


Treating Thoughts as Material Objects Can Increase or Decrease Their Impact on Evaluation

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Abstract

In Western dualistic culture, it is assumed that thoughts cannot be treated as material objects; however, language is replete with metaphorical analogies suggesting otherwise. In the research reported here, we examined whether objectifying thoughts can influence whether the thoughts are used in subsequent evaluations. In Experiment 1, participants wrote about what they either liked or disliked about their bodies. Then, the paper on which they wrote their thoughts was either ripped up and tossed in the trash or kept and checked for errors. When participants physically discarded a representation of their thoughts, they mentally discarded them as well, using them less in forming judgments than did participants who retained a representation of their thoughts. Experiment 2 replicated this finding and also showed that people relied on their thoughts more when they physically kept them in a safe place—putting their thoughts in their pockets—than when they discarded them. A final study revealed that these effects were stronger when the action was performed physically rather than merely imagined.

Keywords

attitudes, self-control, validation, mindfulness

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What do people do with thoughts they do not like? Psychologists have suggested many mental actions that people can take to change unwanted thoughts. They can try to change those thoughts through deliberative self-persuasion or by searching for and exposing themselves to appropriate persuasive information (Maio & Thomas, 2007). People can try to change how they view their thoughts by reinterpreting or even trivializing them (Beck, 1993; Ellis, 1973; Gross, 1998). Indeed, what people think about their thoughts (metacognition) can influence the subsequent impact those thoughts have (see Petty, Briñol, Tormala, & Wegener, 2007).

Despite these efforts, unwanted thoughts sometimes persist. People can try to ignore these thoughts, negate them, suppress them, correct for them, or think about something else, but unfortunately, these mental activities can be difficult to implement and do not always work in the intended ways (Wegner & Erber, 1992). For example, attempts to negate or suppress stereotypes and prejudice can backfire and produce an increase in unwanted thoughts (e.g., Gawronski, Deutsch, Mbirikou, Seibt, & Strack, 2008; Macrae, Bodenhausen, Milne, & Wheeler, 1996; Monteith, Sherman, & Devine, 1998). Also, attempts at correction for unwanted thoughts can lead to

biases in the opposite direction (e.g., Martin, 1986; Schwarz & Bless, 1992; Strack & Mussweiler, 2001; Wegener & Petty, 1997; Wilson & Brekke, 1994).

Instead of engaging in these effortful mental activities that do not invariably produce the desired result, what if people could just throw their unwanted thoughts in the garbage as they do unwanted objects? But can people discard their thoughts as easily as they dispose of objects? Dualist philosopher René Descartes held that the mind is a nonphysical substance, and thus, mental phenomena are also nonphysical (see Cottingham, 1999). According to this classic Western notion of dualism, a thought cannot literally be thrown into the garbage, because it does not have a material or physical nature.

However, people might still be able to treat their thoughts as physical objects. If so, they could break them into pieces, destroy them, and throw them away just as they do physical

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objects. There are two reasons that this possibility may be plausible. First, psychologists have treated thoughts metaphorically as physical objects in order to improve their understanding of cognitive processes. For instance, Abelson's (1986) theoretical perspective on the nature of beliefs treats beliefs as "possessions." Models of organizational behavior refer to the possibility of "owning" immaterial goods, such as organizational knowledge (e.g., Van Dyne & Pierce, 2004). Of course, the feeling of ownership can be applied to all kinds of mental constructs, including scientific ideas and artistic creations (e.g., Heider, 1958). Second, thoughts are also treated like physical objects in nonpsychological domains. For example, language is replete with metaphors linking thoughts and physicality (Lakoff & Johnson, 1980). Thus, people talk about having, acquiring, borrowing, holding, losing, and abandoning their thoughts.

In sum, it may be reasonable to suggest that thoughts can be understood and treated as if they were physical objects. What remains to be examined is the extent to which researchers can move from metaphorical analogies of thought to a more literal view of thoughts as physical objects. In the present work, we examined the impact of treating thoughts as tangible objects in the domain of attitudes.

The goal of the present research was to examine the impact on judgment of treating one's thoughts as external objects and performing physical actions with them. We conducted two primary experiments. In Experiment 1, participants wrote down their positive or negative thoughts about their bodies on a piece of paper and then either threw that paper in the garbage or double-checked the spelling of what they wrote. According to the cognition-as-object view, physically disposing of one's thoughts, which suggests that they were unwanted or lacked value, would lead to mentally disposing of those thoughts. Thus, when thoughts were discarded, participants were expected to use their thoughts less in forming judgments than participants in the control condition would. In Experiment 2, we replicated the thought-disposal effect and added a new condition of thought protection.

