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The Phenomenology and Correlates of Flashbacks in Individuals With Posttraumatic Stress Symptoms

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Abstract

Re-experiencing symptoms are a hallmark of posttraumatic stress disorder (PTSD). Relatively little research has examined flashbacks in individuals with PTSD, and theoretical attempts to define and conceptualize flashbacks continue to be marked by considerable controversy. We compared individuals with PTSD or subthreshold PTSD symptoms (PTSS) with (n = 45) and without flashbacks (n = 32) to trauma-exposed controls (n = 33) and control participants without trauma exposure (n = 33). We compared the qualities of flashbacks of individuals with PTSS to those simulated by individuals without flashbacks. As predicted, individuals with PTSS reported significantly greater sleep disturbances, experiential avoidance, and lower trait mindfulness than those without PTSS. Individuals without PTSS underestimated the vividness, emotional intensity, distress, and functional impact associated with flashbacks. Consistent with basic-mechanisms theory, we did not find evidence of fragmentation of flashbacks in individuals with PTSS. Additional implications and future directions are discussed.

Keywords

posttraumatic stress disorder (PTSD), trauma, flashbacks, trauma memory

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Posttraumatic stress disorder (PTSD) is a common reaction to extremely distressing events (American Psychiatric Association [APA], 2013) and affects about 5% to 7% of the general population in the United States (Kessler, Berglund, Demler, Jin, & Walters, 2005). In contemporary diagnostic systems, reexperiencing symptoms such as flashbacks, intrusive memories, and trauma-related nightmares are considered hallmark symptoms of PTSD (APA, 2000, 2013).

Despite its inclusion in recent and current diagnostic criteria for PTSD, there is no clear consensus as to the definition of flashback. In fact, there has been considerable historical and contemporary controversy about the conceptualization of flashbacks (Frankel, 1994; McNally, 2004) and their relevance to posttraumatic psychological disorders. At the heart of this debate is the question of whether trauma-related memories are qualitatively (processed and stored differently) or quantitatively (at the extreme end of a continuum with other types of memory) different from other autobiographical memories (Zoellner & Bittenger, 2004). Whereas some authors have emphasized the fragmentary nature of flashbacks (e.g., Hellawell & Brewin, 2002), others have not (e.g., Pitman, 1988). Furthermore, some authors have emphasized the specificity of flashbacks to trauma memories (e.g., Kvavilashvili, 2014); however, memories of extremely positive events can also produce flashbacks (Berntsen, 2001).

Theories of Trauma Memory

Special-mechanisms theory

Two views have provided contrasting theoretical accounts of flashbacks: the special-mechanisms perspective versus the basic-mechanisms perspective. Dual representation theory and cognitive theory of PTSD (Brewin, Dalgleish, & Joseph, 1996; Brewin, Gregory, Lipton, & Burgess, 2010; Ehlers & Clark, 2000) posit

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that trauma-related memory is marked by repeated vivid and intrusive memories of the event and difficulty intentionally recalling some aspects of the memory. These theories assume that emotional distress during encoding exerts differential effects on subsequent voluntary and involuntary recall, and voluntary recall is often fragmented and incomplete (Foa, Molnar, & Cashman, 1995; Halligan, Michael, Clark, & Ehlers, 2003; Jelinek, Randjbar, Seifert, Kellner, & Moritz, 2009). Brewin's revised dual representation theory (Brewin et al., 2010) posits that flashbacks develop because of the creation of an inflexible, sensory-driven representation combined with an absence of integration with a more abstract, conceptualized representation. Special-mechanisms theories predict that flashbacks will be experienced as occurring in the present, show high fragmentation, will be of short length, and have a high frequency of sensory and emotional details (Crespo & Fernández-Lansac, 2016).

Basic-mechanisms theory

In contrast, basic-mechanisms theory, as the name implies, holds that the same basic mechanisms of memory encoding apply to both voluntary and involuntary memories of trauma, and that flashbacks are not qualitatively different from other forms of memory and lie on a continuum with other types of memory, including ordinary autobiographical memory and nonflashback trauma memories (e.g., Berntsen & Rubin, 2008; Hall & Berntsen, 2008; Rubin, 2006).

