

Polluting the Stream of Consciousness: The Effect of Thought Suppression on the Mind's Environment¹

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When a person tries to suppress a thought, environmental features are often used as distracters. This research examined whether such distracters later become reminders of the unwanted thought when suppression is discontinued—and so incline the individual who remains in the suppression environment to experience a rebound of preoccupation with the unwanted thought. Subjects were asked to think aloud and to signal with a bell ring any thoughts of white bears. They were directed either to think or not to think of white bears in one context (a slide show). When they were then invited to think about white bears in a different slide-show context, no appreciable rebound of white bear thoughts was found in the subjects who had initially suppressed. However, when they were issued the same invitation on return to the initial context, those who had initially suppressed showed a rebound of preoccupation.

KEY WORDS: obsession; rumination; mental control; thought suppression; context effects.

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Our surroundings can remind us of things. We enter a room and remember what we did there, for instance, or we see a person and recall something we thought about when we last were in that person's presence. These reminders occur when we think of something in an environment and then enter that environment again. There is reason to believe, however, that such reminding is also likely when we have previously tried not to think about something in an environment. People appear to use strategies to distract themselves from unwanted thoughts—strategies that help them suppress the thought, but that also may link the thought to items in their current context, and so make the context a strong reminder of the suppressed thought at later points. Our research examined these potentially "polluting" consequences of thought suppression.

The idea that a person might be reminded of a thought by the context in which the thought was suppressed comes from experiments by Wegner, Schneider, Carter, and White (1987). Subjects in these studies were asked to deliver continuous reports of their thoughts while they were attempting not to think of a white bear. They were instructed to indicate the occurrence of a white bear thought either verbally or by ringing a bell, and were found to signal occurrences repeatedly despite their explicit task. People in this research did not succeed easily in conscious thought suppression. Other subjects were invited to perform an expression task—thinking about a white bear for the same time period. And, of course, these participants reported yet greater levels of thought occurrence. However, when subjects first suppressed thoughts of the white bear, they showed even more thought reports in a subsequent expression period. The act of avoiding a thought for a short time inclined these people to signal a relative outpouring of thought occurrences when they were later allowed to express the thought.

This *rebound effect* is reminiscent of many suppression-induced phenomena observed by psychologists over the years (see Wegner, 1988, 1989; Wegner & Schneider, 1989). Freud (1914/1958) was among the first to remark on how attempts to deny or repress an unwanted thought can lead to a subsequent (conscious or unconscious) preoccupation with that very thought. Other clinical observers have noted this paradoxical effect of suppression (e.g., Lazarus, 1983; Lindemann, 1944), indicating that obsessive concern and distress can result. Just such a pattern is fairly well documented in the case of thought suppression prior to a traumatic event such as surgery (Burstein & Meichenbaum, 1979; Janis, 1958); those patients who avoid thinking about an upcoming surgery are unusually upset and preoccupied with it afterward.

Rebound also arises in more mundane realms of self-control: People who suppress a thought (on the way to suppressing a behavior such as smoking or eating) can become especially prone to later preoccupation with

thoughts of the very activity they have attempted to avoid (Polivy & Herman, 1985). And individuals who attempt to block or inhibit expression or communication following a traumatic experience can encounter excessive levels of rumination (Foa & Kozak, 1986; Rachman, 1980; Silver, Boon, & Stones, 1983) and even physical health problems (Pennebaker, 1989). In short, the rebound effect observed in the initial white bear study has several seeming parallels outside the laboratory.

If the white bear findings indeed reflect mechanisms analogous to those underlying these observations, it is important to develop a clear theoretical understanding of the rebound effect. Wegner et al. (1987) suggested an explanation derived from examination of the verbal protocols of subjects engaged in the thought suppression task. They pointed out that people trying not to think of a white bear commonly undertook an *unfocused self-distraction* strategy—the progressive use of many different distracters rather than just one focus. So, for example, a person suppressing might say "I'll think of the wall," and then spend a few moments discussing this distracter. A distracter so chosen is usually quite uninteresting, and the person is soon off the wall and thinking again about a white bear. A new distracter is then selected ("Okay, I'll think about my shoes"), only to fail, and this cycle repeats itself again (" . . . my fingernails") and again (" . . . the doorknob?").

