

The role of thought suppression in building mental blocks [☆]

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Abstract

This research examined the role of thought suppression in the formation of mental blocks. In Experiment 1, participants were asked to generate a series of creative associates for two target words after initially suppressing a word that was semantically related to one of the two target words. Participants produced fewer responses, and experienced a greater sensation of being mentally blocked, when attempting to produce associates for the target word that was semantically related to the suppressed word. In Experiment 2, participants either thought about or suppressed a series of words prior to completing a word fragment completion task. Each word either corresponded exactly to one of the word fragment solutions (target primes) or resembled one of the solutions but was slightly different in its orthographic properties (negative primes). Participants performed most poorly on the items for which they had initially suppressed negative primes.

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1. Introduction

Most of us can think of a time when we felt we had a *mental block*, a barrier in our minds preventing us from producing desired information. Often this barrier is relevant to the information we are seeking, but it is nonetheless distracting. While trying to think of a creative solution to a problem, for example, we may find ourselves thinking instead of something quite uncreative—an obvious solution that has come to mind before. Or, while trying to retrieve a name or word, we may think of something that sounds similar or has other surface features in common with the target—and find ourselves mentally blocked. The natural inclination when we have such blocks may be to try to suppress the thoughts we feel are blocking our progress. Research on thought suppression reveals, however, that this approach can have the ironic consequence of increasing the cognitive accessibility of the very information we are trying to avoid (Wegner, 1994a). The present studies explored the idea that the attempt to suppress relevant, distracting information can lead to the formation

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of a mental block, hindering a person's success in generating solutions to a problem. Our experiments examined whether instructions to suppress distracting thoughts might paradoxically increase mental blocking by heightening the influence of semantically related distracters (Experiment 1) and orthographically related distracters (Experiment 2).

1.1. *Semantically related distracters*

One common example of a mental block is the “tip of the tongue” or TOT phenomenon (Brown & McNeill, 1966). Such an experience arises when a person cannot retrieve desired information despite the strong feeling of possessing the knowledge (Yaniv & Meyer, 1987). People who experience this type of retrieval failure often report having retrieved several incorrect solutions that were semantically related to the target (Jones, 1988). The specific role of these associated thoughts or interlopers has not been made entirely clear in this literature. Some studies suggest that the related items interfere with the retrieval of the target information (Jones, 1989), while others suggest that they may actually aid retrieval (Meyer & Bock, 1992), and yet others show no influence at all (Perfect & Hanley, 1992).

In a separate line of investigation using a different problem-solving task, Smith and Blankenship (1991) found that the presentation of both relevant and irrelevant distracters prior to a problem-solving task hindered people's ability to solve the subsequent problem. In this study, participants were given a series of problems from Mednick's (1962) remote associates test. For each item, three target words are presented (e.g., *coal*, *peach*, *arm*) and participants attempt to generate a fourth word closely associated with all three (i.e., *pit*). The presentation of target-relevant distracters (e.g., for the problem presented above: *furnace*, *pear*, *leg*) resulted in poorer performance compared to when either no distracters or completely irrelevant distracters (e.g., *belly*, *football*, *election*) were presented. Although problem solving was hampered by the presence of distracters in general, the interference was substantially greater for semantically related distracters.

1.2. *Orthographically related distracters*

Distracters need not be semantically related to target information in order to hinder the problem-solving process. Information that is orthographically similar to target information may also impede a person's ability to solve a problem. Smith and Tindell (1997) tested this by having participants attempt to complete a word fragment completion task (e.g., *A_L__GY* to be completed as *ALLERGY*) after having been primed with words that were either orthographically similar (e.g., *ANALOGY*) or dissimilar (e.g., *UNICORN*) to the correct solution. When participants had been primed with an orthographically similar word (*ANALOGY*), they were significantly less likely to complete the word fragment (*A_L__GY*) correctly than when they had been primed with a dissimilar word (*UNICORN*).

Prior research has demonstrated that the mere presence of both orthographically and semantically related distracters can impair one's ability to successfully retrieve desired information. However, in these prior studies, participants' attention to the distracting information was not controlled or monitored. Rather, only the relevance of the information to the judgment was manipulated—leaving it an open question whether participants were trying to suppress relevant distracters or not. This leaves the mechanism underlying mental blocks unclear. It could be that the manipulation of thought suppression might reveal how mental blocks are formed.

