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Abstract

Thought suppression is a mental control strategy used in attempt to suppress unwanted thoughts. Unfortunately, it often causes a paradoxical increase in the frequency of such thoughts, both immediately (as an ‘initial enhancement effect’) and after thought suppression efforts have been ended (‘ironic rebound effect’). Research surrounding the role played by the valence of the relevant material on thought suppression efficacy has been limited. Despite this limitation, the current paper proposes to review the available thought suppression-valence literature and, from it, determine the role played by target valence on thought suppression efficacy and other suppression outcomes. Considered overall, the extant literature appears to suggest that target valence is not a major determinant of thought suppression outcomes, although further research is needed to confirm this theory.

Keywords

Thought suppression, valence, mental control strategies

The Effects of Target Valence on Thought Suppression Efficacy

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Thought suppression is a mental control strategy used in attempt to suppress unwanted thoughts. Unfortunately, it often causes a paradoxical increase in the frequency of such thoughts, both immediately (as an 'initial enhancement effect') and after thought suppression efforts have been ended ('ironic rebound effect'). Research surrounding the role played by the valence of the relevant material on thought suppression efficacy has been limited. Despite this limitation, the current paper proposes to review the available thought suppression-valence literature and, from it, determine the role played by target valence on thought suppression efficacy and other suppression outcomes. Considered overall, the extant literature appears to suggest that target valence is not a major determinant of thought suppression outcomes, although further research is needed to confirm this theory.

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Thought suppression—the act of attempting not to think about a given topic (the thought suppression target)—is a commonly used mental control strategy employed in attempt to suppress unwanted thoughts. Unfortunately, it tends to be not only ineffective, but counterproductive, leading to paradoxical increases in the frequency of the target thought(s), which occur both immediately, as 'initial enhancement effects,' and after thought suppression efforts have been ended, as 'ironic rebound effects' (Wegner, Schneider, Carter III & White, 1987). For example, if a woman made a conscious effort not to think about a recent romantic break-up of hers, she would likely end up thinking about said break-up more, both while she tried to avoid thoughts related to the break-up (initial enhancement effect) and after she had stopped trying not to think about the break-up (ironic rebound effect).

Although it may seem to be an innocuous (albeit ineffective) mental control strategy, thought suppression has been linked to a wide variety of negative outcomes. Specifically, thought suppression appears to play a large role in the etiology and maintenance of many psychological conditions, especially those characterized by depression and/or anxiety (Iijima & Tanno, 2012). It is possible, for instance, that depressive rumination is facilitated by the ironic rebound effects that result from depressed individuals' tendency to suppress negative thoughts (Erskine, Kvavilashvili, & Kornbrot, 2007; Lucian, 2009). The tendency to suppress unwanted thoughts has also been found to be predictive of self-injury and, more alarmingly, suicide attempts (Cukrowicz, Ekblad, Cheavens, Rosenthal, & Lynch, 2008; Najmi, Wegner, & Nock, 2007). Notably, the damaging effects are not

exclusive to clinical populations. Research has repeatedly linked use of thought suppression to increased feelings of depression, anxiety, and general distress (Borton, Markowitz, & Dieterich, 2005; Kelly & Kahn, 1994; Marcks & Woods, 2005), negative thought processing biases (Beevers & Meyer, 2008), disruptions in immune function (Petrie, Booth, & Pennebaker, 1998), and decreases in state and long-term self-esteem (Borton, 2002; Borton & Casey, 2006; Borton et al, 2005) in both clinical and non-clinical samples.

While many studies have investigated the effects of thought suppression, the factors that affect thought suppression itself have received relatively little research attention. The role played by the valence (perceived positivity versus negativity) of the relevant material on suppression efficacy has been particularly neglected in this regard. A handful of related studies (e.g., McNally & Ricciardi, 1996; Roemer & Borkovec, 1994; Muris, Merckelbach, van den Hout, & de Jong, 1992) have been conducted, but have yielded mixed results, leaving the effects of valence unclear. Additionally, these studies have had a number of major design flaws that compromise the validity of their results, as will be discussed in later sections. Despite these problems, the current paper intends to integrate the results of past suppression-valence research into a model of thought suppression (the Input/Output Model of Thought Suppression) that accounts for the disparate findings. In particular, the current paper used the existing literature to explain how target valence influences thought suppression efficacy, which is described in terms of initial enhancement and ironic rebound effects.

