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The impact of perceived self-efficacy on memory for aversive experiences

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Self-efficacy is a key construct underlying healthy functioning and emotional well-being. Perceptions of uncontrollability, unpredictability, and low self-efficacy are consistently associated with negative mental health outcomes, such as post-traumatic stress disorder (PTSD). To test the causal relation between perceived coping self-efficacy and stress responses we employed a trauma film paradigm in which college students ($N = 33$) viewed a graphic film of the aftermath of a motor vehicle accident following a high (HSE) or low self-efficacy (LSE) induction. Participants were tested for intrusions, distress, and memory recall for the film over the following 24 hours. LSE participants recalled more central details than HSE participants. Further, HSE participants reported fewer negative intrusions immediately following the film and at 24 hours. These findings suggest that strategies that increase perceived coping self-efficacy may reduce intrusive recollections of an aversive event, and also reduce the attentional bias associated with remembering aversive stimuli.

Keywords: Self-efficacy; Trauma; Post-traumatic stress; Memory; Intrusions.

The belief that one possesses a sense of agency and control over one's thoughts, emotions, and behaviours is critical for human functioning. According to the social-cognitive theory of self-efficacy, knowledge, skills, and prior accomplishments are often poor predictors of future functioning and behaviours (Bandura, 1977). Instead behaviour is purportedly mediated by perceptions of one's competence and capabilities and these perceptions are often better predictors of future functioning than previous outcomes. Therefore, although agency and performance are constrained by one's actual capabilities, self-efficacy theory postulates that an interaction exists between one's actual abilities and one's belief that they possess such skills and capabilities (Bandura, 1977, 1986).

There is now considerable evidence that the extent to which individuals perceive themselves as possessing the capacity to cope with adversity contributes to adjustment (for a review see Benight & Bandura, 2004). Across a heterogeneous range of traumatic events, including war, natural disasters, terrorism, and interpersonal violence, individuals who report higher levels of perceived self-efficacy appear to be less vulnerable to the negative consequences of traumatic stress (Benight & Bandura, 2004). Although several mechanisms may underlie the relation between perceived self-efficacy and post-traumatic recovery, findings from experimental studies suggest that, in the face of a traumatic stressor, self-efficacy beliefs may play a critical

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role in modulating levels of stress reactivity. For example, when faced with identical stimuli, people who believe they possess control over negative events display lower physiological arousal and less performance impairment than individuals who believe they lack personal control (Geer, Davison, & Gatchel, 1970; Glass, Singer, Leonard, Krantz, & Cummings, 1973; Litt, Nye, & Shafer, 1993; Sanderson, Rapee, & Barlow, 1989). Whereas individuals exposed to phobic stressors exhibit heightened autonomic arousal and greater production of catecholamine, following an induction increasing self-efficacy, subsequent exposure to the phobic stimuli was associated with lower levels of physiological reactivity and greater immunological functioning (e.g., Bandura, Blanchard, & Ritter, 1969; Bandura, Reese, & Adams, 1982; Bandura, Taylor, Williams, Mefford, & Barchas, 1985; Wiedenfeld et al., 1990). Relatedly, there is considerable evidence from animal studies showing that uncontrollable stress has deleterious effects on fear responses during subsequent exposure to stressors (e.g., Christianson, Thompson, Watkins, & Maie, 2009; Maier & Watkins, 2005).

Although a number of experimental strategies have been employed to experimentally induce perceived self-efficacy in humans, one strategy that has proven to enhance self-efficacy is the use of erroneous feedback about an individual's capabilities in comparison to a fictitious comparison group. For example, following a cold-pressor test, Litt (1988) led participants to believe that they were in either the 90th or 37th percentile rank for pain tolerance. Comparison to the fictitious group led to either an increase or decrease of self-efficacy in the direction of the comparison, which in turn led to changes in pain tolerance. That is, the greater the increase in perceived self-efficacy, the greater the pain tolerance. Interestingly, in a second phase of the experiment the same participants were informed that they had either increased or decreased in their original pain tolerance ranking. This reversal in ranking again corresponded with changes in self-efficacy as well as pain tolerance. Bouffard-Bouchard (1990) found that students who were falsely led to believe that they had a higher standing than their peers set higher goals, adopted more problem-solving strategies, and performed better on cognitive tasks than their peers at the same intellectual level who had been told that they were at a lower standing. Moreover, individuals informed that they possessed greater physical strength demonstrated more physical stamina during a competition. Failure in the competition led to greater physical exertion among those high in self-efficacy, whereas it led to impaired performance among those in the low self-efficacy condition (Weinberg, Yukelson, & Jackson, 1980).

