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Suppressing thoughts of past events: Are repressive copers good suppressors?

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We investigated the ability of individuals with a “repressive coping style” to strategically control thoughts of events from their past, which made them feel either proud or embarrassed, within the thought suppression paradigm. We examined whether (low) anxiety and (high) defensiveness interacts to influence suppression success over and above anxiety and defensiveness alone using low anxious, repressor, high anxious, and defensive high anxious groups. For the emotionally positive “proud event”, all groups avoided event-related thoughts when instructed to suppress. For the emotionally negative “embarrassed event”, repressors reported fewer event-related thoughts than all other groups, even when not instructed to suppress. Repressors also reported the lowest level of suppression effort and showed no “rebound”. We discuss repressors’ memory performance in terms of their natural tendency to avoid negative self-referent material, and thought and memory control in everyday life.

There is increasing evidence that in everyday life individuals may use inhibitory processing strategies to regulate their awareness of memories and thoughts they find threatening or painful (Bjork, Bjork, & Anderson, 1998; Dalgleish, Mathews, & Wood, 1999; Koutstaal & Schacter, 1997). Bjork (1989) defined retrieval inhibition as “a suppression-type process directed at the to-be-inhibited information for some adaptive purpose” (p. 324), which results in the loss of retrieval access to, but not availability of, certain memory material. Clinical disorders, such as functional amnesia, posttraumatic stress disorder, dissociative fugue, and dissociative identity disorder, offer extreme examples of the inhibition or avoidance of personal memories (Brewin, 2001; Kihlstrom & Schacter,

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1995).¹ Although there has been significant debate about the precise mechanism underlying self-initiated memory management (McNally, 2003), the notion that individuals protect themselves by avoiding negative material is consistent with goal-directed models of autobiographical memory (Conway & Pleydell-Pearce, 2000; McAdams, 2001; Singer & Salovey, 1993).

There is evidence also that some individuals are particularly adept at using these protective processing strategies. Weinberger (1990; see also Eysenck, 2000) identified individuals with a “repressive coping style”, who score low on self-report measures of trait anxiety but high on self-report measures of defensiveness; he contrasted “repressive copers” (or “repressors”) with low anxious (low anxiety, low defensiveness), high anxious (high anxiety, low defensiveness), and defensive high anxious (high anxiety, high defensiveness) individuals. Repressors are highly physiologically reactive in potentially stressful situations, yet report low levels of distress (e.g., Derakshan & Eysenck, 1997, 2001; Weinberger, Schwartz, & Davidson, 1979). Also, they demonstrate an avoidant attentional style (e.g., Bonnano, Davis, Singer, & Schwartz, 1991; Newman & McKinney, 2002). Weinberger (1990) argued that “repressors fail to recognize their own affective responses . . . [and] are likely to employ a variety of strategies to avoid conscious knowledge of their ‘genuine reactions’” (p. 338).

One important and consistent finding is that repressors’ defensive style leads to characteristic memory deficits. Repressors have difficulty recalling negatively valenced information, both when the material is personally generated (e.g., autobiographical memories in a cued recall task) and when it is experimentally generated (e.g., lists of words in a directed forgetting task). For instance, Davis (1987; see also Davis, 1990; Davis & Schwartz, 1987; Myers & Brewin, 1994; Newman & Hedberg, 1999) asked repressors and nonrepressors to generate autobiographical memories from childhood in response to positive and negative emotional cue words (e.g., happy, angry).² Whereas repressors recalled a similar number of positive memories to nonrepressors, they recalled fewer negative memories; when they managed to recall negative memories, their recall latencies were much longer. Within a list-method directed forgetting procedure, Myers, Brewin, and Power (1998) asked repressors and nonrepressors to rate two sets of positive and negative adjectives in terms of self-descriptiveness (i.e., how

¹ Inhibition can be understood on at least three levels: as lowering the expression of memory at recall (i.e., the behavioural level), as lowering the accessibility of memory (i.e., the retrieval level), and as lowering the activation of the memory representation itself (i.e., the accessibility level). The behavioural level entails the weakest, descriptive sense of inhibition, whereas the accessibility level entails the strongest, mechanistic sense. In this research, we conceptualise inhibition in terms of the expression and accessibility of memory (for discussion of the concept of inhibition, see Anderson, Bjork, & Bjork, 1994; Dalglish et al., 1999).

² In this literature, nonrepressor comparison groups typically involve a combined group of low anxious, high anxious, defensive high anxious, and/or nonextreme scoring individuals.

descriptive they were of themselves). They told participants that the first set of words were unimportant and could be forgotten and to focus on the second set of words. Whereas both repressors and nonrepressors later recalled fewer words from the first than the second set (i.e., a directed forgetting effect; Bjork, 1989), only repressors were influenced by the emotional valence of the words; they recalled fewer negative self-descriptive words from the first, to-be-forgotten, set than nonrepressors.