Early Research

Although many earlier studies had investigated topics related to thought suppression (e.g., repression), thought suppression itself received minimal research attention prior to Wegner and colleagues' (1987) initial 'white bear' study. In the now-classic study, participants were randomly assigned to either initially express (try to think about) or initially suppress (try not to think about) thoughts of a white bear. Participants then completed the other (expression or suppression) task. While performing these tasks, participants were to continuously verbalize their streams-of-thought (which were tape recorded) and ring a bell any time that they thought about a white bear. Frequency of target thoughts were measured for each task period by adding the number of times that the participant rang the bell with the number of times the participant mentioned white bears without ringing the bell. It was found that participants in both conditions were unsuccessful at suppressing white bear thoughts (suggesting an initial enhancement effect of thought suppression). Further, Wegner et al. (1987) observed that in the initial suppression group, the number of reported target thoughts increased significantly in the expression condition (suggesting an ironic rebound effect). Conspicuously, more target thoughts were reported in the post-suppression expression condition than in the initial expression condition.

Wegner et al.'s (1987) study sparked a wave of research interest on the topic of thought suppression. Although there had been very few (if any) studies on thought suppression before the 1987 study, several dozen were published in the years immediately after it. Interestingly, these studies have produced only mixed support for Wegner et al.'s (1987) original findings. The existence of an initial enhancement effect has been almost universally supported (Wenzlaff & Wegner, 2000), while research surrounding the ironic rebound effect has been much less definitive. A post-suppression rebound in target thoughts has been only occasionally observed (e.g., Geraerts, Merckelbach, Jelicic, & Smeets, 2006; Wenzlaff, Wegner, & Klein, 1991); studies have just as frequently observed the opposite of an ironic rebound, a decrease in target thoughts post-suppression (e.g., Merckelbach, Muris, Van den Hout, & de Jong, 1991; Roemer, & Borkovec, 1994). Most of these studies have used either Wegner et al.'s (1987) original thought suppression paradigm or slightly modified versions of it, so it is unclear why the literature has produced such conflicting results, although some possible explanations are discussed in the following sections. The mixed results that characterize the general thought suppression literature also characterize the thought suppression-valence literature, as is also explored here.

Influence of Target Valence

A small handful of the studies released in the late-1980's through mid-1990's wave of thought suppression research investigated the effects of target valence—the perceived positivity versus negativity of the given thought suppression topic—on suppression outcomes (e.g., Howell & Conway, 1992; Kelly & Kahn, 1994; McNally & Ricciardi, 1996; Muris et al., 1992; Roemer & Borkovec, 1994). However, since the mid-1990's the literature has largely focused on the negative effects of thought suppression and suppression's role in various psychological disorders (e.g., Magee, Harden, & Teachman, 2012; Najmi & Wegner, 2008). Consequently, very few studies since the initial wave have focused directly on the influence of target valence on thought suppression efficacy. This is in spite of the fact that the role played by target valence is not well understood. The studies that have been conducted have produced mixed and often conflicting results, despite generally sharing the same basic methodological design (adapted from Wegner et al., 1987). A sample of such studies is described below and summarized in Table 1.

The most common finding in the literature appears to be that target valence does not influence the number of suppression failures. This finding is perhaps most directly supported by researchers McNally and Ricciardi (1996), who found no significant differences in numbers of suppression failures between emotional and neutral target groups. Other studies have supported the same general finding, but have also complicated it with various qualifications and secondary findings. Take the study of researchers Klein and Bratton (2007), who observed no difference in numbers of reported intrusions between personal negative, nonpersonal negative, and nonemotional valence groups in a thought suppression task. They also found that the groups differed in their response times (RT) for a post-suppression sentence verification task, with the nonemotional group having a faster RT than those in the nonpersonal negative and personal negative groups (although there was no significant difference between the nonpersonal and personal negative groups). On the basis of these results, Klein and Bratton suggest that emotional material (either personal or nonpersonal) and nonemotional material are suppressed equally effectively, but that suppression of emotional material is more cognitively taxing. Yet these results were contradicted by Muris et al. (1992), whose study suggested that neutral targets—but not emotional targets—produce an initial enhancement effect. Considered together, these studies suggest that target valence does not have any consistent effects on suppression success.