1.3. *Ironic effects of thought suppression*

Research on thought suppression has typically examined what happens when people are instructed to try not to think of something, and has often found that this instruction produces a paradoxical result (Wegner, 1994b). Studies have shown that when people attempt to suppress a thought (e.g., a white bear), the thought may return with greater frequency (Wegner, Schneider, Carter, & White, 1987) and may be more accessible than if they had initially focused upon it (Wegner & Erber, 1992). The suppressed thought can return to influence emotions (Wegner, Broome, & Blumberg, 1997), actions (Wegner, Ansfield, & Pilloff, 1998), memory retrieval (Macrae, Bodenhausen, Milne, & Ford, 1997), and even dreams (Wegner, Wenzlaff, & Kozak, 2004).

According to the theory of ironic processes of mental control, these phenomena occur because of the interplay of two processes that are involved in the attempt to control mental states (Wegner, 1994a). One process is a conscious and effortful *operating process* that searches for thoughts consistent with the intended mental state. The other process is an unconscious and automatic *monitoring process* that scans for thoughts that are related to the unwanted mental state. For example, if a person is trying to quit smoking, the operating process might focus on thoughts of health, good hygiene, or the financial benefits of saving the money spent on tobacco. Simultaneously, this person's monitoring process remains on guard for occurrences of the unwanted thoughts of smoking. Thus, when the monitoring process encounters thoughts of smoking, it prompts the renewed activation of the operating process and the person engages in a search for distracting thoughts. However, under conditions of cognitive load, such as mental or physical fatigue or stress, the conscious, and effortful operating process may become compromised, leaving the automatic monitoring process searching for the unwanted thought (Wegner, 1994a). The increased accessibility of the unwanted thought that results can then bring the thought to mind. For the ex-smoker who is under cognitive load, thoughts of smoking will no longer be replaced by those of health, wealth, and hygiene. The unwanted thoughts of tobacco will become the center of his or her focus.

1.4. *The present research*

When people report having a mental block—in that they are unable to generate an idea they think they should be able to generate—they often report having an “interloper”—a thought that seems to be blocking their ideation. The present research examined whether providing such interlopers and instructing people to suppress them might artificially create “mental blocks.” The goal of Experiment 1 was to ascertain the influence that initially suppressing semantically related distracters would have on people's ability to generate a list of creative solutions to a problem. Experiment 2 then investigated the effect that suppressing orthographically related information would have on people's ability to retrieve words in a word-completion task.

2. Experiment 1: Suppression of semantically related information

The goal of this study was to ascertain whether a mental block would emerge when participants were instructed to suppress primes that were semantically related to information that participants would later attempt to retrieve. The experiment used a task in which participants were asked to produce a series of word associations in response to a target word. Before this, however, participants were given an initial thought task in which they were instructed to suppress a given word for a 5-min period. After this task, they were asked to perform word association tasks in which they were to list as many creative associates as they could for each of two given target words. The word that was initially suppressed was semantically related to one of the two target words. It was predicted that participants would generate fewer creative associates for the target word that was semantically related to the word they initially suppressed.

2.1. *Method*

2.1.1. *Participants*

Sixty-nine Harvard undergraduates (30 males, 39 females) participated in the experiment in exchange for either course credit or payment. Three participants failed to follow directions; therefore their data were not included in the analyses.

2.1.2. *Suppression targets and creativity targets*

The two words for which participants were asked to generate creative associates were *table* and *carpet*. These words were selected because according to Palermo and Jenkins' (1964) word association norms, *table*, and *carpet* have similar numbers of associates distributed with similar frequencies.

The most common associates for *table* and *carpet* are *chair* and *rug*, respectively, (Palermo & Jenkins, 1964). During the initial thought task, participants were instructed to suppress either the word *chair* or *rug*. Participants then engaged in the word association task for *table* and for *carpet*, which allowed each person

to serve as their own control. If a person suppressed *chair* in the first phase of the experiment, then *table* would be the relevant target. If they initially suppressed *rug*, then *carpet* would be the relevant target. The target word that was unrelated to the initial prime was the irrelevant target.

2.1.3. Procedure

Participants were run individually or in small groups, and began by practicing writing their stream of consciousness for 2 min. The purpose of this practice session was to familiarize participants with the process of reporting their thoughts. Depending upon which experimental condition they were randomly assigned to, participants were then instructed to suppress thoughts either of a *chair* or a *rug* for 5 min while continuing to write their stream of consciousness.

After the suppression task, participants were given a series of two word association tasks. They were instructed to list as many creative associates as possible for the words *table* and *carpet*. It was explained to participants that the associates they listed should be creative in that each had a clear link to the target, but was not necessarily an obvious association with the word. Participants were given 30 s in which to generate the associate list for each of the two targets, with order of target word presentation counterbalanced across participants. Once the word association task was completed for each target word, participants were asked to rate on a 7-point scale the degree to which they felt they had experienced a mental block while attempting to create each of the associate lists. After completing both association tasks, participants were debriefed and thanked for their participation.