These data suggest that repressors are not only better able or more likely to use inhibitory processing strategies, but that their use of these strategies is selective. Davis (1990) argued that repressors' use of inhibitory strategies "may be motivated in particular by affective experiences that focus attention on the self in a threatening or evaluative way" (p. 585). Research confirms that only negative self-referent information engages the repressive coping style (e.g., self-descriptive not other-descriptive negative adjectives; Barnier, 2001). In other words, individuals with a repressive coping style may be good "repressors" in Freud's (1915/1957; see also Erdelyi, 1990) sense—they selectively and successfully avoid negative information that threatens the self.

Although previous research highlights the nature of the material that engages repressors' use of inhibitory processes or strategies, it is less clear whether these processes represent: (a) an automatic response to particular information; (b) strategic, motivated attempts to control awareness of certain memories; or (c) a combination of these (Dalgleish et al., 1999). Procedures such as cued autobiographical recall and directed forgetting do not allow clear predictions that differentiate between these possible mechanisms to be made. To address this issue we examined repressors' management of negative self-referent material within Wegner's (1994) thought suppression paradigm. This procedure focuses on individuals' ability to successfully avoid or control conscious (and in some cases unwanted and intrusive) thoughts, images, memories or feelings about a topic. In their classic experiment, Wegner, Schneider, Carter, and White (1987, experiment 1) asked participants to try not to think of a white bear and collected continuous stream-of-consciousness reports following the instruction. Although participants showed some initial success in suppressing thoughts of the white bear during this suppression period, the instruction lead to a "rebound effect" whereby they thought of the bear during a subsequent expression period more often than those who had not been asked to suppress. Wegner's (1994; Wenzlaff & Wegner, 2000) theory of ironic processes explains these findings in terms of two mechanisms: an intentional operating process that seeks thoughts that will promote successful suppression of the unwanted thought; and an ironic monitoring process that remains in the background of consciousness and searches for mental contents that indicate a failure to suppress the unwanted thought. Laying aside this interpretation, the thought suppression procedure allows us to compare repressors' "strategic" (suppression instruction) versus "natural" (no instruction) levels of suppression.

To maximise the chance of engaging individuals' repressive coping style, and to link more obviously with both everyday thought control and clinical disorders of memory (Koutstaal & Schacter, 1997; Rassin, Merckelbach, & Muris, 2000), we asked repressors and nonrepressors to recall a recent event during which they felt extremely proud ("proud event") and an event during which they felt extremely embarrassed ("embarrassed event"). These emotional self-relevant autobiographical memories became the target for suppression. This is important because both emotional and self-relevant material show different outcomes within the thought suppression paradigm to neutral, nonpersonal material (Wenzlaff & Wegner, 2000). For instance, McNally and Ricciardi (1996) found that whereas reports of a neutral thought (white bear) decreased from the suppression to expression periods, reports of a negative personally relevant thought increased threefold. When other variables are equal, emotional (particularly negative) material may be more difficult to suppress than neutral material (see also Howell & Conway, 1992; Markowitz & Borton, 2002; for a review, see Wenzlaff & Wegner, 2000). However, we expected that repressors would be good, "natural" suppressors, especially of negative self-referent material.

Rather than comparing repressors simply with a combined group of non-repressors, we used four groups of participants based on Weinberger et al.'s (1979) fourfold classification scheme: low anxious, repressor, high anxious, and defensive high anxious individuals. This allows us to examine whether the interaction of anxiety and defensiveness (i.e., the repressive coping style) influences suppression success over and above anxiety and defensiveness alone. Our thought suppression procedure involved three experimental periods. In an *imaging period*, participants generated and focused on a recent proud event or a recent embarrassed event. In a *suppression period*, participants were instructed either to avoid all thoughts of the target event (*suppression condition*) or to think of anything (*nonsuppression condition*); all participants monitored thought intrusions by pressing a button each time an event-related thought came to mind. In an *expression period*, all participants were invited to think of anything and again monitored event-related thoughts. Participants completed this sequence of imaging, suppression, and expression first for their proud event and then for their embarrassed event, or first for their embarrassed event and then for their proud event.

Based on findings of repressors' memory biases and findings of thought suppression for emotional material, we expected an interaction between anxiety and defensiveness for the embarrassed event but not for the proud event. Specifically, for the proud event, we expected that all participants instructed to suppress would report fewer thought intrusions than those not instructed to suppress. However, for the embarrassed event, we expected that thought suppression would be more successful and less effortful for repressors than for all other groups, irrespective of instruction. The thought suppression paradigm also predicts postsuppression rebound following a period of successful suppression

(although its degree depends on the nature of the targeted material; for reviews, see Abramowitz, Tolin, & Street, 2001; Renaud & McConnell, 2002). We expected that repressors would be skilled at avoiding this phenomenon and would not show rebound (particularly of their embarrassed event) irrespective of an instruction to suppress and initial suppression success.

METHOD

Participants and design

A total of 84 (28 male, 56 female) undergraduate psychology students from the University of New South Wales, Sydney, Australia were tested in a 2 (anxiety: low vs. high) \times 2 (defensiveness: low vs. high) \times 2 (instruction: suppression vs. nonsuppression) \times (2) (event: proud vs. embarrassed) mixed-model design. They participated in return for credit towards their psychology course, and ranged in age from 17 to 44 years ($M = 19.04$, $SD = 3.34$).