Table 1

Author (year)	Method	Target(s) and Target Valence(s)	Ironic Rebound	Valence Differences
Howell & Conway (1992)	Participants assigned to positive and negative induced mood groups and to positive and negative target valence groups. All participants completed a verbal stream-of-consciousness thought suppression task (no other tasks included).	Negative: sad memory Positive: happy memory	N/A	More suppression failures for mood-congruent targets More intrusions for negative valence groups than positive (marginally significant)
Kelly & Kahn (1994)	Participants completed both thought suppression and expression tasks, in randomly assigned order. All tasks involved writing one's stream-of-consciousness and participants were to write a tally mark any time that they thought about the target.	Neutral: nonemotional personal memory Negative: negative personal memory Negative: negative nonpersonal memory	No: initial expression > post-suppression expression (opposite of ironic rebound)	Expression conditions: unpleasant > pleasant Suppression conditions: no valence differences
Klein & Bratton (2007)	Participants completed a thought suppression task in which they were to record target thoughts by pressing a button. Participants subsequently completed a sentence verification task for which their reaction time was measured.	Negative: most unpleasant frequently occurring thought Positive: most pleasant frequently occurring thought	N/A	Sentence verification RT: personal negative memory > neutral memory (nonpersonal negative NS difference between other groups) No difference in suppression failures between valence groups
McNally & Ricciardi (1996)	Participants completed both thought suppression and nonsuppression tasks, in randomly assigned order. All tasks involved verbalizing one's stream-of-consciousness.	Neutral: white bear Negative: personally relevant negative thought	Mixed: decrease across conditions for neutral target group (opposite of ironic rebound), but increase across conditions for negative target group (ironic rebound) approaching significance	No difference in suppression failures between valence groups Increase in reported thoughts following suppression (ironic rebound) approaching significance for negative target
Muris et al. (1992)	Participants were read either an emotionally-charged or neutral story (their thought suppression target). Participants completed both thought suppression and nonsuppression tasks, in randomly assigned order. Participants reported target thoughts by pressing a button.	Neutral: neutral story Negative: emotional (depressing) story	Mixed: observed for neutral group but not for emotional group	Ironic rebound observed for neutral target group but not for negative target group
Roemer & Borkovec (1994)	Participants either completed an initial suppression or initial expression task. All participants then completed a subsequent expression task. All tasks involved verbalizing one's stream-of-consciousness. Verbal statements were categorized as being directly related to the target, indirectly related to the target, or unrelated to the target.	Neutral: neutral imagined situation Negative: negative (anxious) imagined situation Negative: depressing memory	No: initial expression > post-suppression (opposite of ironic rebound)	Expression (number of directly related thoughts): depressing > anxious > neutral Suppression (number of directly related thoughts): no difference between valence groups
Wegner et al. (1987)	Participants completed both thought suppression and expression tasks, in randomly assigned order. All tasks involved verbalizing one's stream-of-consciousness and participants were to ring a bell any time that they thought about the target.	Neutral: white bear	Yes: post-suppression expression > initial expression	N/A

Note. 'Initial enhancement effects'—increases in numbers of target thoughts during thought suppression compared to before thought suppression—were either observed or assumed to have occurred for all groups within all studies and so initial enhancement effects are not described here. 'Ironic rebound' is defined as an increase in number of target thoughts following a thought suppression task OR a greater number of target thoughts observed in post-suppression expression condition than in initial expression condition. 'Suppression failures' or 'intrusions' defined as number of target thoughts occurring during a thought suppression task. 'Suppression' tasks are those in which participants are instructed to try not to think about the target, 'expression' tasks are tasks in which participants are instructed to try to think about the target, and 'nonsuppression' tasks are those in which participants are not given any instruction about whether to think about the target or are told that they may think about anything. 'Stream-of-consciousness tasks' include any task in which participants must express their thoughts as they occur, either verbally or in writing. ^aIronic Rebound described in terms of number of reported target thoughts unless otherwise noted. ^bValence Differences described in terms of reported target thoughts unless otherwise noted.

Another complicating study was conducted by Roemer and Borkovec (1994), who found no significant difference between anxious, depressing, and neutral valence groups for suppression failures when ‘suppression failure’ was defined as the proportion of directly related statements reported during an initial suppression condition. Roemer and Borkovec also observed that anxious targets were associated with significantly more indirectly related statements during suppression than were neutral targets. This suggests that participants were able to suppress emotional and nonemotional material equally well in the sense of avoiding the target thoughts themselves, although the increase in indirect statements observed for anxious targets suggests that there was some effect of valence on suppression success.

