

Autobiographical Integration of Trauma Memories and Repressive Coping Predict Post-Traumatic Stress Symptoms in Undergraduate Students

Tom Smeets,* Timo Giesbrecht, Linsey Raymaekers,
Julia Shaw and Harald Merckelbach

Faculty of Psychology and Neuroscience, Maastricht University, Maastricht, the Netherlands

What differentiates those who are able to adapt well to adverse life events (i.e., persons who are resilient) from those who are not (e.g., persons who develop post-traumatic stress symptoms)? Previous work suggests that enhanced autobiographical integration of trauma memories is associated with more severe post-traumatic stress symptoms. Extending this line of work, the present study looked at whether the integration of trauma memories, repressive coping and cognitive reactivity are related to post-traumatic stress symptomatology following negative life events among otherwise healthy young adults ($N = 213$). Results show that while enhanced integration of trauma memories and high levels of dissociation are related to elevated levels of post-traumatic stress, people who generally engage in repressive coping report fewer post-traumatic stress symptoms. Copyright © 2009 John Wiley & Sons, Ltd.

Key Practitioner Message:

- Enhanced integration of trauma memories is linked to increased post-traumatic stress.
- High levels of trait dissociation are related to elevated levels of post-traumatic stress symptomatology.
- A repressive coping style is associated with fewer post-traumatic stress symptoms.

Keywords: Trauma, Autobiographical Memory, PTSD, Resilience, Repressive Coping

INTRODUCTION

Epidemiological studies indicate that most adults are exposed to at least one traumatic event during

the course of their lives (Ozer, Best, Lipsey, & Weiss, 2003). Traumatic memories related to negative life events are often well retained over time and may even develop into intrusive recollections, which are a hallmark feature of post-traumatic stress disorder (PTSD) (American Psychiatric Association, 2000, criterion B-1). Many authors have argued that a traumatic experience violates the cognitive schemata that people sustain, and, therefore, such

*Correspondence to: Tom Smeets, Faculty of Psychology and Neuroscience, Maastricht University, P.O. Box 616, 6200 MD Maastricht, the Netherlands.
E-mail: tom.smeets@maastrichtuniversity.nl

an experience would be difficult to incorporate in the autobiographical memory system. This poor integration, in turn, would facilitate the development of PTSD symptoms (e.g., Ehlers & Clark, 2000; Kleim, Wallott, & Ehlers, 2008; for reviews, see Brewin & Holmes, 2003; Dalgleish, 2004). Germane to this issue is the widespread idea that dissociative experiences during traumatic events (i.e., peritraumatic dissociation) encompass a defensive function that enables victims to detach psychologically from traumatic experiences, resulting in fragmented trauma memories (Spiegel, 1991; Van der Kolk & Fisler, 1995; for a critical appraisal, see Giesbrecht, Lynn, Lilienfeld, & Merckelbach, 2008). Ehlers and Clark (2000; see also Brewin & Holmes, 2003), on the other hand, also stated that because trauma memories are significantly discrepant from previous experiences embedded within one's autobiographical memory system, they are likely to become very central to the person's evolving sense of self and the world after the trauma (i.e., can be viewed as a turning point in one's life).

Meanwhile, Berntsen, Willert, and Rubin, (2003; see also Berntsen & Rubin, 2006, 2007) observed that trauma memories are particularly well integrated in autobiographical memory and often develop into vivid landmarks. That is, because they are so distinct and have an immense emotional impact, traumatic memories in most cases remain '[. . .] highly accessible and may form a cognitive reference point for the organization of autobiographical knowledge with a continuous impact on the interpretation of non-traumatic experiences and expectations for the future' (Berntsen & Rubin, 2006, p. 418). By cognitive reference point, these authors mean that the traumatic event forms a central component of the autobiographical self or is considered to be a turning point in one's life that might even become relied upon to attribute meaning to other experiences. Berntsen and Rubin (2006) showed that the degree to which traumatic experiences are integrated into autobiographical memory is positively related to the severity of PTSD symptomatology. In a follow-up study, these authors also demonstrated that the integration of trauma memories predicts PTSD symptoms, irrespective of the degree to which dissociative experiences were present (Berntsen & Rubin, 2007). These studies suggest that enhanced, rather than poor, integration of trauma memories may be crucial in promoting PTSD symptoms.