Perceptions of self-efficacy are especially relevant to understanding how individuals cope with stressful life events. Cognitive models of post-traumatic stress disorder (PTSD) propose that low self-efficacy appraisals, such as extreme thoughts about one's vulnerability or inability to cope with the traumatic experience, are key predictors in the pathogenesis of the disorder (e.g., Ehlers & Clark, 2000; Foa, Ehlers, Clark, Tolin, & Orsillo, 1999). Further, these models suggest that individuals who employ maladaptive self-appraisals prior to a traumatic event will be more likely to develop PTSD because they tend to exaggerate a sense of danger and threat in their environment. Consistent with this view, Bryant and Guthrie (2005, 2007) found that, in a sample of firefighters, maladaptive appraisals about one's self prior to trauma exposure predicted PTSD symptom severity following trauma exposure.

The aim of this study was to extend current models by examining whether enhancing perceived coping self-efficacy prior to a stressor would impact subsequent memory for the event. There is strong evidence that emotionally aversive events are recalled more strongly than neutral events (McNally, 2003), and that the focus on the source of distress results in greater recall of events central to the negative event than peripheral events (Christianson, 1992). Further, considerable evidence indicates that people are more likely to have intrusive memories of aversive experiences than neutral ones (Brewin, Gregory, Lipton, & Burgess, 2010; Clark & Rhyno, 2005). It is possible that enhanced self-efficacy reduces the impact of a distressing event; this may occur via reduced arousal, less focused encoding of the central features of the experience, or possibly less post-encoding elaboration of the experience. Accordingly, we predicted that augmenting perceived self-efficacy prior to watching a film clip depicting the immediate aftermath of a serious car accident would lead to poorer recall for details central to the trauma film stimuli and fewer intrusive recollections of the trauma film.

METHOD

Participants

A total of 33 undergraduate students (23 females and 10 males) with a mean age of 19.66 ($SD = 2.84$) from the University of New South Wales (UNSW) who had previously completed a battery of questionnaires in an introductory psychology course participated in this study. Participants either received course credit or $20AUD for their participation.

Materials

Demographics. Participants provided self-report information on their age, gender, years of education, and whether they were currently receiving mental health treatment, or had a present or past diagnosis of mental illness.

Visual analogue scales (VAS) for mood and self-efficacy. Visual analogue scales were used to measure mood (*Distraction*, *Excitement*, *Positive Mood*, *Negative Mood*) and perceived self-efficacy (*Self-Confident*) before and after the experimental induction. Each VAS had anchors ranging from 1 to 10 (e.g., 1 = *not at all self-confident*, 10 = *extremely self-confident*).

Depression Anxiety Stress Scales (DASS; Lovibond & Lovibond, 1995). Participants completed the 21-item self-report DASS to assess current levels of depression, anxiety, and stress symptoms prior to the experimental induction.

Resilience Appraisals Scale (RAS; Johnson, Gooding, Wood, & Tarrier, 2010). Participants completed this 12-item self-report measure assessing appraisals of perceived ability to cope with emotions, perceived ability to cope with difficult situations, and perceived ability to gain social support. The scale was constructed to measure positive self-appraisals similar to those underlying self-efficacy.

Trauma film paradigm. A 10-minute trauma film of real-life footage that has been employed in previous studies (Small, Kenny, & Bryant, 2011) was projected on a MacBookPro laptop 15-inch computer screen. It consisted of live footage from the aftermath of a motor vehicle accident, including emergency service personnel working to extract trapped victims, victims screaming, injured bodies being moved, and a dead body being placed in a body bag. Participants were informed in the recruitment material and at the experiment prior to viewing the film that the film contained graphic scenes of a motor vehicle accident.