Consistent with participant selection in previous studies (e.g., Derakshan & Eysenck, 1999, 2001; Myers et al., 1998; Vetere & Myers, 2002), students were identified and categorised as low anxious (low anxiety, low defensiveness), repressor (low anxiety, high defensiveness), high anxious (high anxiety, low defensiveness), and defensive high anxious (high anxiety, high defensiveness) based on their scores on measures of anxiety (Spielberger State-Trait Anxiety Inventory [STAI]: Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983; range 20–80) and defensiveness (MC: Crowne & Marlowe, 1964; range 0–33). Based on third-splits, low anxiety was defined as a STAI score ≤ 39 and high anxiety was a STAI score ≥ 49 . Low defensiveness was defined as a MC score ≤ 12 and high defensiveness was a MC score ≥ 17 .

Selected from a larger pool of 260 respondents, the sample included: 24 low anxious (9 male, 15 female) with low STAI ($M = 34.96$, $SD = 3.13$) and low MC ($M = 9.50$, $SD = 2.65$) scores; 24 repressor (5 male, 19 female) with low STAI ($M = 31.33$, $SD = 4.92$) and high MC ($M = 21.33$, $SD = 2.53$) scores; 24 high anxious (11 male, 13 female) with high STAI ($M = 54.00$, $SD = 7.02$) and low MC ($M = 8.71$, $SD = 2.93$) scores; and 12 defensive high anxious (3 male, 9 female) with high STAI ($M = 54.92$, $SD = 4.80$) and high MC ($M = 19.58$, $SD = 1.51$) scores.³

Materials and apparatus

Participants' event-related thoughts during the suppression and expression periods were recorded using a joystick button connected to a DOS-based computer program, which recorded the frequency of button presses in 500

³ The smaller number of defensive high anxious participants reflects the fact that the combination of extremely high levels of both anxiety and defensiveness is less common in screening samples than other profiles (Weinberger et al., 1979).

millisecond increments. The joystick was placed on the left arm of participants' chair. Configuration and activation of the program was controlled by the experimenter via a keyboard. For each (proud or embarrassed) autobiographical event, the program recorded for a total of 6 minutes across the suppression and expression periods.

Procedure

The experiment involved two experimental phases corresponding to the two autobiographical events. Each experimental phase consisted of imaging, suppression, and expression periods interspersed with sets of subjective ratings. The two experimental phases were structurally and procedurally identical except that half the participants focused first on an event that made them feel proud followed by an event that made them feel embarrassed, and half focused first on their embarrassed event followed by their proud event. Initial analyses indicated that order of event elicitation had no impact on performance, so the two event orders were collapsed in the analyses reported below. A mathematical filler task separated the experimental phases. Participants were tested in individual sessions and sat in an armchair facing the experimenter.

Imaging period. To begin, the experimenter told participants that they were taking part in an experiment examining the persistence of thoughts in everyday life and their task was to recall and think about two autobiographical events from their past. She asked participants to think of a memory of a specific event they had experienced in the last 12 months; she asked half to think of an event during which they felt extremely proud, and half to think of an event during which they felt extremely embarrassed. She then asked for a brief general description of the remembered event; to minimise self-editing, the experimenter emphasised that there was no need to reveal private or confidential details of the memories. Following this, the experimenter asked participants to close their eyes and to think further about their remembered event. She asked them to think back and to focus on exactly what happened, who was involved, and how they felt. After 2 minutes, the experimenter asked participants to open their eyes and to rate the valence (1 = *very negative*, 10 = *very positive*) and clarity/vividness (1 = *not at all clear/vivid*, 10 = *very clear/vivid*) of their memory, as well as how anxious (1 = *not at all anxious*, 10 = *extremely anxious*) and distressed (1 = *not at all distressed*, 10 = *very distressed*) they felt while thinking of the event.

Suppression period. The experimenter gave participants a computer joystick with a button on top and said that for the next 2 minutes they should use the button to monitor their thoughts. She then administered either suppression or nonsuppression instructions; there were two versions of the suppression instruction. She gave one third of participants an instruction to

suppress the entire event (“I want you to not think about the event during which you felt extremely proud/embarrassed. You can think about anything else, but do not think about that event or anything to do with it”), one third an instruction to suppress the emotional aspects of the event (“I want you to not think about the event during which you felt extremely proud/embarrassed; in particular, I want you to not think about the feelings involved”), and one third nonsuppression instructions (“I want you to think about anything. You might think about the event during which you felt extremely proud/embarrassed or you might not.”). Initial analyses indicated that the wording of the suppression instruction had no impact on performance, so the two versions were collapsed into one condition (16 low anxious, 16 repressor, 16 high anxious, 8 defensive high anxious) and compared with the nonsuppression condition (8 low anxious, 8 repressor, 8 high anxious, 4 defensive high anxious).

The experimenter asked all participants to monitor the content of their thoughts and to press the joystick button each time they had a thought related to their remembered event. She encouraged them to honestly report all event-related thoughts. Participants closed their eyes and monitored their thoughts until the experimenter indicated that 2 minutes had elapsed. Following this, the experimenter asked participants to open their eyes and to rate how often they thought about the event during this period (frequency: 1 = *not at all*, 10 = *all the time*), how hard they tried not to think about the event (effort: 1 = *not at all hard*, 10 = *very hard*), and how successful they thought they were in suppressing event-related thoughts (success: 1 = *not at all successful*, 10 = *very successful*).