Although it is a relatively common finding in the literature, not all studies report a statistically significant lack of effect of target valence on number of suppression intrusions. A study by Howell and Conway (1992) gave rise to the mood-congruity hypothesis of thought suppression, which suggests that mood-congruent thoughts are more difficult to suppress than are mood-incongruent thoughts. This is to say that when a person is in a depressive mood, sad thoughts are more difficult to suppress than non-sad thoughts; similarly, when one is in a cheerful mood, happy thoughts are more difficult to suppress than non-happy thoughts (and so on). In Howell and Conway’s study, target valence was shown to affect the number of suppression intrusions, although its effect was only evaluated as a function of mood. Accordingly, it is unclear what valence effects (if any) might have been observed in individuals in relatively neutral moods.

The inconsistent findings within the suppression-valence literature is perhaps most obvious in the lack of consensus regarding if (and how) valence influences the occurrence of an ironic rebound. For instance, Muris and colleagues (1992) did not observe an ironic rebound effect for either neutral or emotional groups and, similarly, Kelly and Kahn (1994) found that suppression of pleasant or unpleasant intrusive thoughts not only failed to produce an ironic rebound, but that it actually caused the opposite, a decrease in post-suppression thought frequency. These results suggest that valenced targets do not produce ironic rebounds and, in the case of Muris and colleagues’ (1992) work, that valenced targets produce similar thought suppression outcomes as nonvalenced targets.

By contrast, Roemer and Borkovec (1994), who differentiated between numbers of direct and indirect references to the target, observed that individuals with anxious or depressing targets exhibited a post-suppression rebound in the form of increased direct target-references, but that such an increase was not found for individuals with neutral targets. Such results are

comparable to those of McNally and Ricciardi (1996), who found that individuals with a neutral target exhibited a post-suppression decrease in number of target-mentions (the opposite of a rebound effect), while those with a negative target showed a post-suppression increase (ironic rebound). The results of these studies, unlike those described earlier, suggest that valenced (specifically, negative) targets produce ironic rebounds and that these rebounds differentiate them from nonvalenced targets, which do not produce rebounds.

Overall, the thought suppression-valence literature has produced no definitive conclusions with respect to the influence of target valence on thought suppression efficacy. The reasons for this are unclear, but it is highly possible that the recurring design flaws and inconsistencies within past thought suppression-valence studies (described in the next section) have played a large role.

Limitations of Previous Research

The thought suppression literature—particularly that related to the effects of target valence—has been marked by major, recurring design flaws and methodological inconsistencies. In particular, studies have varied in the types of instructions they have provided for their nonsuppression conditions. Some have used ‘expression’-type instructions, in which participants are instructed to *try to think of the target*, while others have used ‘liberal’-type instructions, in which participants are told that they may *think of anything, including the target*. For example, if a study used ‘white bears’ as a thought suppression target, expression-type instructions might take the form of ‘try to think about white bears’ or ‘think about white bears as much as possible,’ while liberal-type instructions could take the form of ‘you may think about anything, including white bears.’ Expression- and liberal-type instructions have been shown to produce significantly different patterns of results (Merckelbach et al, 1991; Rassin, Muris, Jong, & de Bruin, 2005), which makes it difficult to compare results across studies that used different types of instructions. Fortunately, this problem appears to be leveling off, as the type of nonsuppression instructions researchers use has become increasingly consistent. In general, early research (including Wegner et al.’s [1987] original study) tended to use expression-type instructions, while more recent research (mid-1990s onward) has increasingly favored liberal-type instructions.

Another design flaw that has persisted in the literature is the use of a suppression-expression/expression-suppression design, which is to say a design using Wegner et al.’s (1987) original paradigm. In such studies, half of the participants complete a suppression task followed by an expression task, and half complete an

expression task followed by a suppression task. Studies using this design (e.g., Kelly & Kahn, 1994) have then compared numbers of expression task target-mentions between initial expression and initial suppression groups to evaluate whether an ironic rebound effect occurred. This is problematic, as it introduces the possibility for confounding practice effects. Individuals in the post-suppression expression group (i.e., the initial suppression group) will have had more experience with the thought-reporting task than those in the initial expression group and so might simply be better at reporting the target thoughts when they occur. To correct for this, more recent studies have generally tended to include either an expressive- or liberal-type nonsuppression task that is completed by all participants following the initial expression/suppression conditions. Additionally, studies now tend to have participants complete a 'practice' thought-reporting session before moving on to the experimental tasks (Wenzlaff & Wegner, 2000).