Trauma film paradigm memory questionnaire (Small et al., 2011). We employed a cued-recall memory test comprising content from the film that was adopted from a previous study (Small et al., 2011). This test generated items that were ''central'' to the trauma, facts or elements directly related to the victims in the film (e.g., number of injured individuals), or were ''peripheral'' to the trauma, information associated with the event that was not directly related to the victims (e.g., the number of fire trucks at the scene), and the final test only comprised items that were fully agreed on by two independent raters. On the basis of this coding, the 20-item memory questionnaire comprised 10 central/trauma-focused and 10 peripheral/non-trauma-focused items. Correct responses were summed and divided by the total number of questions. Percentages for central and peripheral responses were calculated separately.

Procedures

Baseline measures. After participants provided written informed consent (approved by the UNSW Human Research Ethics Committee), they completed the DASS and baseline ratings of mood and self-efficacy on the VAS.

Self-efficacy induction. A total of 17 participants were then randomly assigned to the high self-efficacy (HSE) condition and 16 were participants were assigned to the low self-efficacy (LSE) condition. In order to modify self-efficacy we provided false feedback to participants from psychological screening measures they had completed at the beginning of their course. Specifically, HSE participants were verbally instructed as follows:

> . . . based on the way in which you responded to items on the questionnaire during your introduction to psychology course, we were able to derive a highly accurate measure of how you cope in stressful situations. In fact, according to our analyses, you are in the top 1% of ''copers''. Although like most people you may experience some negative emotions during and

> after a stressful event, in general you have fewer negative emotions and recover much more quickly, and you feel capable of overcoming difficult life events in the future. That is, compared to the general population you feel a greater sense of control and confidence when managing adverse and stressful events.

In contrast, participants in the LSE condition were told:

> . . . based on the way in which you responded to items on the questionnaire during your introduction to psychology course, we were able to derive a highly accurate measure of how you cope in stressful situations. According to our analyses, you are in the lower 50–30%ile of ''copers''. Like most people you may experience some negative emotions during and after a stressful event, but at times may find that it takes you much longer than others to recover, and in general, you are often concerned with your ability to overcome difficult life events in the future. That is, you tend to feel a lack of control or confidence when dealing with adverse and stressful life events.

Both inductions were matched for word count. Individuals in both conditions were then asked if this description is consistent with how they view themselves, and were asked to provide up to three of their own words describing how they cope with stressful events.

Post-induction measures. Following the induction participants were re-administered the VAS, as well as the RAS to provide an additional measure of self-efficacy. After completing the post-induction measures individuals viewed the trauma film paradigm. They sat in front of the computer with the experimenter in the room. Following the film the experimenter asked each participant how they were feeling and ensured that they were not experiencing adverse reactions to the film. Participants were then instructed to ''close their eyes and relax'' for 3 minutes. After 3 minutes the experimenter instructed participants to open their eyes and to estimate the number of intrusions of the film during the preceding 3 minutes and how distressing they found the film. Specifically, participants were asked ''During the time in which your eyes were closed, how many time did visual images of the film pop into your mind?'' and ''On a scale of 1–10, how distressing did you find the film?'' Following these two questions they were then asked to complete the VAS for a third time.

Participants were then debriefed and informed about the self-efficacy induction prior to leaving the laboratory. They were told that feedback they received regarding their capacity to cope with stressful events was manufactured to examine differences in emotion and memory when viewing trauma-related events. It was explained that the feedback did not reflect their actual abilities to cope with stressful events, and this was unknown to the experimenter. Participants were informed about the false feedback prior to leaving the laboratory, but the full hypothesis of the study was not disclosed until after the 24-hour follow-up. Although this debriefing prior to the end of the experiment may have led to some demand characteristics, the UNSW ethics board required that participants did not leave the laboratory believing that the feedback they received was an actual estimation of their coping abilities.