Expression period. The experimenter asked participants to focus again on the joystick and said that for the next 2 minutes they should use the button to again monitor their thoughts. She told all participants that they could “spend the next two minutes thinking about anything you like. You might like to think about the event during which you felt extremely proud/embarrassed or you might not”. She asked them to honestly monitor the content of their thoughts in the same way as during the suppression period. Participants closed their eyes and monitored their thoughts until the experimenter indicated that 2 minutes had elapsed. Following this, the experimenter asked participants to open their eyes and to make the same ratings of intrusion frequency, suppression effort, and suppression success as during the suppression period.

This was the end of the first experimental phase. The experimenter asked participants to complete a 5 minute mathematical filler task while she reset the joystick program and then began the second phase. This phase was identical to the first phase with the exception that participants who were initially asked to focus on an event during which they felt extremely proud, now focused on an event during which they felt extremely embarrassed, and participants who focused on their embarrassed event, now focused on their proud event. At the

end of the second experimental phase, participants were invited to ask questions, debriefed, and thanked for their time.

RESULTS

Autobiographical events selected during the imaging period

All 84 participants generated memories of events that made them feel proud and embarrassed as requested. These memories differed in terms of emotional significance and quality. A 2 (anxiety) \times 2 (defensiveness) \times 2 (instruction) \times (2) ANOVA of participants' ratings of emotional valence yielded a main effect of event, $F(1, 76) = 233.10$, $p < .001$, $\eta_p^2 = .754$, and an interaction between event and defensiveness, $F(1, 76) = 4.51$, $p = .037$, $\eta_p^2 = .056$.⁴ Participants rated their proud events as very positive ($M = 8.29$, $SD = 1.41$) and their embarrassed events as quite negative ($M = 4.31$, $SD = 1.78$). High defensive individuals (repressor and defensive high anxious) rated their embarrassed event as slightly more negative ($M = 3.92$, $SD = 1.61$) than low defensive individuals (low anxious and high anxious; $M = 4.60$, $SD = 1.85$); there was no difference for their proud event. A similar $2 \times 2 \times 2 \times (2)$ ANOVA of ratings of clarity/vividness yielded an interaction between event and anxiety, $F(1, 76) = 4.17$, $p = .045$, $\eta_p^2 = .052$. Overall, participants rated their memories of the proud ($M = 8.37$, $SD = 1.53$) and embarrassed ($M = 7.88$, $SD = 1.72$) events as very clear and vivid. However, whereas high anxiety individuals (high anxious and defensive high anxious) rated their proud ($M = 8.06$, $SD = 1.71$) and embarrassed ($M = 8.08$, $SD = 1.73$) events similarly, low anxiety individuals (low anxious and repressor) rated their embarrassed event ($M = 7.73$, $SD = 1.72$) as slightly less clear than their proud event ($M = 8.60$, $SD = 1.35$).

A 2 (anxiety) \times 2 (defensiveness) \times 2 (instruction) \times (2) (event) mixed-model ANOVA of participants' ratings of anxiety during the imaging period yielded main effects of event and anxiety, $F(1, 76) = 4.62$, $p = .035$, $\eta_p^2 = .057$ and $F(1, 76) = 3.95$, $p = .050$, $\eta_p^2 = .049$, respectively, and an interaction between anxiety and defensiveness, $F(1, 76) = 4.42$, $p = .039$, $\eta_p^2 = .055$. A similar $2 \times 2 \times 2 \times (2)$ ANOVA of ratings of distress during this period also yielded main effects of event and anxiety, $F(1, 76) = 35.29$, $p < .001$, $\eta_p^2 = .317$ and $F(1, 76) = 4.84$, $p = .031$, $\eta_p^2 = .060$, respectively; and interactions between event and anxiety and between anxiety and defensiveness, $F(1, 76) = 4.54$, $p = .036$, $\eta_p^2 = .056$ and $F(1, 76) = 4.63$, $p = .035$, $\eta_p^2 = .057$, respectively. Participants felt more anxious and distressed while thinking about their embarrassed event (anxiety: $M = 3.81$, $SD = 2.47$; distress: $M = 3.01$, $SD = 2.29$) than their

⁴Partial eta squared (η_p^2) was used to estimate the strength of association for each effect in ANOVA. Tabachnick and Fidell (1996) recommended its use because, unlike eta squared (η^2), it is not influenced by the number and significance of other independent variables in the design.

proud event (anxiety: $M = 3.21$, $SD = 2.13$; distress: $M = 1.60$, $SD = 1.11$). Also, high anxiety individuals (high anxious and defensive high anxious; anxiety: $M = 3.79$, $SD = 1.56$; distress: $M = 2.58$, $SD = 1.45$) reported more anxiety and distress than low anxiety individuals (low anxious and repressor; anxiety: $M = 3.30$, $SD = 1.79$; distress: $M = 2.09$, $SD = 1.29$). Finally, repressors reported lower levels of anxiety ($M = 3.10$, $SD = 1.84$) and distress ($M = 1.88$, $SD = 1.24$) than low anxious (anxiety: $M = 3.50$, $SD = 1.77$; distress: $M = 2.31$, $SD = 2.31$), high anxious (anxiety: $M = 3.46$, $SD = 1.39$; distress: $M = 2.46$, $SD = 1.37$), and defensive high anxious (anxiety: $M = 4.46$, $SD = 3.79$; distress: $M = 2.83$, $SD = 1.64$) individuals.

