men. This may likely

be due to the handgrip being a "heavy tension" model. As such, only the data from the male participants were used in the analysis. Females did not significantly differ in attitudes across the self-control conditions, $t(18) = .42$, $p = .68$.

4. Attitude certainty was also measured (Tormala & Petty, 2002). It was found that self-control exertion did not significantly affect participants' attitude certainty, $t(20) = .64$, $p = .53$. This was also found to be the case in Studies 3 and 4.

5. Strong arguments produced more favorable attitudes than weak arguments in the control condition, $F(1, 116) = 12.07$, $p < .01$, and the depletion condition, $F(1, 116) = 39.34$, $p < .001$.

6. Only the path from thought favorability to attitudes reached significance for the weak arguments condition, $\beta = .43$, $t(58) = 3.67$, $p = .001$.

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