Experiment 1

Method

Participants and design. Eighty-three students at a public high school in Albacete, Spain, participated in Experiment 1 as part of a course designed to prevent eating disorders (average age = 15.6 years, $SD = 0.69$). The students were randomly assigned to the cells of a 2 (thought direction: positive vs. negative) \times 2 (treatment: thought disposal vs. control) between-subjects factorial design.

Procedure. The experiment was presented as a study on body image. All participants received written instructions asking them to complete several tasks. As part of the first task, each participant was randomly assigned to generate and write down

either positive or negative thoughts about his or her own body during a 3-min period. In the positive-thoughts condition, participants were told to list as many positive thoughts about their bodies as they could; in the negative-thoughts condition, participants were told to list as many negative thoughts about their bodies as they could (e.g., Killeya & Johnson, 1998). Examination of the thoughts listed indicated that all participants followed the instructions.

After listing his or her thoughts, each participant was randomly assigned to either the thought-disposal or the control condition. All participants were asked to look back at the thoughts they wrote. In the thought-disposal condition, participants were asked to contemplate their thoughts and then throw them into the trash can located in the room, because their thoughts did not have to remain with them. In the control condition, participants were asked to contemplate their thoughts and to check for any grammar or spelling errors they could find.

The dependent variable in our analysis was participants' attitudes toward their bodies. Participants were told that they should record these attitudes because their self-image might have influenced their previous responses. Attitudes were assessed using three 9-point semantic-differential scales (e.g., *bad-good*, *unattractive-attractive*, *like-dislike*). Ratings were highly intercorrelated ($r = .88$), so we averaged them (after reverse scoring as appropriate) to create a composite attitude index. Higher values on this index indicated more favorable attitudes.

Results

The dependent measure was submitted to a 2 (thought direction: positive vs. negative) \times 2 (treatment: thought disposal vs. control) analysis of variance (ANOVA). Results of the ANOVA revealed a significant main effect of thought direction, $F(1, 79) = 4.26, p = .04, \eta^2 = .046$, qualified by a significant Thought Direction \times Treatment interaction, $F(1, 79) = 5.33, p = .02, \eta^2 = .05$. As Figure 1 shows, the difference

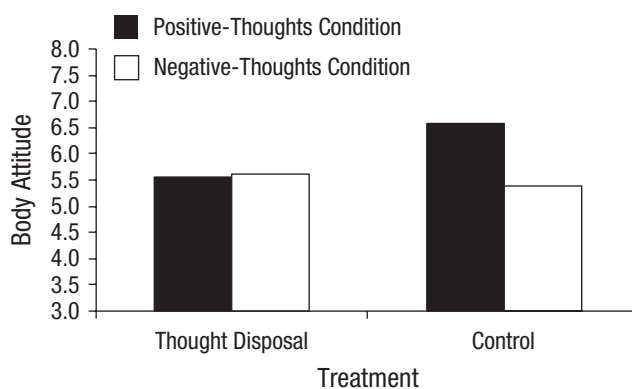


Fig. 1. Results from Experiment 1: participants' mean rating of their attitudes toward their own bodies as a function of the type of treatment they received and the direction of their thoughts.

between the positive-thoughts condition ($M = 6.59$, $SD = 1.11$) and negative-thoughts condition ($M = 5.38$, $SD = 1.31$) was significant only for participants in the control condition ($M = 5.55$, $SD = 1.42$), $F(1, 79) = 8.44$, $p < .01$, and not for participants in the thought-disposal condition ($M = 5.62$, $SD = 1.06$), $F(1, 79) = 0.035$, $p = .85$.¹

Discussion

Consistent with our hypothesis that a thought-disposal treatment can influence judgments by invalidating people's thoughts, results showed that the attitudes of participants who physically threw their thoughts away showed less impact of the thought-direction induction than did the attitudes of participants who physically retained their thoughts. These findings are consistent with previous research on self-validation (Petty, Briñol, & Tormala, 2002), which showed that thoughts tagged as invalid or held with low confidence are less influential than thoughts tagged as valid or held with high confidence (see Briñol & Petty, 2009). It is important to note that because the treatment was induced after thoughts were already generated, it could not affect the valence or the number of participants' thoughts. Rather, the treatment decreased the strength of the influence that participants' thoughts had on their attitudes.