In summary, participants generated appropriate positive (proud) and negative (embarrassed) memories as targets for suppression. The proud and embarrassed events differed in valence, but not vividness and clarity. Whereas all participants (particularly high anxiety individuals) felt more anxious and distressed when thinking about their embarrassed event, repressors reported the lowest levels of negative affect.

Suppression success

Table 1 presents participants' mean number of event-related thoughts (as indicated by button presses) during the suppression period for the proud and embarrassed events. To index the distribution of these thoughts across groups, instructions, and events, Table 2 presents minimum, maximum, median, and mode values. A 2 (anxiety) \times 2 (defensiveness) \times 2 (instruction) \times (2) (event) mixed-model ANOVA of this data yielded main effects of anxiety, $F(1, 76) = 7.47$, $p = .008$, $\eta_p^2 = .090$, defensiveness, $F(1, 76) = 3.46$, $p = .067$, $\eta_p^2 = .043$, and instruction, $F(1, 76) = 13.22$, $p = .001$, $\eta_p^2 = .148$. It also yielded a near significant interaction between anxiety and instruction, $F(1, 76) = 3.46$, $p = .067$, $\eta_p^2 = .043$. To test the prediction that repressors would show characteristic avoidance of their embarrassed event irrespective of suppression instruction, we conducted follow-up 2 (anxiety) \times 2 (defensiveness) \times 2 (instruction) ANOVAs for the proud and embarrassed events separately.

For the proud event, the follow-up ANOVA yielded only main effects of anxiety (near significant) and instruction, $F(1, 76) = 3.59$, $p = .062$, $\eta_p^2 = .045$ and $F(1, 76) = 9.77$, $p = .003$, $\eta_p^2 = .114$, respectively. As expected within the thought suppression paradigm, individuals told to suppress ($M = 3.05$, $SD = 2.25$) reported fewer event-related thoughts than individuals not told to suppress ($M = 4.82$, $SD = 3.36$). Also, low anxiety individuals (low anxious and repressor; $M = 3.19$, $SD = 2.32$) reported fewer event-related thoughts than high anxiety individuals (high anxious and defensive high anxious; $M = 4.25$, $SD = 3.23$). Overall, all participants suppressed thoughts of their proud event when instructed.

TABLE 1
Mean number (and standard deviations) of event-related thoughts during the suppression period

<i>Anxiety and defensiveness</i>	<i>Instruction</i>	
	<i>Suppression</i>	<i>Nonsuppression</i>
<i>Proud event</i>		
Low anxiety		
Low defensiveness (LA)	3.63 (2.36)	4.00 (3.16)
High defensiveness (REP)	1.88 (1.36)	4.13 (2.03)
High anxiety		
Low defensiveness (HA)	3.81 (2.59)	5.63 (5.01)
High defensiveness (DHA)	2.75 (2.05)	6.25 (1.50)
<i>Embarrassed event</i>		
Low anxiety		
Low defensiveness (LA)	3.75 (3.70)	4.75 (4.06)
High defensiveness (REP)	1.69 (1.40)	2.13 (1.55)
High anxiety		
Low defensiveness (HA)	3.50 (2.88)	7.38 (6.09)
High defensiveness (DHA)	2.88 (1.13)	6.25 (3.86)

Note: LA = low anxious; REP = repressor; HA = high anxious; DHA = defensive high anxious.

For the embarrassed event, the follow-up ANOVA yielded main effects of anxiety, $F(1, 76) = 6.03$, $p = .016$, $\eta_p^2 = .074$, defensiveness, $F(1, 76) = 4.23$, $p = .043$, $\eta_p^2 = .053$, and instruction, $F(1, 76) = 7.70$, $p = .007$, $\eta_p^2 = .092$. It also yielded a near significant interaction between anxiety and instruction, $F(1, 76) = 3.45$, $p = .067$, $\eta_p^2 = .043$. Again, as expected within this paradigm, individuals told to suppress ($M = 2.96$, $SD = 3.04$) reported fewer event-related thoughts than individuals not told to suppress ($M = 4.53$, $SD = 3.94$). Also, whereas low anxiety individuals (low anxious and repressor; $M = 2.96$, $SD = 3.04$) reported fewer event-related thoughts than high anxiety individuals (high anxious and defensive high anxious; $M = 4.53$, $SD = 3.94$), low defensive individuals (low anxious and high anxious; $M = 4.44$, $SD = 4.09$) reported more event-related thoughts than high defensive individuals (repressor and defensive high anxious; $M = 2.56$, $SD = 2.20$).