Empirical Findings

Vividness and sensory detail

There is generally widespread agreement that involuntary intrusion of vivid, sensory-detailed memories is associated with PTSD, and predictions based on the basic- versus special-mechanisms approaches are not substantively different in this area (Brewin, 2014a; Hellawell & Brewin, 2002). Several studies have found that (a) trauma narratives are dominated by sensory aspects when compared with ordinary autobiographical narratives and (b) trauma narratives use more present tense than ordinary memories (Crespo & Fernández-Lansac, 2016; Hellawell & Brewin, 2002, 2004). In addition, when comparing traumatic memories of individuals with PTSD with traumatic memories of participants without PTSD (Berntsen, Willert, & Rubin, 2003), those with PTSD indicated that their memory was more vivid, sensory, and emotional than those without PTSD. Likewise, in a study of traumatic imagery of motor vehicle accident survivors, trauma-exposed participants without PTSD reported less vivid imagery associated with trauma intrusions than those with PTSD (Bryant & Harvey, 1998). Consistent with special-mechanisms theory, there is some evidence that flashbacks are more detailed, vivid, and sensory-driven than voluntary autobiographical memories of trauma in individuals with PTSD; however, these findings are also consistent with the basic-mechanisms theory because flashbacks are on the continuum with nonflashback trauma memories.

Emotional intensity

Kvavilashvili (2014) posited that flashbacks are accompanied by intense physiological, emotional, and behavioral responses that often resemble those experienced at the time of the traumatic event. Brewin, Huntley, and Whalley (2012) reported that sections of written trauma narratives that were associated with flashbacks were rated as more negative and arousing than other nonflashback, trauma-related memories in individuals with PTSD. Likewise, Hellawell and Brewin (2004) found that sections of written trauma narratives associated with flashbacks were associated with core emotional experiences of PTSD (fear, helplessness, and horror). Finally, individuals with PTSD reported greater emotional intensity associated with trauma intrusions compared to trauma-exposed participants without PTSD (Bryant & Harvey, 1998). However, it is not apparent whether these findings suggest that flashbacks differ from other memories in quality (special mechanisms) or if flashbacks lie on a continuum with other types of memory (basic mechanisms).

Memory enhancement

Basic-mechanisms theory is supported by empirical findings that both involuntary and voluntary memories of trauma are enhanced with greater PTSD severity and by accumulating evidence that involuntary remembering is not specific to traumatic events (Berntsen & Rubin, 2014; Rubin, Berntsen, & Bohni, 2008; Rubin, Dennis, & Beckham, 2011). Consistent with basic-mechanisms theory, Rubin et al. (2011) compared memory content (stressful vs. other memory), memory type (voluntary vs. involuntary), and diagnosis (PTSD vs. no PTSD) and concluded that PTSD affects all autobiographical memories similarly (e.g., greater emotional intensity, more frequent memory rehearsal).

Coherence versus fragmentation of trauma memories

The assumption that voluntary autobiographical memory of trauma is fragmented and disorganized in individuals with PTSD remains disputed (Berntsen et al., 2003; Brewin, 2016; Rubin, 2011; Rubin, Berntsen, et al.,

2008; Rubin, Berntsen, Ogle, Deffler, & Beckham, 2016; Rubin, Deffler, et al., 2016; Rubin et al., 2011) and constitutes a central difference between theoretical approaches. Some studies have found evidence for memory fragmentation; specifically, flashbacks are not typically memories of the entire trauma, but instead are of distinct moments within an event (Bourne, Mackay & Holmes, 2013). However, there is growing evidence that fragmentation of trauma memories is not necessarily specific to PTSD, and integration of such fragmented memories is not associated with recovery (Zoellner & Bittenger, 2004). For example, traumatic memories in individuals with PTSD were not rated as less coherent or more fragmented than trauma memories in those without PTSD (Berntsen et al., 2003). Similarly, Rubin (2011) found that trauma narratives were no less coherent than other narratives in individuals with PTSD.

Rubin, Deffler, et al. (2016) compared the transcribed (a) trauma memories, (b) most important memories, and (c) most positive memories of individuals with and without PTSD using nearly 30 different measures of coherence and found that trauma memories were no less coherent that other types of memory. Furthermore, there was no evidence that incoherence was substantially greater in memories of individuals with PTSD compared with trauma-exposed controls. However, Brewin (2016) disputed these conclusions and noted that impairment in voluntary trauma-memory retrieval along with increased trauma-memory intrusions were identified in several early studies of trauma memory (e.g., Foa et al., 1995), are featured in most major theories of PTSD (e.g., Brewin et al., 1996; Ehlers & Clark, 2000), and have been supported elsewhere in extensive reviews (Brewin, 2014a). Rubin, Berntsen, et al. (2016) subsequently claimed that the target article (Rubin, Deffler, et al., 2016) found no evidence that local measures are associated with greater incoherence and concluded that several comprehensive reviews (e.g., Crespo & Fernández-Lansac, 2016; O'Kearney & Perrot, 2006) failed to support the fragmentation of trauma memory. Cleary, there is still considerable controversy regarding the central tenets of trauma memory, and these controversies have their roots in the historical and sociocultural formulation of the term "flashback" and the diagnosis of PTSD.