Experiment 2

Experiment 2 was designed with five objectives. First, we aimed to provide a conceptual replication of Experiment 1 and show a decrease in thought use after physical thought disposal. Second, we attempted to specify the aspect of the thought-disposal treatment that was responsible for the effects on attitudes by more clearly isolating the behavioral component of the induction. That is, compared with the control group in the prior experiment, participants in the control group in Experiment 2 were not asked to read their thoughts again, a process that kept exposure to those thoughts constant across the thought-disposal and control conditions.

Third, we changed the topic of the thought task in order to generalize our findings to a new issue and to rule out the possibility that thought disposal would work only when the thoughts were about the self. Thus, instead of asking participants to generate thoughts about their bodies, we asked them to generate arguments in favor of or against the Mediterranean diet (i.e., high consumption of fruits, vegetables, legumes, and unrefined cereals, with olive oil as the basic fat; see Willett et al., 1995).

Fourth, and most important, a key goal of this experiment was to provide an extension of the previous findings by showing that thought use could be increased when participants physically kept their thoughts safe rather than discarding them. We created a new condition in which participants were asked to write their thoughts on a piece of paper and then take their thoughts with them. Our expectation that individuals would show increased reliance on their thoughts when those thoughts

were kept safe is related to the logic behind the endowment effect. This effect refers to the tendency for people to require more money to give up an object they own than they are willing to pay to acquire the same object (Thaler, 1980). That is, goods that one owns are valued more highly than identical goods that one does not own (Kahneman, Knetsch, & Thaler, 1991; Tversky & Kahneman, 1991). Similar arguments have been made about one's thoughts. That is, one's own thoughts are seen as better than the thoughts generated by others (Greenwald & Albert, 1968; Perloff & Brock, 1980). Given that our argument is that thoughts can be treated as material objects, we tested whether people would value (rely on) their thoughts more when they physically kept ("owned") them versus did something irrelevant to the paper on which their thoughts were written (as the control group was instructed to do).

Finally, the previous experiment established that treating thoughts as real objects can influence attitudes, but it remained an open question whether the impact of treating thoughts as objects could extend to other outcomes that are the downstream consequences of attitudes, such as behavioral intentions. If it could, this would establish that the current phenomenon has important real-world implications because previous research has established that behavioral intentions are the best predictors of behavior (Ajzen, 1991; Fishbein & Ajzen, 1975).

Considering the findings of the previous experiment, we expected participants in the thought-disposal condition to show reduced reliance on their thoughts in forming attitudes and behavioral intentions toward the Mediterranean diet compared with participants in the control or thought-protection conditions. Furthermore, we expected participants in the thought-protection condition to show a greater effect of thought direction on attitudes and intentions than those in the control or thought-disposal conditions.

Method

Participants and design. Two hundred eighty-four undergraduate students from a public high school in Albacete, Spain, voluntarily participated in Experiment 2 as part of a course on preventing eating disorders (average age = 16.87 years, $SD = 3.02$). They were randomly assigned to the cells of a 2 (thought direction: positive vs. negative) \times 3 (treatment: thought disposal, control, or thought protection) between-subjects factorial design.

Procedure. The experiment was presented as a study on eating habits. All participants received written instructions asking them to complete several tasks. As part of the first task, each participant was randomly assigned to list either positive or negative thoughts about the Mediterranean diet for 3 min. Before listing their thoughts, all participants were reminded that a Mediterranean diet involves high consumption of fruits, vegetables, legumes, and unrefined cereals, with olive oil as the basic fat.

After listing his or her thoughts about the diet, each participant was randomly assigned to complete either the thought-disposal, thought-protection, or control task. Participants in the thought-disposal condition received instructions to remove the page on which they wrote their thoughts from the rest of the instruction booklet and place it in the trash can located in the room. In the thought-protection condition, participants were instructed to remove the page on which they wrote their thoughts from the rest of the instruction booklet, fold it, and take it with them in their pocket, wallet, or purse. In the control condition, participants were told to remove the page on which they wrote their thoughts from the rest of the instruction booklet and fold the four corners so we could identify that page later if necessary.