The critical feature of unfocused self-distraction is that it creates associations between the unwanted thought and all the various distracters. The wall is now likely to be a reminder of white bears, as are the shoes and every distracter used during suppression. Many of the person's current mental contents—including items in the setting that are used as distracters, as well as other thoughts that may be current on the person's mind—become associated with the unwanted thought. These items can then serve as cues to remind the person of the thought in the subsequent expression period, so to yield the observed rebound effect.

One test of this explanation of the rebound was offered by Wegner et al. (1987, Experiment 2). This study called for some subjects to use a *focused self-distraction* strategy for suppression. They were told to try not to think of a white bear, but to think of a red Volkswagen in case they did. This instruction was planned to help subjects avoid using their current thoughts and context as distracters, and was expected to produce an attenuation of the rebound effect. And in fact, this was observed. The results showed a rebound effect only among those subjects for whom no special strategy was suggested. Presumably, subjects given a distracting focus were later unlikely to think about it, and so escaped the unusual level of contextual reminding that underlies the rebound. This suggests that there is

indeed something special about unfocused self-distraction that yields the rebound phenomenon.

If unfocused self-distraction operates by forging connections between environmental features and the unwanted thought, then it is important to explore the influence of context continuity on the rebound effect. As in the white bear experiments of Wegner et al. (1987), the present study called for subjects to think aloud and to signal with a bell ring any occurrences of thoughts of white bears. Subjects were directed either to suppress or to express the thought of a white bear in a 5-min session. A context for this was provided in the form of a slide show on one or the other of two themes throughout this session. Then, subjects in both conditions spent two additional sessions under instructions to think about white bears. In the first session, the slides shown were on a different theme than those shown in the earlier session. In the final session, the slides shown reverted to the beginning theme. It was expected that the rebound effect would only occur in this latter session.

METHOD

Subjects

Trinity University undergraduates (29 females and 18 males) in introductory psychology classes participated in return for extra class credit. Each was randomly assigned to an initial suppression condition or an initial expression condition.

Procedure

Each subject participated individually, first by reading a set of instructions on how to report one's stream of consciousness. The instructions were adapted from those used by Pope (1978), and were fashioned to encourage continuous verbalization. The instructions asked only for subjects to think aloud, and made no special appeal for any explanation or justification of the thought.

The participant was asked and gave informed consent to spend several 5 min periods alone reporting to a tape recorder "everything that comes to mind." For each period, it was explained that the experimenter would say "begin"—and then leave the room for the duration of the period. After one such practice period, the experimenter returned to issue added instructions. Participants assigned to the *initial suppression* condition were told: "In the next five minutes, please verbalize your thoughts as you did before,

with one exception. This time, try not to think of a white bear. Every time you say 'white bear' or have 'white bear' come to mind, though, please ring the bell on the table before you." Participants assigned to the initial expression condition were told: "In the next five minutes, please verbalize your thoughts as you did before, with one exception. This time, try to think of a white bear. Every time you say 'white bear' or have 'white bear' come to mind, please ring the bell on the table before you." In two subsequent 5 min periods, the experimenter entered the room again and delivered expression instructions to all subjects. Thus, while subjects in the initial suppression condition first suppressed the thought and then expressed it for two sessions, those in the initial expression condition expressed the thought for three sessions in a row.

The context was manipulated through the continuous presentation of a series of color slides on a wall directly in front of the subject. It was explained to the subjects that this presentation might help alleviate any boredom they could experience during the experiment. The subject's desk area was shielded at the back and sides by dull brown partitions, such that the projection wall was the only visually interesting area in the room. The slides were projected automatically, one every 15 s, beginning immediately after the initial think-aloud instructions were given. As subjects verbalized their ongoing thoughts in a preliminary 5-min "warmup" period, 20 different slides were shown of landscapes and outdoor scenes.

The slides shown in the next three 5-min periods constituted the context manipulation. Subjects in both the initial suppression and initial expression groups viewed one set of 20 slides in the first period. This was either a set featuring classroom scenes (students at desks, professor at a blackboard, students in a lab, etc.), or one picturing household appliances (coffee maker, refrigerator, electric can opener, etc.). For all subjects, then, the alternate set of slides was shown in the next period. The initial set of slides was shown once more in the final period. The specific slide sets were counterbalanced across conditions. Thus, the context manipulation amounted to an A-B-A design for all subjects; their initial task was performed in context A, their next task (of expression) was performed in context B, and their final task (of expression again) was performed in context A.