Even more problematic for the thought suppression literature is the lack of consistency in the nature of the investigated targets. Studies ostensibly about general thought suppression vary greatly with respect to use of targets that are, to list a few examples, self-relevant or non-self-relevant, self-generated or provided, highly salient or non-salient, or primarily visual or verbal in nature. Unfortunately, the vast majority of past studies using more than one target have also mixed many of these mentioned variables between groups. Of particular note are studies investigating valence (e.g., McNally & Ricciardi, 1996; Nixon, Flood, & Jackson, 2007) that include a white bear target (which is presumably non-self-relevant, provided, and non-salient) as a neutral comparison condition alongside personally relevant thoughts or memories (which are presumably self-relevant, self-generated, and possibly salient). This inconsistency among thought suppression targets makes it unclear which variables account for any observed effects and so prevents definitive conclusions from being drawn from the thought suppression-valence literature. Accordingly, future research would benefit from use of more consistent thought suppression targets, both within and between individual studies.

In addition to the problems that affect the general thought suppression literature, the thought suppression-valence literature is plagued by its own set of problems. For example, a recurring issue is the common tendency for valence studies to leave out either neutral or positive valence conditions, with inclusion of positive conditions being particularly rare. Additionally, many studies that include a neutral condition use a white bear target, which introduces its own set of problems (e.g., the mentioned possible inconsistencies between targets). Similarly, another common issue is the variation in emotions

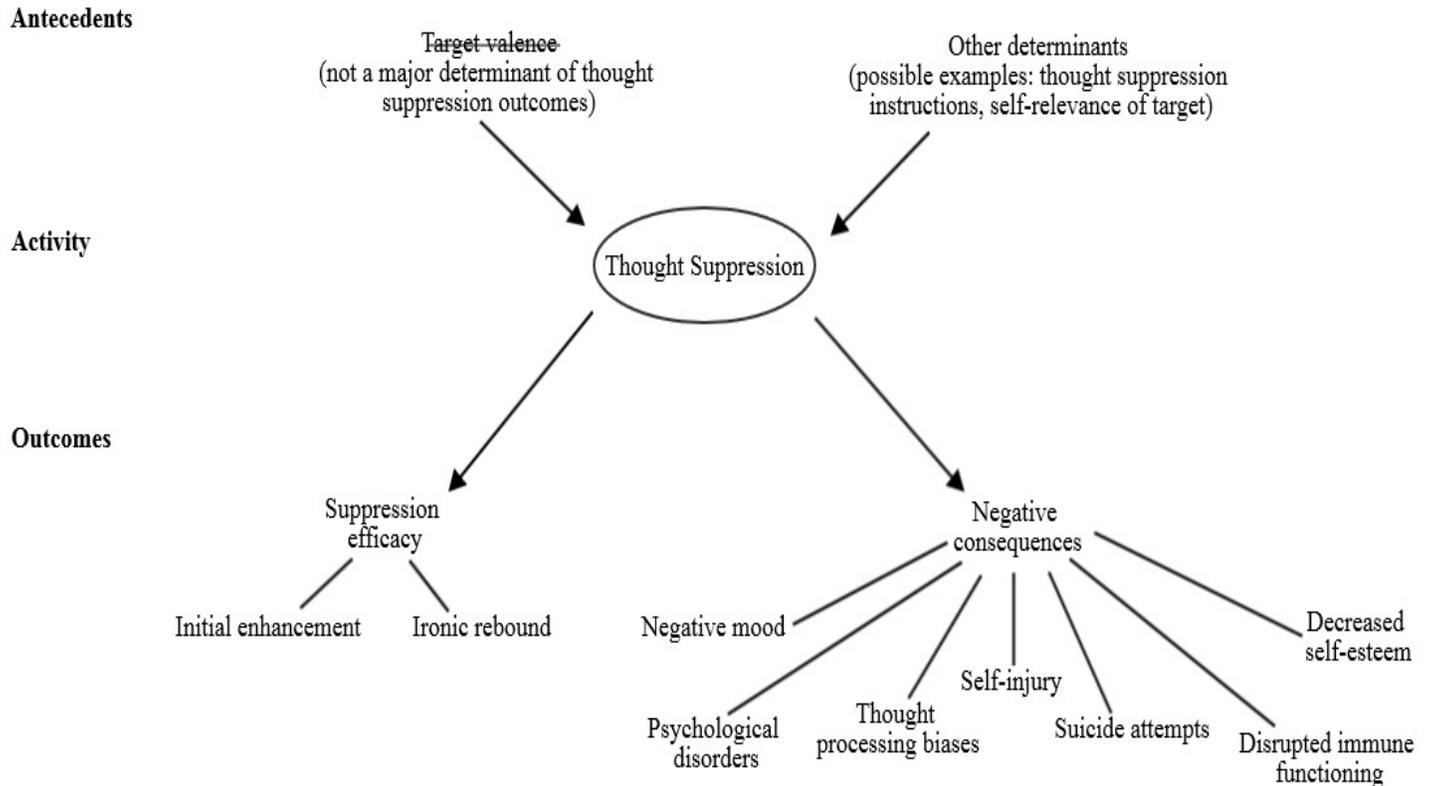
associated with each valence direction (positive and negative). The targets in studies that include a negative valence condition have varied in whether they are associated with underlying feelings of sadness, anxiety, embarrassment, or any other negative emotion. This is particularly noteworthy considering that depressing- versus anxious-type negative targets have been shown to produce different patterns of results (Roemer & Borkovec, 1994). In any case, it seems likely that inconsistency in what constitutes a 'positive' or 'negative' target can account for much of the variability observed in the results of previous studies.