Interestingly, converging evidence shows that people may differ dramatically in the way they react to and cope with the impact of trauma, resulting in a huge diversity of outcome patterns follow-

ing traumatic events (e.g., Bonanno, 2004, 2005). For example, many people seem to be *resilient* in the face of adverse life events. These individuals adapt and respond remarkably well to trauma, tragedy or other stressful life events, and seem able to thrive in the face of adversity (Bonanno, 2004; Masten, 2001), or experience only minor suffering. Some people, on the other hand, are unable to recover from the experienced acute distress and go on to develop PTSD. This array of potential reactions to traumatic experiences has fueled recent research on factors that might affect the ability to adapt to aversive events and their aftermath.

One such factor is heightened emotionality during and immediately after the traumatic event. Research in the field of cognitive-affective neuroscience has shown that people differ widely in their cognitive reactivity to emotional stimuli (Davidson, 2000; Hedlund & Rude, 1995). Moreover, different individuals may subjectively experience the same event as more or less traumatic (Gross, 2002). Also, cognitive reactivity has recently been shown to be intimately linked to rumination (e.g., Moulds et al., 2008), which is a well-known predictor of persistent PTSD (Michael, Halligan, Clark, & Ehlers, 2007). Collectively, this suggests that individual differences in cognitive and emotional reactivity may influence one's ability to cope with distressing events, and that failure in cognitive emotion regulation following negative life events may result in a more prominent role for traumatic memories in autobiographical memory. Further evidence in support of this idea stems from a meta-analysis by Ozer and co-workers, indicating that peritraumatic dissociative experiences, such as changes in cognitive and perceptual functioning during the trauma, are among the best predictors of PTSD symptom severity (Ozer et al., 2003; but see Candell & Merckelbach, 2004; Van der Velden et al., 2006).

Psychoanalytic theorists have long advocated the idea that people may *repress* or dissociate traumatic experiences because they are too painful to remember. Thus, Freud (1915/1957) noted that such selective repression of painful experiences is used to some degree by almost everyone to cope with negative life events. Although the concept of repression has been operationalized in a variety of ways (see Erdelyi, 2006 for review), probably the most common and influential is that of *repressive coping style*, a specific combination of low levels of anxiety and high defensiveness (Weinberger, Schwartz, & Davidson, 1979). Repressive coping has been linked to resilience and/or PTSD symptomatology in a variety of studies (e.g., Coifman, Bonanno,

Ray, & Gross, 2007; Ginzburg, Solomon, & Bleich, 2002). Coifman et al. (2007), for example, found that people who exhibited a repressive coping style had fewer symptoms of psychopathology, were better adjusted and experienced fewer health problems than those who did not exhibit repressive coping. However, to the best of our knowledge, it has not yet been studied whether repressive coping also relates to how trauma memories are integrated in autobiographical memory.

Overall, there is a lack of consensus about the integration of adverse life experiences into autobiographical memory and how this relates to PTSD symptoms (e.g., Berntsen & Rubin, 2007; Ehlers & Clark, 2000). With this controversy in mind, the current study sought to replicate Berntsen and Rubin's (2006, 2007) findings showing that integration of trauma memories and dissociative experiences independently predicts PTSD symptoms. In addition, we investigated which factors may promote resilience. Specifically, in this study, we evaluated whether cognitive reactivity and a repressive coping style, apart from how well negative life experiences are integrated into autobiographical memory, are predictive of PTSD symptomatology following adversity.