RESULTS

The taped sessions were analyzed by different coders for two variables—thought reports such as bell rings and mentions of *white bear*, and slide mentions indicating attention to the context.

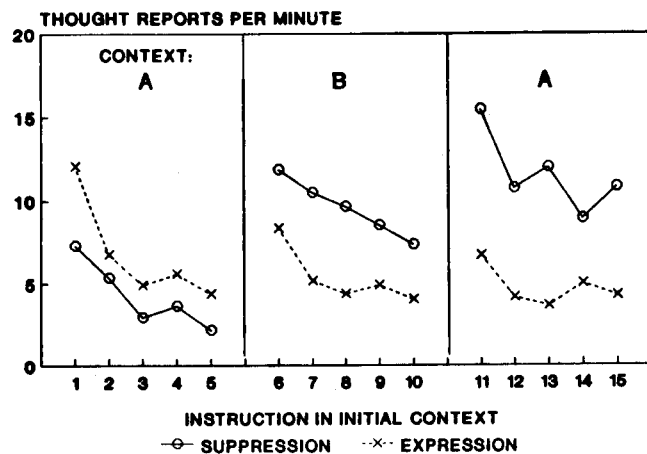


Fig. 1. Thought reports (bell rings and mentions) by minute for initial suppression or initial expression in context A and for subsequent expression by these groups in context B and again in context A.

Thought Reports

Analysis of the tape recordings was made for total thought reports per minute. Reports included all bell rings and mentions of *white bear* or *bear*, including pronouns and indirect references. Intercoder reliability computed as the correlation between a pair of coders within a session averaged .96 for the three thought sessions.

A 2 (Initial Suppression vs. Initial Expression group) \times 3 (Thought Period) \times 5 (Minute Within Period) analysis of variance (ANOVA) was conducted on thought reports. This analysis was chosen because subsidiary analyses with sex of subject and specific context as factors revealed no significant main or interactive effects for these variables. The means for the analysis are represented in Fig. 1.

The appearance of the context-dependent rebound effect in this figure is quite dramatic, and the ANOVA indicates that it is reliable. A significant interaction of condition (initial suppression vs. initial expression) and period (first, second, third) was found, showing that the two conditions had different effects over periods, $F(2, 90) = 14.55, p < .0001$. Decomposition of this interaction revealed first a marginally significant difference between conditions in the initial period, $t(45) = 1.81, p < .08$. Subjects in the initial suppression period, as might be expected, tended to report fewer white bear thoughts ($M = 21.4$) than did subjects in the initial expression period ($M = 33.7$). This result suggests that suppression induces a remark-

able number of intrusions of the to-be-suppressed thought, but that the level of thinking in suppression may yet be lower than that yielded by instructions to express the thought deliberately. The level of thought during suppression in this research was slightly higher than that observed by Wegner et al. (1987). There are conditions, however, under which suppression can yield the same or more thought-relevant responding than expression (Wegner & Erber, 1990; Wegner, Shortt, Blake, & Page, 1990; Wenzlaff, Wegner, & Roper, 1988), so the absence of a major disparity here is not entirely surprising.

The key comparisons for evaluation of the rebound effect were several. First, looking at contrasts between conditions after the initial session, we find a weak rebound effect in the new context and then a strong rebound effect in the old context. In the new context (context B in Fig. 1), the level of expression for the initial suppression group ($M = 47.9$) was marginally higher than the level for the initial expression group ($M = 26.8$), $t(45) = 2.01, p < .06$. In the old context at the third session (content A on the right-hand side of Fig. 1), however, the level of expression for the initial suppression group ($M = 57.9$) was significantly higher than the level of expression for the initial expression group ($M = 23.8$), $t(45) = 2.61, p < .02$. The usual suppression rebound effect observed in previous white bear studies was not significantly evident here until the original context of suppression was reintroduced.

Viewing this interaction through comparisons over sessions within each condition leads to a similar conclusion. The mean thought reports for the initial expression condition dropped significantly from the first session ($M = 33.7$) to the second one ($M = 26.8$), $t(23) = 3.60, p < .001$; they also dropped significantly from the first session to the third ($M = 23.8$), $t(23) = 3.53, p < .002$. The decrease from the second to the third session was not significant. So, as might be expected on the basis of simple fatigue or progressive disinterest, thought reports during three consecutive periods of thought expression tended to decrease over time.