The experimenter then received consent from the participants to contact them 24 hours later to ensure that they were not experiencing adverse reactions to the film and to complete a brief set of follow-up questions about their reactions to the film. During the follow-up call participants were asked to rate how distressing they found the film currently (e.g., 1 = not at all distressing, 10 = extremely distressing), and were asked to ''estimate the number of times in which visual images of the film popped into your mind over the past 24 hours''. In addition participants were asked to rate the extent of the injuries, the veridicality of the film, and their estimation of how much pain the victims were experiencing all on a 1–10 scale (1 = none, 10 = extreme). Furthermore, participants were asked to complete a memory task for the film they had watched during the study.

Following these questions participants were asked if their participation in the experiment led to any noticeable changes in their mood or anxiety, and if they felt that the experiment interfered with their daily functioning in school, with friends, or at a job over the past 24 hours. The experimenter then asked each participant if they had any questions about the study or any concerns, and discussed the full aims of the study. All of the participants were given the contact information and were encouraged to contact the authors AB or RB if they began to experience any changes in mood or functioning that they

attributed to the experiment. None of the participants reported having an adverse reaction to the film during the study or at the 24-hour follow-up, nor did any participant contact the researchers after the completion of the study.

RESULTS

Table 1 presents the mean participant characteristics. HSE and LSE groups did not differ by age, $t(31) = .96$, $p = .35$, years of education, $t(31) = .72$, $p = .48$, gender, χ^2 $(1, N = 33) = .41$, $p = .52$, or the DASS subscales of depression, $t(31) = .67$, $p = .51$, anxiety, $t(31) = 1.45$, $p = .16$, or stress, $t(31) = 1.20$, $p = .24$. Although group differences did not emerge on the subscales of the DASS, one outlier in the LSE condition was identified. A secondary analysis was conducted in which this individual was removed from the analysis. A comparison of DASS total scores continued to show a lack of between-group difference on the DASS, $t(30) = .52$, $p = .61$. None of the participants was currently receiving any behavioural or psychopharmacological mental health treatment.

Induction checks

A series of 2 (Condition: HSE and LSE) $\times$ 3 (Induction: Pre-induction, Post-induction, Post-trauma film paradigm) repeated-measures analyses of variance (ANOVAs) on Distraction, Excitement, Positive Mood, and Negative Mood, and Self-Efficacy scales revealed a significant main effect for Condition, $F(1, 31) = 19.45$, $p < .001$, $\mu = .39$ and a Condition $\times$ Induction interaction, $F(1, 31) = 11.71$, $p < .001$, $\mu = .27$. Mean scores are presented in Table 2. Although participants did not differ in their perceived self-efficacy prior to the induction, individuals in the HSE condition reported higher levels of self-efficacy following the induction, $t(31) = 3.89$, $p < .001$, $d = 1.36$, as well as following the trauma film paradigm, $t(31) = 5.56$, $p < .001$, $d = .1.89$. In addition individuals in the HSE condition showed a significant increase in perceived self-efficacy from baseline to post-induction ratings, $t(16) = 3.45$, $p < .001$, $d = .80$, whereas individuals in the LSE condition demonstrated a significant decrease in perceived self-efficacy from baseline to post-induction, $t(15) = 2.39$, $p < .05$, $d = .67$. A main effect for Induction was also found for Distraction, $F(1, 31) = 3.48$, $p < .05$, $\mu = .10$. Follow-up t-tests revealed a trend for participants in both conditions to feel more distracted following the film, $t(32) = 1.72$, $p < .09$, $d = 1.11$. No other comparisons were significant. A comparison of positive coping self-appraisals on the RAS collected post-induction revealed that individuals in the HSE condition reported higher levels of positive coping self-appraisals than individuals in the LSE condition, $t(31) = 3.22$, $p < .01$, $d = 1.11$.

TABLE 1
Mean participant characteristics

	High self-efficacy		*Low self-efficacy*	
Variable	*M*	*SD*	*M*	*SD*
Age	20.12	3.26	19.19	2.19
Education (years)	12.97	1.33	12.69	0.87
%Female	64.71	–	75.00	–
DASS Depression	4.47	3.91	5.56	5.43
DASS Anxiety	6.12	5.72	8.94	5.44
DASS Stress	7.64	9.02	11.13	7.56

DASS = Depression Anxiety Stress Scale.