METHOD

Participants

Our sample consisted of 213 undergraduate students (168 women) enrolled at Maastricht University. Their mean age was 19.6 years (SD [standard deviation] = 2.59; range: 17–39 years). All participants signed a written informed consent and were given a small financial compensation in return for their participation.

Materials

Post-Traumatic Stress Symptom Scale–Self-Report Version (PSS–SR; Foa, Riggs, Dancu, & Rothbaum, 1993; Cronbach's Alpha = 0.90)

The PSS–SR is a self-report measure comprised of 17 items corresponding to the re-experiencing, avoidance and arousal cluster of respondents' current PTSD symptoms. Illustrative items are 'reliving the event' and 'overly alert'. Participants rate the frequency of each item on four-point scales ranging from 0 (*not at all or only one time*) to 3 (*five or more times a week/almost always*). A total score can be obtained by summing across items, with higher scores reflecting more stress-related symptoms. A classification of PTSD can be made when

at least one re-experiencing, three avoidance and two arousal symptoms of the PSS–SR are endorsed by individuals who were exposed to an adverse life event (Foa et al., 1993). Following Foa and co-workers, a symptom was rated as present if the corresponding PSS–SR item received a score of 1 or greater. Psychometric evidence supporting the PSS–SR as a screening tool for PTSS can be found in Wohlfarth, van den Brink, Winkel, and ter Smitten (2003).

Centrality of Event Scale (CES) (Berntsen & Rubin, 2006; Cronbach's Alpha = 0.97)

The CES assesses ways in which an emotional or traumatic event may become integrated into a person's autobiographical memory system. Specifically, the CES comprises 20 items that measure the extent to which a traumatic memory becomes: (1) a reference point for everyday inferences; (2) a turning point in a person's life story; or (3) a central component of personal identity (Berntsen & Rubin, 2006). Examples of items are 'This event tells a lot about who I am' and 'This event has become a reference point for the way I look upon my future'. Items of each of these three subscales are answered on a five-point scale (anchors: 1 = *totally disagree*; 5 = *totally agree*). The CES total score reflects the average of all items. Higher CES total scores are indicative of enhanced autobiographical integration of the traumatic memory.

Index of Self-Regulation of Emotion (ISE) (Mendolia, 2002)

The ISE measures dispositional repressive coping styles (i.e., a specific combination of low reported anxiety and high defensiveness). As is typical for research on repressive coping, the ISE is based on the Marlowe–Crowne Social Desirability Scale (SDS) (Crowne & Marlowe, 1960; Cronbach's alpha = 0.75) and the Taylor Manifest Anxiety Scale (TMAS) (Bendig, 1956; Cronbach's alpha = 0.89). However, extending the typical categorical measurement strategies (e.g., Weinberger, 1990; Weinberger & Davidson, 1994; Weinberger et al., 1979), the ISE reflects a continuous composite score of the SDS and TMAS. The main advantage of a continuous measure of repressive coping such as the ISE is that there are no arbitrary cut-off scores involved (e.g., a tertile split) and that all participants can be included and assessed (Mendolia, 2002). The ISE can be computed by subtracting the SDS from the TMAS for each participant individually, and then inverting these scores by subtracting them from the highest conceivable positive score (i.e., ISE =

20 – [TMAS – SDS]). High ISE scores are indicative of a tendency to engage in a repressive coping style when faced with adverse life events or experiences. Low ISE scores, on the other hand, reflect an inability to distance oneself from threatening emotional or traumatic life events and relatively high levels of anxiety (Mendolia, 2002).