Although there was no statistical interaction between anxiety and defensiveness, inspection of Table 1 reveals that, numerically at least, repressors reported fewer event-related thoughts of their embarrassed event than all other groups in both the suppression and nonsuppression conditions. The distribution data in Table 2 suggests that repressors' mean number of reported thoughts was not an artifact of a few participants. Rather, there was little variance in their thought suppression performance for the embarrassed event; the range of

TABLE 2
Range, median, and mode of event-related thoughts during the suppression period

	<i>Instruction</i>					
	<i>Suppression</i>			<i>Nonsuppression</i>		
	<i>Range</i>	<i>Median</i>	<i>Mode</i>	<i>Range</i>	<i>Median</i>	<i>Mode</i>
<i>Anxiety and defensiveness</i>						
<i>Proud event</i>						
Low anxiety						
Low defensiveness (LA)	0–7	3.5	2,6	0–10	3.5	2,4
High defensiveness (REP)	0–5	2	2	1–7	4.5	5
High anxiety						
Low defensiveness (HA)	1–10	3	1,2,3	1–16	4	1,4
High defensiveness (DHA)	0–6	2	2	5–8	6	5
<i>Embarrassed event</i>						
Low anxiety						
Low defensiveness (LA)	0–15	3	3	0–13	4	4
High defensiveness (REP)	0–5	1	1	0–4	2	1
High anxiety						
Low defensiveness (HA)	0–8	3	1	0–18	7.5	none
High defensiveness (DHA)	1–4	3	4	2–10	6.5	2,4,9,10

Note: LA, low anxious; REP = repressor; HA = high anxious; DHA = defensive high anxious. For some groups there was more than one mode. There was no mode for HA individuals in nonsuppression (embarrassed event); reported thoughts for these eight participants were 0, 1, 3, 6, 9, 10, 12, and 18.

reported thoughts was only 0 to 4 or 5, and the median and mode were very low at 1 or 2. This is particularly notable in the nonsuppression condition, where repressors' thoughts of the embarrassed event ranged from 0 to 4 in comparison to 0–13 for low anxious, 0–18 for high anxious, and 2–10 for defensive high anxious individuals. In other words, only repressors consistently suppressed thoughts of their embarrassed event irrespective of suppression instruction.

Subjective effort and success of suppression

Participants' ratings of thought frequency were strongly correlated with the number of reported thoughts as indicated by button presses (proud event: $r = .64$, $p < .001$; embarrassed event: $r = .62$, $p < .001$). Participants also rated their suppression effort and suppression success. A 2 (anxiety) \times 2 (defensiveness) \times 2 (instruction) \times (2) (event) mixed-model ANOVA of participants' ratings of effort yielded main effects of anxiety (near-significant) and instruction, $F(1, 76) = 3.34$, $p = .072$, $\eta_p^2 = .042$ and $F(1, 76) = 7.69$, $p = .007$, $\eta_p^2 = .092$, respectively. It also yielded a near-significant interaction between anxiety and defensiveness, $F(1, 76) = 3.46$, $p = .067$, $\eta_p^2 = .044$. A similar 2 \times 2 \times 2 \times (2)

ANOVA of ratings of success yielded only a near-significant main effect of event, $F(1, 76) = 3.42$, $p = .068$, $\eta_p^2 = .043$. Participants in the suppression condition ($M = 5.76$, $SD = 2.10$) reported higher levels of effort than individuals in the nonsuppression condition ($M = 4.55$, $SD = 1.82$). Also, high anxiety individuals (high anxious and defensive high anxious; $M = 5.82$, $SD = 2.13$) reported higher levels of effort than low anxiety individuals; $M = 5.01$, $SD = 2.00$). Notably, repressors reported lower levels of suppression effort ($M = 4.65$, $SD = 2.01$) than all other groups, including low anxious ($M = 5.38$, $SD = 1.95$), high anxious ($M = 5.44$, $SD = 1.83$), and defensive high anxious ($M = 6.58$, $SD = 2.53$) individuals. Although the pattern of button presses suggests that not everyone suppressed (particularly embarrassed) event-related thoughts, all believed that they were relatively successful in not thinking about their proud ($M = 5.82$, $SD = 2.36$) and embarrassed ($M = 6.38$, $SD = 2.61$) events. And although repressors had the lowest levels of both event-related thoughts and suppression effort, they did not rate themselves as more successful at suppressing than other groups.

TABLE 3
Mean change (and standard deviations) in event-related thoughts from the suppression to expression periods ("rebound")

	<i>Instruction</i>	
	<i>Suppression</i>	<i>Nonsuppression</i>
<i>Anxiety and defensiveness</i>		
<i>Proud event</i>		
Low anxiety		
Low defensiveness (LA)	-0.81 (2.90)	-0.63 (2.13)
High defensiveness (REP)	-0.38 (2.03)	-1.00 (2.20)
High anxiety		
Low defensiveness (HA)	-0.44 (3.27)	-1.75 (1.67)
High defensiveness (DHA)	0.63 (3.07)	-2.50 (1.00)
<i>Embarrassed event</i>		
Low anxiety		
Low defensiveness (LA)	-1.44 (2.37)	-2.88 (3.31)
High defensiveness (REP)	-0.50 (0.97)	-0.75 (1.04)
High anxiety		
Low defensiveness (HA)	-1.50 (2.28)	-3.63 (6.21)
High defensiveness (DHA)	-1.25 (2.55)	-0.50 (5.07)

Note: LA = low anxious; REP = repressor; HA = high anxious; DHA = defensive high anxious. Positive values represent an increase in event-related thoughts from suppression to expression periods, and negative values represent a decrease.