TABLE 2
Self-report summary scores before and after self-efficacy induction

	Pre-induction	*Post-induction*	*Post-film*
Positive			
HSE	5.82 (1.29)	6.00 (1.62)	5.35 (1.37)
LSE	5.56 (1.59)	5.06 (1.39)	6.69 (1.70)
Negative			
HSE	7.23 (1.14)	6.94 (1.20)	6.76 (1.39)
LSE	6.69 (1.70)	6.31 (1.66)	5.94 (1.53)
Distracted			
HSE	2.59 (1.46)	2.53 (1.50)	3.39 (1.53)
LSE	2.81 (1.56)	3.44 (2.19)	3.94 (2.21)
Excited			
HSE	4.71 (1.86)	4.94 (1.82)	3.94 (1.68)
LSE	5.12 (1.41)	5.06 (1.48)	4.56 (1.67)
Self-confident			
HSE	6.35 (1.11)[d]	7.24 (1.05)[b,d]	7.29 (1.10)[c]
LSE	6.13 (1.16)[e]	4.75 (2.38)[b,e]	4.25 (1.95)[c]
Resilience appraisals[a]			
HSE	–	50.71 (6.29) [f]	–
LSE	–	42.44 (8.39) [f]	–

HSE = High self-efficacy. LSE = Low self-efficacy. Resilience appraisals = Resilience Appraisal Scale. [a]Administered post-induction only; [b]$p < .001$; [c]$p < .001$; [d]$p < .01$; [e]$p < .05$; [e]$p < .001$; [f]$p < .01$.

TABLE 3
Self-generated descriptions of coping following high vs low self-efficacy induction

High self-efficacy			*Low self-efficacy*		
different points of view	look for the positive	try to solve	fidgety	short-tempered	anxious
high self-esteem	religious beliefs	rationality	stressed	panic	worried
persistent	distract self	motivated	stressful	pressure	breakdown
distract self with enjoyable things	bound to make mistakes	talking to people	stressful	anxious	tired
confident	positive	successful	tired	anxious	determined
optimistic	driven	detached	stressed	fear	panic
calm	positive	happy	stressed	nervous	agitated
relieved	positive	determined	trapped	annoyed	tense
resourceful	passive	intuitive	stressed	fear	panic
relaxed	not serious	pro-active	stressed	nervous	agitated
carefree	don't take things too hard	make others feel better	stressful	angry	incapable
patient	confrontational	understanding	nervous	shaky	very anxious
calm	denial	time management	isolated	withdraw	avoid other things
control	compensation	perspective	calm	indecisive	nervous
relaxation techniques	reappraisal	athletic	overthink	nervous	tense
perspective	get on with things	look forward	worried	isolating	isolate
optimistic	easy-going	things will pass	sweaty palms	headache	very anxious
patient	confrontational	understanding	nervous	shaky	avoid other things
calm	denial	time management	isolated	withdraw	
control	compensation	perspective			

Post-induction self-reported descriptions. We further examined whether the induction was effective by comparing the content of the descriptions generated by participants concerning how they perceive their ability to cope with stressful events. One participant provided two words, whereas the remaining participants provided three words. The words were highly consistent with the condition induction (see Table 3 for complete list of words). Among the 98 words generated by participants, 97% of the words appeared to describe coping skills consistent with the experimental induction.

Post-film responses

Individuals in the HSE condition had significantly fewer visual intrusions than individuals in the LSE condition, $t(31) = 2.66$, $p < .05$, $d = .91$ (see Table 4). Further, individuals in the LSE condition rated the film as more distressing than those in the HSE condition, $t(31) = 3.28$, $p < .01$, $d = 1.15$.

Investigation of the data revealed three outliers. A secondary analysis in which these individuals were removed continued to show that individuals in the LSE condition ($M = 5.93$, $SD = 2.76$) reported more intrusions than individuals in the HSE condition ($M = 3.44$, $SD = 3.31$), $t(28) = 2.22$, $p < .05$, $d = .62$.