Dissociative Experiences Scale (DES) (Bernstein & Putnam, 1986; Cronbach's Alpha = 0.91)

The DES is a widely used self-report instrument containing 28 items describing dissociative phenomena, such as feelings of derealization, depersonalization, disturbances in identity, dissociative amnesia and absorption. Participants indicate on 100 mm Visual Analogue Scales (anchors: *not at all* and *very much*) the frequency with which they experience the phenomena described by each item. Sample items are 'Some people have the experience of feeling that other people, objects and the world around them are not real' and 'Some people sometimes have the experience of feeling as though they are standing next to themselves or watching themselves do something and they actually see themselves as if they were looking at another person'. Scores on the individual items are averaged to obtain a mean DES score, with higher scores indicating a higher frequency of dissociative symptoms. The psychometric qualities of the DES are well established (e.g., van IJzendoorn & Schuengel, 1996).

Leiden Index of Depression Sensitivity-Revised (LEIDS-R) (Van der Does & Williams, 2003; Cronbach's Alpha = 0.89)

The LEIDS-R is a 34-item scale measuring cognitive reactivity to sad mood (i.e., how easily maladaptive cognitions or cognitive styles are

triggered by mild non-pathological mood fluctuations) on a five-point scale (anchors: 0 = *not at all*; 4 = *very strongly*). High LEIDS-R scores indicate raised levels of cognitive reactivity. The LEIDS-R is a revised version of the LEIDS, which taps cognitive reactivity to mood induction procedures (Van der Does, 2002b) and has good internal consistency and concurrent validity (Van der Does, 2002a).

Procedure

Data collection took place during a mass screening session among first year undergraduate students. Undergraduates who indicated to have experienced a significant negative life event were asked to complete the CES and PSS-SR. As both the CES and the PSS-SR probe about an individual's most traumatic life event, our instructions emphasized that students had to complete the CES and PSS-SR with reference to the same negative life event. Test protocols were approved by the standing ethics committee of the Faculty of Psychology and Neuroscience, Maastricht University.

RESULTS

Table 1 gives mean scores on PSS-SR, CES, ISE, DES and LEIDS-R. Pearson product-moment correlations between these variables are also shown. Based on their current PSS-SR scores and following the classification proposed by Foa et al. (1993), 64 participants could be classified as suffering from post-traumatic stress (e.g., due to serious motor vehicle accidents, the death of a loved one). As expected, there was a significant positive correlation between the CES and PSS-SR scores ($r = 0.46, p < 0.001$). Further analyses indicated that the CES correlated with the PSS-SR re-experiencing subscale ($r = 0.43, p < 0.001$), the avoidance subscale

Table 1. Full sample ($N = 213$) mean scores and standard deviations ($M \pm SD$) on the Post-Traumatic Stress Symptom Scale-Self-Report Version (PSS-SR), Centrality of Event Scale (CES), Index of Self-Regulation of Emotion (ISE), Dissociative Experiences Scale (DES) and the Leiden Index of Depression Sensitivity-Revised (LEIDS-R), and Pearson product-moment correlations between these measures

	M ± SD	PSS-SR	CES	ISE	DES	LEIDS-R
PSS-SR	8.23 (7.9)	1.00				
CES	2.32 (1.0)	0.46*	1.00			
ISE	29.36 (9.0)	-0.51*	-0.20*	1.00		
DES	18.23 (10.7)	0.42*	0.14	-0.31*	1.00	
LEIDS-R	39.83 (16.1)	0.20*	0.06	-0.42*	0.35*	1.00

* $p < 0.001$; two tailed.

Table 2. Summary of forward stepwise regression with Post-Traumatic Stress Symptom Scale–Self-Report Version (PSS–SR) scores as dependent variable in an undergraduate sample ($N = 213$)

PSS–SR	Adjusted R^2	B	SE	Beta (β)	t	p
CES	0.21	2.73	0.41	0.35	6.71	<0.001
ISE	0.39	–0.32	0.05	–0.36	–6.57	<0.001
DES	0.45	0.19	0.04	0.26	4.85	<0.001

The variables in the forward stepwise regression were: age, gender, Centrality of Event Scale (CES), Index of Self-Regulation of Emotion (ISE), Dissociative Experiences Questionnaire (DES) and Leiden Index of Depression Sensitivity–Revised. The adjusted R^2 denotes the cumulative total explained variance.