Rebound of event-related thoughts

Table 3 presents the mean change in event-related thoughts (as indicated by button presses) across the suppression and expression periods for the proud and embarrassed events. Rebound is defined as an increase in event-related thoughts from the suppression to the expression period; in Table 3, positive values represent an increase across the periods and negative values represent a decrease. A 2 (anxiety) \times 2 (defensiveness) \times (2) (instruction) \times (2) (event) mixed-model ANOVA of this data yielded main effects of defensiveness (near significant) and instruction, $F(1, 76) = 3.44, p = .068, \eta_p^2 = .043$ and $F(1, 76) = 4.67, p = .034, \eta_p^2 = .058$, respectively. Individuals told to suppress showed less change in event-related thoughts ($M = -.77, SD = 1.63$) than individuals not told to suppress ($M = -1.73, SD = 2.34$; who reported fewer event-related thoughts during the expression than suppression period). Also high defensive individuals (repressor and defensive high anxious) showed less change in event related thoughts ($M = -0.63, SD = 1.58$) than low defensive individuals (low anxious and high anxious; $M = -1.44, SD = 2.11$; who also reported fewer thoughts during the expression than suppression period). Overall, there was no rebound effect during the expression period, despite successful suppression (particularly by repressors).

DISCUSSION

Repressors were more successful in suppressing thoughts of an embarrassing autobiographical event than low anxious, high anxious, and defensive high anxious individuals. For the embarrassed event, repressors reported the lowest number of event-related thoughts, rated their suppression attempts as less effortful than all other groups, and showed no rebound. They avoided these thoughts even when not instructed to do so. For the proud event, repressors reported a similar number of thoughts to other groups, and like them, avoided only when instructed. Repressors' different reactions to the proud and embarrassed events confirm that their avoidant processing is engaged by negative self-referent material; in this experiment, an autobiographical memory.

Although we focused on only one negative memory (of an embarrassing event), we believe that repressors' suppression would generalise to other, but perhaps not all, categories of emotionally negative memories. Myers and Brewin (1994) asked repressors to recall childhood memories in response to cues "sorry", "angry", "clumsy", "hurt", and "lonely", and reported that repressors had difficulty recalling memories to all of the cues. In contrast, Davis (1987, experiment 2) asked for memories in response to 10 negative emotion words, and reported that repressors had difficulty recalling memories to only "angry" and "fearful" cues. For different people, the repressive coping style may be engaged by different material/memories. Higgin's (1987; see also Strauman, 1992) self-discrepancy theory predicts, for instance, that memories

(“I was nasty to my mother”) that prime a discrepancy between an individual’s self-concept (“I am a nice person”) and their self-evaluative standard or guides (“I should be a nice person”) are associated with emotional discomfort and thus avoided. Individual repressors may be motivated to avoid material that threatens their particular sense of self (Weinberger, 1990).

Repressors’ suppression of the embarrassed event is consistent with their response to experimental memory procedures, including autobiographical recall, recall of stories or scenarios, and directed forgetting (Barnier, 2001; Davis, 1987, 1990; Davis & Schwartz, 1987; Krahe, 1999; Myers & Brewin, 1994, 1995; Myers et al., 1998; Newman & Hedberg, 1999). It is consistent also with anxiety biases in memory. Clinically anxious individuals differ substantially from nonanxious controls on procedures that measure attention/encoding or retrieval (e.g., emotional Stroop, dot probe tasks, directed forgetting), especially in response to anxiety-specific stimuli (Cloitre, 1998; MacLeod, 1999).

Repressors as natural suppressors

Repressors’ thought suppression suggests that they are highly effective, natural suppressors. They reported few intrusive thoughts of their embarrassed event even when not instructed to suppress. In contrast, low anxious, high anxious, and defensive high anxious participants reported up to 18 intrusive thoughts when not instructed to suppress. Repressors also gave the lowest ratings of suppression effort, which implies that they have a natural suppression style experienced as relatively effortless. Over time and repeated practice, effortful suppression may take the form of a habitual, automatic “repression” (Wegner & Zanakos, 1994). Interestingly, repressors did not rate their suppression attempts as more successful than other participants, which suggests that they may lack insight into their avoidance.

It is important to note that, for the embarrassed event, we found main effects of anxiety and defensiveness rather than an interaction between them. Overall, low anxiety individuals (low anxious and repressor) reported fewer event-related thoughts than high anxiety individuals (high anxious and defensive high anxious), and high defensive individuals (repressor and defensive high anxious) reported fewer event-related thoughts than low defensive individuals (low anxious and high anxious). Repressors’ performance may be due to anxiety or defensiveness alone, rather than their combination. But numerically, repressors reported the lowest number of event-related thoughts and the distribution data in Table 2 showed a consistent pattern markedly different from other groups. Our failure to detect an interaction is probably due to a lack of power; defensive high anxious individuals are less common in screening samples, but more are needed to clearly separate out the effects of anxiety and defensiveness.