Phenomenology of Flashbacks

Sensitivity and specificity of flashbacks

Frequent, negative, and involuntary memories of unpleasant events are evident across many forms of psychopathology (Brewin et al., 2010; Bryant, O'Donnell, Creamer, McFarlane, & Silove, 2011). However, a sense of reliving in the present, stronger feelings of helplessness, and differences in content appear to distinguish PTSD-related flashbacks from other forms of intrusive thoughts present in other disorders (Birrer, Michael, & Munsch, 2007; Brewin, 2014a; Brewin et al., 2010). In a large study of traumatically injured patients, Bryant et al. (2011) found that flashbacks were highly specific to PTSD, unlike other forms of reexperiencing. Likewise, Duke, Allen, Rozee, and Bommaritto (2008) found that the frequency of flashbacks was significantly higher among individuals with PTSD compared with trauma-exposed individuals without PTSD, and flashback frequency was a more sensitive and specific predictor of PTSD than were nightmares.

Related psychopathology

Sleep disturbances and dissociative experiences are commonly reported by trauma-exposed individuals. Acute dissociative responses (peritraumatic dissociation) are a risk factor for the subsequent development of PTSD (Classen, Koopman, Hales, & Spiegel, 1998), and the dual representation theory of trauma memory (Brewin et al., 2010) suggests that peritraumatic dissociation may underlie vulnerability to flashbacks. Furthermore, the sleep-dissociation perspective posits that traumatic experiences disrupt the sleep–wake cycle and increase vulnerability to dissociative experiences (van der Kloet, Merckelbach, Giesbrecht, & Lynn, 2012). Sleep complaints, including insomnia and nightmares, are frequent and persistent in patients with PTSD (Germain, Buysse, Shear, Fayyad, & Austin, 2004) and exacerbate reexperiencing symptoms (Germain, Buysse, & Nofzinger, 2008).

Other related phenomena

Mindfulness can be described as paying attention to what is occurring in the present in an accepting and nonjudgmental manner (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006). Experiential avoidance is defined as an unwillingness to remain in contact with difficult or unwanted internal experiences (Hayes, Strosahl, & Wilson, 2012), and psychological inflexibility refers to rigid psychological reactions (Bond et al., 2011). Lower trait mindfulness is associated with greater PTSD severity (Shorey, Brasfield, Anderson, & Stuart, 2014; Stephenson, Simpson, Martinez, & Kearney, 2017). Likewise, greater psychological inflexibility and experiential avoidance were associated with greater PTSD severity in several studies (Lewis & Naugle, 2017; Meyer, Morissette, Kimbrel, Kruse, & Gulliver, 2013; Seligowski, Rogers, & Orcutt, 2016; Thompson & Waltz, 2010). Acting with awareness and nonreactivity, two facets of mindfulness, predict reductions in reexperiencing symptoms. However, there is limited research exploring

the connections among mindfulness, experiential avoidance, and psychological inflexibility and specific PTSD symptoms, including flashbacks (Stephenson et al., 2017).

Historical and Sociocultural Aspects of Flashbacks

History of the term "flashback"

Historically, the term "flashback" appears to have originated in literature and film and was subsequently reified in the trauma literature and used to describe the experiences of Vietnam veterans with post-Vietnam syndrome (later known as posttraumatic stress disorder; Lembcke, 1998; McNally, 2004). Bernstein (2005) noted that Marcel Proust was the first author to use the term "involuntary memory"; in 1934, Proust described these involuntary memories as sensations reminding him of previous, generally positive experiences. Russ Meyer's "Motorpsycho" (1965) featured a traumatized Vietnam veteran; his flashbacks actually predated their appearance in the psychological literature by several years, and some authors have suggested that the idea of a flashback was actually one borrowed from film (Lembcke, 1998). In the psychological realm, Horowitz (1969) first used the term flashback to refer to the return of imagery after the effects of hallucinogens wore off, and Frankel (1994) subsequently highlighted the problems created by the inconsistent use of definitions of flashbacks in the literature.