The mean thought reports for the initial suppression condition followed quite a different pattern. We found that thought report levels during expression were greater than in initial suppression ($M = 21.4$), both with the introduction of new context in the second session ($M = 47.9$), $t(22) = 3.07, p < .01$, and in the return to the old context in the third session ($M = 57.9$), $t(22) = 3.18, p < .01$. And, in clear support of the idea that the rebound is enhanced by a return to the old context, thought report levels increased significantly between expression in the second session new context ($M = 47.9$) and expression in the third session when the original context of suppression was reinstated ($M = 57.9$), $t(22) = 2.12, p < .05$. Indeed, the level of thought reporting by the initial suppression subjects on return-

ing for expression of the thought in the old context ($M = 57.9$) was marginally higher even than the level shown by initial expression subjects in their very first session ($M = 33.7$), $t(45) = 1.86$, $p < .07$.

To summarize, it appears that the rebound effect is dependent on the continuity of context between suppression and expression. The rebound observed when subjects were invited to express the thought in a context unlike the one in which they initially suppressed the thought was not particularly substantial. The rebound observed at a later session—when by dint of simple fatigue one would expect subjects to report the thought less often—was significant. That later session, of course, featured a slide show context like that of initial suppression. The return to that context appears to be a cause of renewed preoccupation.

Slide Mentions

Additional observations relevant to the processes underlying the rebound were derived from analyses of slide mentions. Two coders examined the taped protocols of all subjects with a view toward counting instances of (a) slide mentions that occurred immediately before a thought report, and (b) all other slide mentions. In all cases, a separate slide mention was coded when slide-related content occurred in the tape following the occurrence of any content that was not slide-related (including a bell ring or mention of a white bear). Intercoder reliability calculated as the correlation between coders over subjects was .87 for the first measure and .91 for the second. It is important to note that both of these measures were significantly correlated over subjects with white bear thought reports in all periods, $r(47) = .34$ to $.65$, all $p < .05$. Thus, they cannot be taken as strictly independent of the main results of the study. However, their pattern can be examined for its consistency with the processes we believe may underlie the rebound effect.

One way to gauge conscious attention to context in this study, for example, is simply to count the total number of slide mentions—the sum of the two measures. It would be expected that greater attention to context would occur in suppression than in a comparable period of thought expression. Slide mentions did not vary significantly in an ANOVA that examined the effects of condition and thought period (see Table I), but the relevant comparison was nonetheless examined. Subjects during initial suppression showed a tendency to mention the slides significantly more often ($M = 20.1$) than did subjects during initial expression ($M = 15.2$), $t(45) = 1.73$, $p < .05$ (one-tailed). Although this is not a strong effect, it is fully consistent

Table I. Slide Mention Measures

Condition	Period (context)		
	Initial (A)	Second (B)	Third (A)
	Slide Mentions		
Initial suppression	20.1	19.5	21.6
Initial expression	15.2	17.3	17.1
	Cuing Index		
Initial suppression	.35	.53	.60
Initial expression	.47	.48	.43

with our argument that suppression promotes conscious attention to context in the service of self-distraction.

A second analysis of slide mentions focused on a different measure—the degree to which slides tended to cue white bear thoughts. For this purpose, a *cuing index* was computed for each session as the number of slide mentions that occurred immediately before thought reports divided by the total number of slide mentions for the subject. This index can be understood as a measure of the degree to which mentioning a slide served to cue subjects to think about a white bear. An ANOVA on this index revealed a significant interaction of condition and session, $F(2, 90) = 7.05$, $p < .002$. Means for this analysis are shown in Table I. Subsequent comparisons between conditions for each session indicated that this index differed only in the third session. During expression in the third session, subjects in the initial suppression condition showed higher values on the cuing index ($M = .60$) than did subjects in the initial expression condition ($M = .43$), $t(45) = 2.11$, $p < .05$. Means on this index did not differ significantly between conditions in the first session or the second session, $p > .15$ in each case.