High anxious and defensive high anxious individuals suppressed their embarrassed event when instructed (like repressors). They reported twice as

many thoughts of their embarrassing event when not instructed to suppress (unlike repressors). These findings challenge the view that emotional thoughts and memories are invariably difficult to suppress (McNally & Ricciardi, 1996; Wenzlaff & Wegner, 2000). However, the impact of negative emotion may be tempered by the self-relevance of the target thought (Howell & Conway, 1992; Kelly & Kahn, 1994; Renaud & McConnell, 2002). Kelly and Kahn (1994) reported that participants' initial suppression of self-generated intrusive thoughts was followed by diminished expression. They argued that suppressing familiar personal thoughts is less problematic than suppressing other thoughts. Such thoughts or experiences may be easier to suppress, particularly if they have been targeted by avoidance in the past.

Contrary to the predictions of ironic processes theory (Wegner, 1994; Wenzlaff & Wegner, 2000), we did not observe rebound, irrespective of suppression instruction. For low anxious, high anxious, and defensive high anxious individuals, the lack of rebound for their embarrassed event is not surprising; they were less likely to suppress it in the first place. For repressors, the lack of rebound is consistent with our prediction that they may be especially skilled at avoiding a sudden postsuppression increase in thoughts, perhaps by continued vigilance and avoidance (whether automatic or effortful). The lack of rebound could be due to the nature of the targeted material. Rebound is often variable for emotional material, and like suppression success, influenced by self-relevance, familiarity, and even a "rebounding style" (Kelly & Kahn, 1994; Renaud & McConnell, 2002; Rutledge, Hollenberg, & Hancock, 1993).

Repressors' performance may reflect a reporting bias rather than a genuine experience of limited awareness. The thought suppression paradigm relies on a behavioural self-report of subjective experience. Although the number of button presses was significantly correlated with retrospective ratings of thought frequency, it is possible that repressors especially were failing to report what they were actually experiencing. Repressors by definition behave in socially desirable ways (as measured by the MC) and may be highly motivated to meet perceived experimental demands. Research using "bogus pipeline manipulations" suggests instead that they are self-deceivers not other-deceivers (Derakshan & Eysenck, 1999). Rather than simply failing to report intrusions, they may use a different criterion for what counts as an event-related thought. One way to minimise the influence of such factors is to use a procedure that indexes the impact of thought control on incidental recall of avoided material (Anderson & Green, 2001).

Pathways and products of suppression success

Assuming that repressors' reports of event-related thoughts accurately reflect their experience, their seemingly natural suppression style may reflect a relatively inadvertent process similar to that seen in retrieval-induced forgetting

(RIF). In RIF, information or memories that receive retrieval practice (i.e., they are repeatedly retrieved and rehearsed) inhibit the retrieval of items or memories that are related to practised material, but do not receive practice (Anderson, Bjork, & Bjork, 1994). For instance, Barnier, Hung, and Conway (this issue) asked participants to generate up to four autobiographical memories to a number of positive, negative, and neutral category cues. During a retrieval-practice phase, participants practiced retrieving a subset of the memories from each category cue. On a final recall test, participants recalled more practised than unpractised memories from the same category cues. Repressors may focus on (and in effect practice) positive memories at the expense of negative memories, which would decrease the accessibility of negative memories. This is consistent with Davis' (1987, 1990; Davis & Schwartz, 1987; see also Newman & Hedberg, 1999) finding that repressors recalled more positive than negative autobiographical memories from childhood, and Boden and Baumeister's (1997) finding that repressors distracted themselves from an unpleasant film by thinking of pleasant thoughts and memories. Repressors' focus on positive rather than negative memories may begin as an effortful strategy, but become habitual and effortless over time. Indeed, based on Howell and Conway's (1992) finding that individuals are less likely to report negative thought intrusions when they are in a positive mood, repressors may automatically lessen the accessibility of unwanted negative thoughts by simply focusing on positive memories that engender a positive mood.

Both the findings and limitations of this research raise questions for future research on individual differences in thought and memory management. Repressors may be good suppressors because the autobiographical memories they selected and we targeted for suppression were the focus of avoidance in the past; in other words, repressors may have chosen thoughts that they knew they could control. This is one difficulty of using personally generated rather than experimentally controlled material. However, repressors may be much less likely to avoid neutral, low self-relevant targets. It is unclear also whether repressors are avoiding their memory of an event or simply their emotional reaction to it. Schimmack and Hartmann (1997) argued that the repressive coping style influences the experience of emotions rather than the accessibility of memories. Most research has focused on repressors' memory performance rather than considered the extent to which emotional inhibition renders cognitive inhibition more likely (Koutstaal & Schacter, 1997). Notably, our two versions of the suppression instruction, which targeted either emotions or the entire event, had similar effects.

In summary, this experiment highlights important individual differences in the management of (particularly negative) memories. Our results reinforce previous findings that repressors use inhibitory strategies to regulate their awareness of thoughts and memories they find threatening or uncomfortable. Repressors appear to be talented, natural suppressors, at least in the laboratory.

Future research should tell us how repressors use this characteristic style to manage awareness of information in everyday life.

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