Discussion

When the results of the previous thought suppression-valence studies are considered together, it becomes clear that no definitive conclusions can be made about the effects of target valence on thought suppression efficacy. However, the overall pattern of results does provide support for two conflicting interpretations. The first possibility is that, due to the described methodological problems in the literature, a coherent understanding of the effects of target valence on thought suppression outcomes is simply not currently possible. By contrast, the second interpretation suggests that a major conclusion *can* be drawn from the available literature, but that it is negative—suggesting a *lack* of relationship between target valence and suppression outcomes—rather than the expected positive conclusion that some sort of relationship between the two exists (no matter how poorly understood said relationship would be).

According to the latter interpretation, the literature appears to suggest that target valence has very little (if any) effect on thought suppression outcomes. Importantly, this would explain both why the thought suppression-valence literature has been so limited and why the few studies that have been done in the area have produced such inconsistent results. If it is true that target valence has little to no effect on thought suppression outcomes, then thought suppression studies that focus on valence would tend to yield null results and so would also tend not to be published (as per the 'file drawer effect'). Further, one could use this interpretation to make sense of the inconsistent pattern of results observed in the suppression-valence studies that still manage to find significance. Given that valence has little effect, one would assume that the results of these studies were actually driven by other, non-valence factors. As these factors would differ between the studies, this interpretation would explain the great inconsistency in their results. The problem with this interpretation is that it is not clear what these driving factors might be, although differences in methodology and target characteristics like those

Figure 1 Graphical representation of the Input/Output Model of Thought Suppression.



described earlier (e.g., use of expression- versus liberal-type instructions, use of self-generated versus provided targets, etc.) likely play a large role. A visual depiction of an Input/Output Model of Thought Suppression is presented in Figure 1.

An advantage of the given Input/Output Model of Thought Suppression is that it lends itself to empirical testing. As an example, using the Input/Output Model of Thought Suppression for framework, a study could be designed to investigate whether the self-relevance of a thought suppression target mediates thought suppression's effects on self-esteem. This could be tested by randomly assigning participants to self-relevant and non-self-relevant target groups and comparing their levels of self-esteem both before and after a thought suppression task.

To summarize, if one assumes that a coherent model of thought suppression can be derived from the available literature, target valence does not appear to be a major factor in determining thought suppression outcomes. Rather, it appears that these outcomes are primarily shaped by other forces, although it is not clear what these relevant forces are. Given that thought suppression is associated with a variety of damaging outcomes—including negative thought processing biases, decreases

in self-esteem, and even the etiology and maintenance of various psychological disorders (Beevers & Meyer, 2008; Borton & Casey, 2006; Iijima & Tanno, 2012)—it is greatly important that the process and its influences be well understood. Thought suppression itself has received little research attention, however, and so the construct is currently not well described. Accordingly, it is recommended that future research be carried out on nonvalence potential determinants of thought suppression outcomes, as such research could ultimately allow the development of strategies to prevent or reverse thought suppression's negative consequences. The use of a coherent model, such as the Input/Output Model of Thought Suppression proposed in this paper, could guide this further research.

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