Twenty-four-hour follow-up

Twenty-four hours after the experiment participants in the LSE estimated that they had experienced significantly more intrusions for the film, $t(31) = 2.31$, $p < .05$, $d = .80$ (see Table 4). Participants in the LSE condition also continued to feel more distressed about the film than those in the HSE condition, $t(31) = 3.04$, $p < .01$, $d = .49$. However, the two groups did not differ in their

TABLE 4
Ratings of intrusions, distress, and memory accuracy

	High self-efficacy		*Low self-efficacy*		
Variable	*M*	*SD*	*M*	*SD*	*t*
Post-film					
Intrusions	4.41	5.14	17.87	20.23	2.66*
Distress	5.65	2.60	7.94	1.06	2.31*
Post 24 hours					
Intrusions	3.35	1.82	5.00	2.20	3.23**
Distress	5.89	3.04	8.25	.68	3.04**
Memory score					
Central	.51	.14	.66	.20	2.47*
Peripheral	.55	.10	.58	.15	.63

Memory score = Proportion of correct responses on trauma-film memory questionnaire completed 24 hours after viewing film. Central = detailed directly related to the trauma. Peripheral = details indirectly related to the trauma.
*$p < .05$; **$p < .01$.

ratings of the extent of the injuries, $t(31) = .47$, $p = .64$, how realistic the film seemed, $t(31) = .51$, $p = .61$, and their estimation of how much pain the victims were experiencing, $t(31) = 1.28$, $p = .21$.

Twenty-four-hour follow-up memory questionnaire. Separate scores were calculated and averaged for central and peripheral details of the film. Individual in the LSE condition demonstrated better recall accuracy for central details than individuals in the HSE condition, $t(31) = 2.47$, $p < .01$, $d = .31$ (see Table 4). However, there were no group differences for recall accuracy of peripheral details, $t(31) = .64$, $p = .53$.

DISCUSSION

Participants in the HSE condition reported fewer negative intrusions and less distress immediately following and 24 hours after viewing the distressing scenario. Moreover, although group differences did not emerge for memory accuracy of peripheral details, individuals in the LSE condition demonstrated more accurate recall for central trauma details 24 hours after watching the film. These findings demonstrate direct effects of self-efficacy on intentional and unintentional memory for distressing events.

The finding that individuals in the LSE condition displayed greater memory for the central details of the trauma film than those in the HSE condition accords with the interpretation that low-efficacious participants perceived the scenario as more distressing. According to self-efficacy theory, individuals with low self-efficacy are more likely to perceive danger in their environment and to preferentially focus on potential threats (Benight & Bandura, 2004). There is strong evidence that people tend to have better recall for threat-related material relative to the less-threatening aspects of an experience (Kramer, Buckhout, & Eugenio, 1990). The finding that low-efficacy participants demonstrated preferential retrieval of events central to the distressing images suggests that they preferentially encoded these events more than high-efficacy participants. Another possibility is that individuals in the low-efficacy condition elaborated more on the central events than the high-efficacy participants following encoding, and this contributed to the greater recall of central events. According to self-efficacy theory, individuals low in self-efficacy tend to spend more time thinking about prior negative events, which in the present study may have further consolidated the rehearsed aversive experiences. Interestingly, participants in the LSE and HSE conditions did not differ in general mood ratings following the induction. Despite this, the two groups displayed different levels of distress to the film, suggesting that the self-efficacy becomes operational when one is confronted with situational challenges rather than affecting one's baseline mood. It is also worth remembering that our participants were healthy college students, and so elevating mood may have been difficult with a simply efficacy induction.

The tendency for individuals in the high self-efficacy condition to report fewer negative intrusions and lower levels of distress following the film is consistent with evidence that perceived self-efficacy plays a central role in modulating anxiety, autonomic arousal, and plasma catecholamine secretion following adverse experiences (Bandura et al., 1982, 1985; Weidenfeld et al., 1990). This finding also accords with evidence from naturalistic studies that pre-trauma self-efficacy appraisals influence post-traumatic stress responses to subsequent aversive experiences (Bryant & Guthrie, 2005, 2007). The manipulation of self-efficacy in this study provides causal evidence to supplement this naturalistic evidence. The current finding may be explained in terms of prevailing models of intrusive memories. Numerous models emphasise the crucial role of arousal at the time of encoding and consolidation. For example, different models posit that (a) intrusions may occur as a result of elevated arousal at the time of the trauma resulting in fragmented encoding, which can lead to subsequent intrusions (Ehlers & Clark, 2000), (b) that experiences encoded under extreme arousal are more likely to be conditioned with associated stimuli, which contribute to subsequent intrusive memories occurring in response to conditioned cues (Foa, Steketee, & Rothbaum, 1989), or (c) the predominance of perceptual encoding under conditions of high arousal leads to increased subsequent intrusions (Brewin et al., 2010). Other models posit that intrusive memories occur as a result of unsuccessful attempted suppression (Wenzlaff & Wegner, 2000), which may be less likely in participants with higher self-efficacy because they perceive a greater capacity to manage the