2.2. Results

The data were analyzed in a 2 (suppression word: *chair* vs. *rug*) \times 2 (order of target words) \times 2 (relevant vs. irrelevant association target word) ANOVA with repeated measures on the last factor. The dependent variables of interest were fluency of responses generated and self-reported mental blocking.

2.2.1. Response fluency

We were interested to see if the degree of semantic similarity that the initially suppressed word shared with the association target word would affect the fluency with which associates for the target word could be generated. To determine this, the number of associates participants produced for both the relevant and irrelevant target words were entered into the ANOVA. The results revealed that participants generated significantly fewer responses for the target word that was semantically related to the word they initially suppressed ($M = 5.83$) compared to the target word that was unrelated to the suppressed word ($M = 6.60$), $F(1, 65) = 4.83$, $p < .05$, $\eta^2 = .07$, and other effects were not significant. These results show that the fluency with which a person can generate word associates can be reduced by the prior instructed suppression of a semantically related word.

2.2.2. Self-reported mental blocking

After completing the word associate task, participants were asked to indicate on 7-point scales the amount of mental blocking they felt while trying to find creative associates for the words *table* and *carpet*, respectively. Each participant therefore made ratings for both target words, one that was relevant to the word they initially suppressed (e.g., ratings corresponding to *table* after suppressing *chair*) and one that was irrelevant (e.g., ratings corresponding to *carpet* after suppressing *chair*). The ANOVA revealed that participants reported experiencing significantly greater mental blocking when producing associates for the relevant target word ($M = 4.73$) compared to the irrelevant target word ($M = 4.04$), $F(1, 65) = 7.87$, $p < .05$, $\eta^2 = .11$, and other effects were not significant. These results indicate that the degree of semantic relatedness a suppressed distracter shares with the target word affects the subjective experience of being mentally blocked in generating associates to the target.

2.3. Discussion

The results demonstrate that the degree of semantic association between a distracter and target information plays a significant role in the mental blocking process. Specifically, the act of suppressing a distracter that is

related to a target word can result both in decreased response fluency for associates to the target word as well as a subjective feeling of being mentally blocked during the association task. These results also reveal that the suppression of a semantically related distracter can obstruct one's ability to produce a series of solutions.

The blocking thoughts or interlopers that come to mind when we are generating solutions to a problem are not always semantically related to the problem. The distracting thoughts may be thoughts of our own failure at the problem, or they may be thoughts of possible solutions that resemble correct solutions only on the surface. In the next experiment, we examined the potential influence of the suppression of distracters that have such a surface resemblance to the target information.

3. Experiment 2: Suppression of orthographically related information

This study explored the influence of suppressing orthographically related information on the formation of mental blocks. In a procedure that extends upon a paradigm introduced by Smith and Tindell (1997), participants were initially instructed either to think about or to suppress a series of words prior to attempting a word fragment completion task. Each word they encountered in this preliminary task either corresponded exactly to one of the word fragment solutions (target primes) or resembled one of the solutions but was slightly different in its orthographic properties (what Smith and Tindell called "negative primes"). Based on past research on thought suppression (Wenzlaff & Wegner, 2000), it was predicted that attempting to suppress relevant but incorrect information would, ironically, make that information more accessible, thus hindering the ability to generate the correct answer.

3.1. Method

3.1.1. Participants

Forty-three undergraduates at the University of Virginia (9 males, 34 females) participated in the experiment in exchange for research credit in their introductory psychology course.

3.1.2. Design and procedure

Participants were run in groups ranging from 5 to 12 people. After being greeted by the experimenter, participants were seated in desks arranged in front of a large screen. The experimenter explained to the participants that in the first task, they would be shown a series of words on the screen. As part of the task, they would be instructed to either think about the given word for a 30-s interval or try *not* to think about the word for 30 s. The participants were told that it was essential that they adhere to the thought instructions. The experimenter then presented 12 words, individually, for 30 s each. Beneath each word were the instructions: "please TRY TO THINK about this word," or "please TRY NOT TO THINK about this word." In addition, the experimenter read these instructions out loud upon presenting each word in order to emphasize the instructions.