The dependent variable in our analysis was participants' attitudes and behavioral intentions toward the Mediterranean diet. To assess attitudes, we asked participants to rate the diet using seven 9-point (1–9) semantic-differential scales. These scales were anchored by the following terms: healthy-unhealthy, desirable-undesirable, positive-negative, in favor-against, foolish-wise, harmful-beneficial, and recommended-not recommended. In addition, to assess intentions toward the Mediterranean diet, we asked participants three questions: To what extent they would be willing to participate in a campaign designed to promote the diet, to what extent they would eat according to the Mediterranean diet in the future, and to what extent they were willing to support this diet in any other way. Participants indicated their assessments using 9-point scales ranging from 1 (*not at all*) to 9 (*totally*). Both attitudes and behavioral-intentions items were averaged to form a single index of overall evaluation of the diet for each participant ($r = .91$). Higher values on this index indicated more favorable evaluations.²

Results

We conducted a 2 (thought direction: positive vs. negative) \times 3 (treatment: thought disposal vs. thought protection vs. control) ANOVA on the overall evaluative measure. The analysis

revealed a significant main effect of thought direction on evaluation of the Mediterranean diet, such that participants who generated thoughts in favor of the diet held more favorable evaluations ($M = 6.84$, $SD = 1.14$) than those who generated thoughts against the diet ($M = 6.35$, $SD = 1.21$), $F(1, 282) = 18.55$, $p < .01$, $\eta^2 = .06$. More critical, the two-way interaction between thought direction and treatment was significant, $F(2, 282) = 42.84$, $p < .001$, $\eta^2 = .23$ (see Fig. 2).³

To fully interpret this interaction, we conducted a series of further contrasts. First, the comparison between the thought-disposal and control conditions revealed a significant interaction between thought direction and condition (Fig. 2). The effect of thought direction on evaluation of the diet was greater for control than for thought-disposal participants, $t(282) = -4.60$, $p < .001$. This pattern replicated the one obtained in Experiment 1. For control participants, those who generated positive thoughts reported more favorable evaluations of the diet ($M = 6.78$, $SD = 0.89$) than did those who generated negative thoughts ($M = 6.16$, $SD = 1.05$), $F(1, 282) = 6.55$, $p = .01$. For the thought-disposal condition, however, the effect of thought direction on evaluation was reversed: Participants who generated negative thoughts reported more favorable evaluations of the diet ($M = 7.10$, $SD = 0.99$) than those asked to generate positive thoughts ($M = 6.27$, $SD = 1.18$), $F(1, 282) = 17.17$, $p < .001$. Stated simply, when people treated their thoughts as “trash,” their judgments were the opposite of their thoughts. People might be especially likely to do the opposite of their thoughts when they have very high doubt about what they have in mind, when they overcorrect for the direction of their thoughts (e.g., Martin, 1986), or when they are concerned about thoughts that are framed or perceived to be represented in a dichotomous manner (Beck, 1993; Ellis, 1973).

In the comparison between the control and thought-protection conditions, the interaction between thought direction and condition was also significant. It showed that the new thought-protection condition led to greater thought use than the control condition did, $t(282) = 3.87$, $p < .001$. Thus, the effect of thought direction on evaluations of the diet was greater for the

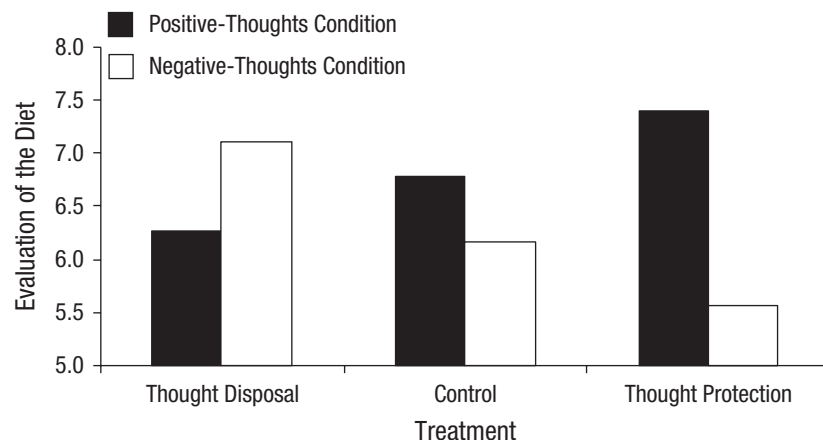


Fig. 2. Results from Experiment 2: mean evaluation of the Mediterranean diet as a function of the type of treatment participants received and the direction of their thoughts.

thought-protection condition than for the control condition. For thought-protection participants, those who generated positive thoughts reported more favorable evaluations of the diet ($M = 7.39$, $SD = 1.01$) than did those who generated negative thoughts ($M = 5.57$, $SD = 1.01$), $F(1, 282) = 78.11$, $p < .001$.^{4,5}

General Discussion

In Western dualistic philosophy, thoughts cannot be treated as material objects because they are not a question of matter. However, language is replete with metaphorical analogies suggesting that thoughts can be understood and treated as if they were physical objects. The present research examined whether treating thoughts as if they were real could influence attitudes and behavioral intentions. In our first experiment, relative to control subjects, participants who literally threw their thoughts away used those thoughts less in forming attitudes. Our second experiment conceptually replicated this finding for a different topic. This study included a new condition in which participants kept their thoughts in their possession (e.g., in their pocket). Compared with participants in other conditions, those who kept their thoughts showed increased reliance on their thoughts in forming their attitudes and behavioral intentions.