($r = 0.43$, $p < 0.001$) and the arousal subscale ($r = 0.38$, $p < 0.001$).

Forward stepwise multiple regression analysis with PSS–SR scores as the dependent variable, and age; gender; and the CES, ISE, DES and LEIDS–R scores serving as predictors was used to evaluate whether autobiographical integration of trauma memories, repressive coping, dissociative experiences and cognitive reactivity to sad mood, respectively, are predictive of symptoms of post-traumatic stress following adverse life events. As can be seen in Table 2, the CES, ISE and DES were predictive of PSS–SR scores, with β s of 0.35, –0.36 and 0.26, respectively. This model accounted for 45% of the variance in PSS–SR scores. When restricted to the subsample of 64 participants who endorsed significant post-traumatic stress symptoms (mean PSS–SR score \pm SD = 17.7 ± 7.15), similar results were found in that the CES ($\beta = 0.24$, $t = 2.23$, $p = 0.03$), ISE ($\beta = -0.40$, $t = -3.76$, $p < 0.001$) and DES ($\beta = 0.34$, $t = 3.12$, $p = 0.003$), but not the LEIDS–R ($\beta = -0.07$, $t = -0.64$, NS) were predictive of PSS–SR scores.

DISCUSSION

The fact that 64 participants in our sample showed elevated PSS–SR scores and could be classified as suffering from post-traumatic stress made clear that this was not a trauma-free sample. Therefore, data from this sample can be used to test ideas about how concepts such as autobiographical memory integration, repressive coping and post-traumatic stress relate to each other. The main findings of our study can be summarized as follows. First, we found a substantial correlation (21% explained variance) between the autobiographical integration of trauma memories and symptoms of post-traumatic stress following negative life events, thereby replicating Berntsen and Rubin (2006, 2007). Moreo-

ver, integration of trauma memories, repressive coping and dissociative experiences were found to be independent predictors of post-traumatic stress symptoms. Importantly, our findings suggest that while enhanced integration of trauma memories and dissociation go along with heightened levels of post-traumatic stress, repressive coping is associated with fewer post-traumatic stress symptoms.

While the present findings are well in line with those of Berntsen and Rubin (2006, 2007), they challenge the widely held view that traumatic events are poorly processed and integrated within autobiographical memory (e.g., Brewin & Holmes, 2003; Dalgleish, 2004; Ehlers & Clark, 2000; Van der Kolk & Fisler, 1995). Our results suggest that the more traumatic memories become anchor points by which future events are evaluated and organized into autobiographical memory, the higher the reported levels of post-traumatic stress. In contrast, we found less well-integrated trauma memories to be associated with fewer post-traumatic stress symptoms.

Repressive coping can be seen as a habitual emotion regulation strategy (e.g., Coifman et al., 2007). Our results demonstrate that the more individuals tend to engage in a repressive coping style when faced with adverse life events, the better they are in adapting to these events. This finding concurs with studies that ascribe a crucial role to emotion regulation in adaptive responses to adversity (e.g., Bonanno, Keltner, Holen, & Horowitz, 1995; Bonanno, Noll, Putnam, O'Neill, & Trickett, 2003; Bonanno, Papa, Lalande, Westphal, & Coifman, 2004; Bonanno, Znoj, Siddique, & Horowitz, 1999; Coifman et al., 2007; Mauss, Evers, Wilhelm, & Gross, 2006). Bonanno et al. (2004), for example, found that among a sample of high-exposure survivors of the 9/11 terrorist attacks on the World Trade Center, resilience was critically determined by individuals' flexibility to shift between enhancing and suppressing emotions. Similarly, Coifman

et al. (2007) showed that both bereaved and non-bereaved individuals who engaged in repressive coping behaviour had fewer symptoms of psychopathology, were better adjusted and experienced fewer health problems than those who did not.