After completing the first part of the experiment, participants were given a brief questionnaire as a manipulation check to ensure that the thought instructions were followed correctly. After the questionnaires were collected, participants were given a word fragment completion task (Smith & Tindell, 1997) in which they were shown word fragments (e.g., *A_L__GY*) on the overhead screen and were asked to attempt to write the complete word (e.g., *ALLERGY*) on a blank sheet of paper. The word fragments were displayed one at a time on the screen. Each word fragment remained on the screen for 5 s. After each word fragment was shown, participants were given 7 additional seconds in which to solve it. Half of the solutions to the word fragments corresponded exactly to words that the participants had viewed earlier in the study (target primes). The other solutions to the word fragments were orthographically similar, but not identical, to words that had been presented to the participants earlier (negative primes; e.g., *ANALOGY*). The word fragments, target primes, and negative primes were identical to those used by Smith and Tindell (1997). Smith and Tindell found that these 12 negative primes were particularly likely to interfere with participants' ability to successfully complete the corresponding word fragments. Both prime (target vs. negative) and thought instructions (think about vs. suppress) were counterbalanced across sessions. After completing the word fragment task, participants were thoroughly debriefed and thanked for their participation.

3.2. Results

3.2.1. Manipulation check

After participants viewed all 12 primes in the initial phase of the study, a manipulation check was administered. Participants were asked to rate on 9-point scales whether they followed the instruction to think about the primes (“When you were asked to try to think about certain words, how much did you try to think about them?”) and the instruction to suppress the primes (“When you were asked to try not to think about certain words, how much did you try not to think of them?”). Two participants responded with the lowest possible rating (a “1” or “Didn’t try much at all”) on the scales assessing their efforts to adhere to the instructions. Therefore, data from these two participants were discarded prior to the main analyses; data from the remaining 41 participants were used in all analyses.

3.2.2. Scoring

Participants’ success at completing the word fragments was analyzed using a 2 (think about prime vs. suppress thoughts of prime) \times 2 (target prime vs. negative prime) repeated-measures ANOVA. There were four types of instructions (think about the target prime, suppress thoughts of the target prime, think about the negative prime, and suppress thoughts of the negative prime), and each participant completed three word fragments for each of the four instruction types. The scores for conditions could thus vary from zero (none correct) to three (all correct).

As predicted, participants correctly completed more word fragments for which they had seen a target prime ($M = 2.72$) than those for which they had seen a negative prime ($M = 1.33$), $F(1,40) = 116.30$, $p < .001$, $\eta^2 = .74$. Participants also completed more word fragments when they had been told to think about the prime ($M = 2.13$) than when they had been told to suppress thoughts of the prime ($M = 1.92$), $F(1,40) = 5.84$, $p = .02$, $\eta^2 = .13$. Crucial to our primary hypothesis, the main effects were qualified by a significant interaction between prime type (target prime vs. negative prime) and thought instruction (think about prime vs. suppress thoughts of prime), $F(1,40) = 5.72$, $p = .02$, $\eta^2 = .13$ (see Fig. 1). Simple effects analyses revealed that suppression had an especially detrimental effect for the items preceded by a negative prime. Initially suppressing a negative prime significantly impeded participants’ ability to complete the corresponding word fragments ($M = 1.10$), as compared to thinking about a negative prime ($M = 1.56$), $F(1,40) = 10.30$, $p < .01$. There was no difference on the fragment completion task between participants who were instructed to suppress thoughts of the target prime ($M = 2.73$) and participants were instructed to think about the target prime ($M = 2.71$), $p > .10$.

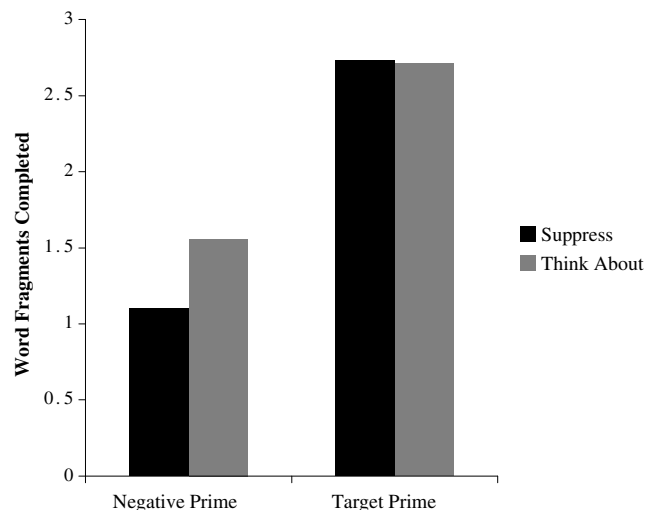


Fig. 1. Number of word fragments completed as a function of thought instructions and prime type (Experiment 2).