Given that language contains various metaphors mapping thoughts onto physical things (Lakoff & Johnson, 1980), our research opens the possibility of many other interventions. For example, people might be able to protect their thoughts from changing if they write them down and hide them prior to a counterattitudinal attack.

In addition to extending the results to other actions relevant to attitude change and resistance, future research should also examine the boundary conditions for these effects. For example, would similar actions performed by other people (e.g., a friend throwing your thoughts away) have similar effects? This question awaits further research. The general idea that thoughts can be treated as if they were physical objects is in line with recent work on embodied cognition (e.g., Semin & Smith, 2008) and situated cognition (e.g., Robbins & Aydede, 2009), which suggests that the relationship between body, mind, and environment is multidirectional.

Another important question is to what extent performing the physical action with the thoughts adds anything beyond merely imagining that action. Actual performance of the behavior might have a number of advantages over mere imagination, such as leading to more complex and richer representations (Niedenthal, Barsalou, Winkielman, Krauth-Gruber, & Ric, 2005), activating one's self-concept to a greater extent (Peck & Shu, 2009), and functioning as a stronger prime (Dijksterhuis & van Knippenberg, 1998).⁶

To address the issue empirically, we conducted a new study in which 78 undergraduate students from Universidad Castilla La Mancha in Albacete, Spain, were asked to type in the computer their negative thoughts about the Mediterranean diet and were instructed to create an electronic file with those thoughts. After creating the file, each participant was randomly assigned

to one of four experimental conditions. Some of the participants were asked to use the mouse to move the electronic file to the recycle bin (physical-disposal condition), whereas others were asked to use the mouse to move the file to a storage disk (physical-protection condition). These two conditions required participants to physically move the mouse with their hand in order to move the electronic files.⁷ In the remaining two conditions, participants were asked to mentally imagine that they would perform that action, but without having to actually do it. That is, half of the participants were asked to mentally visualize themselves moving the files to either the recycle bin (mental-disposal condition) or to the storage disk (mental-protection condition). Finally, participants evaluated the diet on the same items used in Experiment 2.

The 2 (dispose vs. protect) \times 2 (physically move vs. imagine) ANOVA revealed a significant interaction between the two independent variables, $F(1, 74) = 15.93$, $p < .001$. Consistent with the findings of the main studies, results showed that participants in the physical-disposal condition ($M = 7.61$, $SD = 1.13$) had reduced reliance on their negative thoughts in evaluating the diet compared with participants in the thought-protection conditions ($M = 6.10$, $SD = 1.15$), $F(1, 74) = 17.80$, $p < .001$. In contrast, we found that the evaluations of participants in the imagination conditions did not differ after visualizing the action of moving thoughts to be recycled ($M = 6.67$, $SD = 1.02$) or to be stored ($M = 7.11$, $SD = .98$), $F(1, 74) = 1.73$, $p = .19$. Furthermore, the difference between physically moving the negative thoughts to the recycle bin and merely imaging that action was significant, $F(1, 74) = 7.38$, $p = .008$. Similarly, there was a significant difference in evaluations between storing the file and simply imaging doing so, $F(1, 74) = 9.87$, $p = .005$. These findings provided a conceptual replication and extension of the previous findings to a new domain, showing that physical actions can be more powerful (even when performed on the computer) than mere imagination.⁸