experience. We did not index management strategies in the post-encoding phase, and so cannot infer the role of any effects of the efficacy induction on subsequent cognitive responses. Each of these interpretations is consistent with the finding that participants in the high self-efficacy condition reported less distress in response to the film both immediately after viewing it, as well as the following day.

We recognise that the design of the current experiment permitted demand characteristics associated with the self-efficacy induction to possibly influence self-reported responses of memory and intrusion reports; this possibility is highlighted by the same experimenter administering the induction and assessing memory responses. Future studies could implement Orne's (1969) real-simulating paradigm by preparing participants prior to the study with an independent experimenter to simulate their responses to the experimental instructions (rather than to experience them); according to this paradigm, if simulators perform differently from actual participants, then actual participants' responses cannot be attributed to demand characteristics. Indirect measures of intrusions could also be implemented, such as assessing cognitive performance on demanding tasks during which occurrence of intrusions can be assessed; strength of intrusions can be assessed via the extent to which cognitive performance is impaired as a result of intrusive processing (Hill & Bryant, 2010). Additionally, psychophysiological responses could be used, such as skin conductance or EMG, to index the extent to which presentation of memory reminders affect participants receiving high and low self-efficacy inductions.

We note additional methodological limitations. First, we note that our reliance on a single-item measure with unknown psychometric properties to investigate the number of intrusions self-reported by participants immediately following the film and at the 24-hour follow-up is limiting. The rationale for the use of the single-item question was to limit the impact of demand characteristics by reducing the salience of this item during the experiment via embedding the item within a larger number of unrelated questions; we were concerned that extensive measures of intrusive responses might have cued participants to respond in a biased way. Having demonstrated the effect with this measure, we suggest future studies need to index intrusions with more comprehensive measures of both frequency (e.g., Impact of Event Scale-Revised; Weiss & Marmar, 1997), as well as diary and real-time recordings (see Holmes & Bourne, 2008). Importantly, some models such as the dual-representation theory (e.g., Brewin, 2001) propose that two separate memory systems, verbally accessible memory (VAM) and situational accessible memory (SAM), underlie the way in which trauma memories are processed. The VAM purportedly involves verbal memories that are contextualised in the past; in contrast, SAM comprises primarily poorly contextualised perceptual images associated with one's emotional reaction, which are believed to be more vulnerable to imagery-based intrusions. Multi-dimensional measures that index the phenomenology, intensity, and management of intrusive memories will more comprehensively assess the impact of self-efficacy on intrusive experiences (see Hagenaars, Brewin, van Minnen, Holmes, & Hoogduin, 2010). We also note that inferences from this study would be enhanced by using an intra-individual design in which the same participant's levels of self-efficacy were manipulated across time, so that individual differences could be controlled. Finally, our induction may have involved various facets of self-esteem, including mood, self-referential appraisals, and motivational factors; future studies could dismantle the components of self-esteem to isolate the differential effects of each facet.

The novelty of this study is that it demonstrates a causal effect of enhanced self-efficacy on memory for aversive experiences. There are potential clinical implications of this finding insofar as facilitating self-efficacy in those who are likely to be exposed to traumatic experiences may enhance their ability to cope via more adaptive encoding and retrieval of the potentially distressing information. Experimental studies that manipulate self-efficacy in people who are high-risk for trauma exposure, or those entering exposure-based therapy, may lead to strategies that can enhance resilience and treatment.

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