3.3. Discussion

The results of this study suggest that the attempt to suppress a relevant distracter can, ironically, create a mental block. These results speak against the common intuition that a mental block is an obstacle which results when we are actively *thinking* about a distracter. Rather, it is when we actively try to suppress distracting information that a block in cognition is most likely to arise. The interaction between thought instruction and prime type suggests that it is not the mere act of suppression that can hinder the search for target information; rather, it is the suppression of a relevant distracter that is likely to lead to a mental block.

It should be noted that there was no difference in performance on the word fragment completion task between the conditions in which participants suppressed the target primes versus when they had thought about the target primes. Attempting to suppress thoughts of the target primes did not make the words more accessible, as might be predicted by the ironic process theory. However, participants in both the target prime conditions were performing at a high level ($M = 2.72$ out of a possible 3.00). Thus, it is possible that any additional accessibility due to the suppression was masked by a ceiling effect; that is, participants found the word fragments very easy to complete after having been primed with the target words. Further research using a more difficult word fragment completion task could test this possibility.

4. General discussion

These studies found that the suppression of thoughts can lead to mental blocks. Experiment 1 revealed that the attempt to suppress a word (e.g., CHAIR) that is semantically related to a target word (i.e., TABLE) reduced the fluency with which other associates to the target word could be generated, and also led to higher levels of self-reported mental blocking during the association task. Experiment 2 found that when people are led to suppress the thought of a word (such as ANALOGY) that is orthographically related to a target word (such as ALLERGY), they are later hindered in the ability to retrieve the target word in response to a word fragment completion task (e.g., “A_L__GY”). The attempt to suppress the orthographically related distracter led to more mental blocking than did the attempt to think about the distracter.

4.1. The role of distracters

The results of these studies help to clarify how mental blocks arise during the problem-solving process, specifically the role that distracters may play. Different theories have been offered to explain the influence that distracters or interlopers have on a person's ability to retrieve target information. According to the partial activation theory, mental blocks such as tip-of-the-tongue states (TOTs) are the result of an insufficient activation of the target information, such that the information fails to reach the threshold required for retrieval. Providing people with related “clues” can actually help to fully activate the target information. In other words, cues, which could otherwise be considered distracters, may help a person to overcome a mental block (Burke, Mackay, Worthley, & Wade, 1991; Meyer & Bock, 1992).

According to the blocking hypothesis, interlopers, which are plausible but incorrect pieces of information, can hinder the problem-solving process because they block retrieval of the target information (Jones & Langford, 1987). Recent work found evidence that providing participants with a delay following the onset of a tip-of-the-tongue (TOT) state allows for incubation effects to occur. That is, more TOT states are resolved after a delay compared to if retrieval attempts continue immediately after the block arises (Choi & Smith, 2005). These findings offer support for the blocking hypothesis. By allowing for a delay, the information that is blocking the target becomes weakened allowing for the correct information to be retrieved. If interlopers helped in the retrieval process as is posited by the partial activation theory, a delay would likely result in fewer TOT states being resolved because the partially activated information would decrease in activation over time (Choi & Smith, 2005).

The results of the present research extend the blocking theory to include the idea of ironic processing. In both studies, the suppression of relevant information impaired people's ability to generate the target information. This is likely due to the fact that the active attempt at suppression ironically increased the accessibility of the unwanted thought thus making it difficult if not impossible to retrieve the correct response (Wegner &

Erber, 1992). This is consistent with the blocking theory. If increasing the accessibility of relevant information facilitated the problem-solving process as suggested by the partial activation theory, our results would likely have shown an increase in performance on the items for which participants initially suppressed relevant cues.

4.2. Overcoming mental blocks

Taken together, the results of these studies suggest that suppressing distracters that are orthographically or semantically related to target information may lead to the formation of a mental block. But how then do these findings translate into strategies for overcoming common experiences of mental blocks—such as tip-of-the-tongue states, writer’s block, or blocks in creativity? One study surveyed people in advertising about the techniques they used for overcoming mental blocks. The responses fell into five general categories: seeking out more information about the problem, getting away from the problem, physical exercise, talking through the problem with other people, and writing everything and anything that comes to mind, no matter how non-sensical it may be (Moriarty & VandenBergh, 1984). The results of this survey suggest that strategies for overcoming mental blocks may be somewhat idiosyncratic. However, the current research suggests that the key factor in overcoming a mental block is, ironically, the ability not to focus too much on overcoming it. By attempting to exert too much control over one’s thoughts, one may end up exacerbating the very block one sought to alleviate.

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