The analyses of slide mentions, in sum, reveal that subjects' conscious thoughts corroborate our interpretation of the processes underlying the rebound phenomenon. In the initial suppression period, there was some evidence of more frequent conscious consideration of context than in the initial expression period. Apparently, self-distraction in the service of suppression may involve recurrent attention to the environment. Then, at the point where the rebound was observed—when the subjects who had once suppressed the thought in a context were invited to think about it in the same context—there was evidence of contextual cuing of the once-suppressed thought. When slides were mentioned, they were often followed

immediately by thought reports. This tendency was more pronounced among those subjects who had suppressed rather than expressed the thought in that context before. This pattern of mentions overall is compatible with the hypothesized operation of self-distraction.

DISCUSSION

Suppressing a thought may clear the mind in one way, but pollute it in another. To find momentary avoidance of a thought, we pay by tainting our mental environs. The distracters we select to help in suppression are often found in our current environments, and these can thus become enmeshed, one by one, in a mental amalgam with the unwanted thought at its center. The context turns from distracter to a powerful reminder of the unwanted thought, such that, when we indulge in expression of the thought, the context cues it strongly and repeatedly. When suppression is lifted, therefore, this cueing remains to promote a rebound of the suppressed thought.

This depiction of the course of thought suppression is substantiated by two different kinds of evidence in this study. Evidence from reported occurrences of an unwanted thought indicates that only a modest rebound effect arises when suppression is followed by an opportunity to express the thought in a new context. These reports also show that when there is a subsequent opportunity for thinking the unwanted thought in the old context, a more vigorous rebound is unleashed. The second sort of evidence is the number and timing of subjects' mentions of the context itself. There is some indication that the context is mentioned more often during suppression than expression; this, then, would be the point at which items of context are linked with the unwanted thought. And there are strong signs that more mentions of the context occur just before intrusions of the unwanted thought during the rebound than at other times. This research suggests, then, that changes in context between suppression and expression—even changes involving only a new theme in a slide show—undermine the suppression-induced rebound.

We would expect that effects somewhat similar to the ones observed in these studies could be produced merely by arranging for people to *think* about an item in a context. The present experiment was not designed to detect such effects. Even so, because such thought expression does not incorporate the context explicitly in the conscious thought process, we suspect that any rebound induced by prior expression would be slight. Instead of such an effect, we found a general tendency for people to tire of the task and attend less and less to the target thought across multiple expression opportunities, regardless of context. So, although the present findings do

not pertain to the issue precisely, they make it possible to speculate that the traditional context effects of memory research (cf. Smith, 1988; Tulving & Thomson, 1973), based as they are on forms of expression only, may generally be less robust than suppression-induced effects.

In any event, it appears that thought suppression stores an unwanted thought in the individual's cognitive representation of the suppression context. Although this is admittedly an analogue finding, the potential impact of this phenomenon in the enterprise of suppression in everyday life should not be underestimated. The rebound effect might be damaging, for example, if a person has recently completed a diet, successfully stopped drinking or smoking, or otherwise engaged in some suppression of thought and behavior—and then chooses to remain in the very place in which the self-control was accomplished. The place could then serve as a constant reminder of the unwanted habitual or excessive behavior, and this reminding could promote a flood of polluted thoughts that could reintroduce the unwanted behavior.

This observation suggests an interesting counterpoint to the conventional wisdom of behavior therapy. Although behavior therapists have long held that people must learn to behave differently in the very circumstances that normally give rise to their unwanted behaviors, treatment at home is not always superior to inpatient treatment (e.g., Polich, Armor, & Braiker, 1981). This could be because outpatient treatment could induce self-control relapse more than inpatient treatment because of the operation of processes suggested by our research. Among individuals who use thought suppression as an aid to self-control, for instance, it could be expected that the post-treatment relaxation of self-control at home would promote stronger reminding of the unwanted habit if the person originally suppressed it at home than if the treatment occurred elsewhere.

It remains an open question, of course, whether these kinds of implications translate into useful clinical suggestions. White bears are hardly the traumatic events, addictive substances, or obsessional ruminations that people elect to suppress in everyday life. Moreover, the suggestion that self-control might better be undertaken away from home departs dramatically from the conventional recommendation that outpatient treatment be used to maximize the generalization of counterconditioning. Further research will certainly be needed before these results can serve as the basis for clinical recommendations.

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