In one of our recent studies, we demonstrated that cognitive reactivity to emotional challenges was predictive of a longitudinal increase in self-reported resilience (Giesbrecht et al., 2009). In the current study, we found a significant correlation between cognitive reactivity and post-traumatic stress symptoms, which replicates earlier work from our lab (Giesbrecht et al., 2009). Moreover, because of the substantial phenomenological overlap between PTSD and depression (e.g., Rosen & Lilienfeld, 2008), our findings are also reminiscent of a recent study by Booij and Van der Does (2007), demonstrating that higher levels of cognitive reactivity are a vulnerability marker of depression. Furthermore, we obtained evidence that the tendency to dissociate is positively related to levels of post-traumatic stress symptoms, thereby lending further support to the belief that dissociation overlaps with PTSD symptomatology (e.g., Ozer et al., 2003; but see also Merckelbach, Dekkers, Wessel, & Roefs, 2003a, 2003b). Note that Ozer et al. (2003) found that peritraumatic dissociation (e.g., changes in cognitive and perceptual functioning during the trauma) was among the most potent predictors of PTSD symptom severity. Moreover, a recent prospective study by Van Emmerik, Kamphuis, and Emmelkamp (2008) found that peritraumatic dissociative experiences immediately following elective surgical abortion, but not trait dissociation, predicted re-experiencing and avoidance symptoms at 2 months. In the present study, dissociation was measured using the DES (Bernstein & Putnam, 1986), which relates to a broader category of dissociative experiences rather than dissociation experienced *during* a trauma. Thus, the positive relation between dissociation and post-traumatic stress symptoms obtained in the current study may be in part mediated by the levels of peritraumatic dissociation experienced during or in the immediate aftermath of participants' traumatic life experiences.

One obvious limitation of the present study is that participants completed measures of autobiographical integration of trauma memories and post-traumatic stress symptoms keeping in mind their most traumatic life event. Admittedly, not all of our participants had experienced negative life events that would satisfy the A1 and A2 trauma criteria of the DSM-IV-TR (American Psychiatric Association,

2000). Nevertheless, the study by Berntsen and Rubin (2007) provides evidence that integration of trauma memories (as assessed by the CES) predicts PTSD symptom severity irrespective of whether or not participants meet the DSM-IV-TR A1/A2 criteria. Thus, our finding that enhanced autobiographical integration of trauma memories predicts post-traumatic stress symptoms is unlikely to be an artefact of the type or severity of the negative life events in our sample. Other limitations of this study are its cross-sectional design and its reliance on self-reports. Future studies should preferably use a longitudinal approach that includes psychophysiological measures of cognitive-emotional reactivity and structured clinical interviews to assess symptoms of post-traumatic stress. Similarly, one could argue that autobiographical memory integration, referring to the amount of links between trauma-related and trauma-unrelated memories within hierarchical representation models of autobiographical memory (e.g., Ehlers & Clark, 2000), may be too complex to be fully grasped by the self-report CES. Hence, future studies may benefit from using more objective cognitive paradigms tapping the integration of trauma memories within the autobiographical memory system.

Summing up, the current study provides further evidence for the idea that enhanced integration of trauma memories, rather than poorly integrated trauma memories, is related to symptoms of post-traumatic stress. Furthermore, these results illustrate that aside from dissociative experiences and the extent to which trauma memories are integrated into one's autobiography, the capacity to regulate one's emotions is crucial for an adaptive response to negative life events. Specifically, in the present study, we demonstrated that relying on a repressive coping style is associated with fewer post-traumatic stress symptoms following adversity. Future research could benefit from further exploring and identifying potential psychological correlates of resilience, as this is a crucial next step in gaining knowledge about what allows people to thrive in the face of adversity. This knowledge can then be used to predict or track recovery from trauma, and could provide important new insights for treatment interventions in patients suffering from traumatic stress.

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