Finally, the present research has important practical implications. For example, therapists have devoted attention to approaches that focus on lowering self-awareness of thoughts (e.g., Leary, Adams, & Tate, 2006). Treatments that promote mindfulness have become particularly popular as a way to teach clients to achieve these goals and to develop a more objective relationship with their thoughts. For example, patients engaged in mindfulness treatments are asked to deal with their harmful thoughts by visualizing those thoughts as passing material objects in the mind (Brown, Ryan, & Creswell, 2007). According to acceptance and commitment therapy (Hayes & Strosahl, 2004), clients can also be trained to treat their thoughts as chess pieces and move them on a real chess board (see also Baer, 2006). Although these specific techniques have not been tested empirically, they are assumed to produce a variety of positive psychological outcomes (e.g., Brown et al., 2007). Consistent with this view, the present research has shown that detaching and separating (in this case, literally) one's negative thoughts can decrease negative evaluations. The very same treatment (thought disposal) produced the opposite effect when thoughts were positive. This finding suggests that techniques

involved in some mindfulness treatments can backfire—at least for some people and for some situations, particularly those in which positive thoughts are present. Our research also suggests a new, simple strategy by which people can develop a closer relationship with their positive thoughts (e.g., physically carrying them). Taken together, these results suggest that it is important to know which specific processes are responsible for the reported effectiveness of mindfulness treatments.

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Declaration of Conflicting Interests

The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

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Notes

1. The main effect of treatment was not significant, $F(1, 79) = 2.12$, $p = .14$, $\eta^2 = .023$.
2. The attitude ratings alone were correlated with each other when averaged to form an overall attitudinal index ($r = .90$). Similarly, the three items of behavioral intentions were highly correlated when they were averaged to form a single index of overall intentions toward the diet ($r = .77$). Furthermore, the correlation between attitudes and behavioral intentions was significant, $r = .58$, $p < .001$.
3. The 2×3 ANOVA conducted on just the attitudes measure alone revealed that the predicted two-way interaction between thought direction and treatment was significant, $F(2, 260) = 34.93$, $p < .001$, $\eta^2 = .20$. When this interaction was decomposed, each of the two-way contrasts was also significant ($ps < .05$). Mimicking this pattern, the 2×3 ANOVA conducted on the behavioral-intentions measure showed the same effects as for attitudes, revealing that the interaction between thought direction and treatment was significant, $F(2, 276) = 49.01$, $p < .001$, $\eta^2 = .23$. In addition, each of the two-way comparisons was significant ($ps < .05$).
4. For completeness, the interaction between thought direction and condition was also decomposed by comparing each pair of conditions with the third. First, the interaction was significant when the control condition (contrast weight = -1) and thought-protection condition (contrast weight = -1) were combined and compared with the thought-disposal condition (contrast weight = 2), $t(260) = -7.24$, $p < .001$. There was also a significant interaction when the thought-protection condition (contrast weight = 2) was compared with the combined thought-disposal (contrast weight = -1) and control conditions (contrast weight = -1), $t(260) = 6.77$, $p < .001$. Finally, the interaction was also significant when the thought-disposal condition (contrast weight

= 1) was compared with the thought-protection condition (contrast weight = -1), excluding the control condition from the analysis (contrast weight = 0), $t(260) = 8.339$, $p < .001$.

5. The interaction can also be decomposed in another way. Specifically, when participants generated positive thoughts, protecting those thoughts increased evaluations of the diet relative to the control condition, $t(282) = 2.97$, $p = .003$. In contrast, when participants generated negative thoughts, thought protection decreased evaluations of the diet relative to the control condition, $t(282) = -2.44$, $p = .015$. Finally, as implied by the comparison tests just reported, the comparison between thought direction and treatment (thought disposal vs. thought protection) was also significant. This finding shows that the effect of the direction of thoughts on evaluations was greater for thought-protection than for thought-disposal participants, $t(282) = 9.19$, $p < .001$.

6. Furthermore, the effect of imagination might produce not only relatively weaker effects compared with actual performance, but it also has some important boundary conditions. For example, mentally visualizing a behavior has been found to be a particularly difficult task for some people, leading to backfiring effects (e.g., Petrova & Cialdini, 2005).

7. The actions used in this program of research (e.g., placing thoughts in the recycle bin or in the trash vs. in storage or in one's pocket) appear to have relatively clear evaluative meanings (e.g., one's thoughts were desired or undesired). However, the meaning of these actions can vary among individuals and situations. For example, if a person is listing facts and desires to remember them, then placing the listed facts in storage may not be a better strategy than putting them in the trash. In this context, extra effort will need to go into remembering facts that are discarded compared with those that are saved. This extra effort will make it easier to retrieve the facts later, when they are needed (see Sparrow, Liu, & Wegner, 2011). Following previous work on subjective meaning (e.g., Briñol, Petty, & Tormala, 2006), we argue that if the meaning associated with one's behavior changes, the effect of that action on subsequent judgment could also change.

8. Obviously, these results do not imply that imagination can never produce significant effects for some people under other circumstances (e.g., Anderson, 1983).

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