Kardiner's (1941) early descriptions of flashback-like phenomena and accompanying case illustrations were consistent with the contemporary notion of flashbacks. Nevertheless, it was not until the 1980s that the term flashback was used in reference to trauma. The *DSM–III–R* (APA, 1987) was the first diagnostic manual to include the term, describing it as "sudden acting or feeling as if the traumatic event were recurring (includes a sense of reliving the experience . . .)" (p. 250). Subsequent studies in the 1980s variously described flashbacks as dissociative episodes, revisualization of trauma scene, and sudden reexperiencing (Burstein, 1984; Kolb & Mutalipassi, 1982; Mellman & Davis, 1985).

Sociocultural aspects of flashbacks

Some historians and clinicians espouse the view that PTSD is at least partially a modern sociocultural construction (i.e., social-constructionist perspective) that developed in the aftermath of the Vietnam War (Lembcke, 1998; McNally, 2004; Summerfield, 2001; Young, 1995), and that flashbacks appear to be more specific to expressions of posttraumatic stress in industrial, liberal, individualistic cultures, such as the United States. Similarly, Jones et al. (2003) found that the incidence of flashbacks was significantly greater in the most recent cohort of British service members and concluded that some of the purportedly core characteristics of PTSD (e.g., flashbacks) are culture-bound and have evolved over time. However, we emphasize that although the social-constructionist perspective affirms sociocultural influences, it by no means denies the reality of posttraumatic conditions nor questions the legitimacy of the suffering of survivors (McNally, 2004, 2012).

Other authors have argued that flashbacks and PTSD are not culture-bound (i.e., natural kind perspective) or that the link between PTSD and culture is weaker than suggested. For example, Elbert and Schauer (2002) stated that "PTSD and its symptoms are present across cultures, with the only differences being the culturally specific expression of symptoms and the indigenous ways in which sufferers deal with them" (p. 883). Although our understanding of flashbacks continues to advance, questions remain regarding how sociocultural influences impact expectancies and manifestations of trauma-related psychological syndromes (see Lynn, Hallquist, Williams, Matthews, & Lilienfeld, 2007; McNally, 2003, 2012).

Present Study

Our study was designed to address gaps in the extant literature; specifically, relatively little is known about the phenomenological qualities of flashbacks and how flashbacks are linked to other trauma-related psychological sequelae. Given the continued controversy about the ontology of PTSD (see McNally 2003, 2012; Rubin, 2011; Rubin, Boals, & Berntsen, 2008; Rubin, Dennis, et al., 2011), innovative studies, like the present one, are critical to understanding the sociocultural aspects of PTSD.

We compared the psychological symptoms and characteristics of individuals clinically diagnosed with PTSS (PTSD or subthreshold PTSD symptoms) and flashbacks with three relevant groups: (a) individuals clinically diagnosed with PTSS without flashbacks, (b) control participants who experienced similar traumas, and (c) control participants without trauma exposure. Our design allowed us to compare features of those with PTSS who developed flashbacks to those who did not do so. Given that not all individuals who are exposed to traumatic events develop PTSS, we also included trauma-exposed comparison participants in order to continue to explore factors that differentiate resilient individuals from individuals with PTSD, as well as control for the effects of trauma exposure (Bryant & Harvey, 1998; Rubin, Deffler, et al., 2016). Finally, the inclusion

of demographically similar, non-trauma-exposed participants allowed us to tap into the sociocultural expectations about trauma, PTSD, and flashbacks among those without personal experience of trauma. Bryant and Harvey (1998) employed a similar design and noted that this quasi-control methodology also allows for an examination of the degree to which clinical participants are influenced by demand characteristics.

In our study we explored the frequency, severity, sensory, and experiential properties of flashbacks in individuals with PTSS. Our study is the first to comprehensively examine the relation of flashbacks to other psychological characteristics. Specifically, we examined psychological characteristics (e.g., psychological inflexibility, mindfulness, dissociation) and related psychopathology (e.g., sleep complaints) that potentially predict which individuals who experience highly aversive events will develop PTSD and which individuals will experience resilient outcomes. Finally, we compared the self-report ratings of the flashbacks of individuals with PTSD with comparison subjects' role-played descriptions to evaluate the sociocultural aspects of flashbacks.

On the basis of the current literature, we hypothesized that individuals who experience posttraumatic conditions with flashbacks would score higher on measures of experiential avoidance (Lewis & Naugle, 2017; Seligowski et al., 2016), lower on measures of psychological flexibility and mindfulness (Meyer et al., 2013; Stephenson et al., 2017), and higher on measures of dissociation (Brewin et al., 2010; Classen et al., 1998) than comparison groups. In addition, we predicted that sleep disturbances would predict flashback experiences in trauma-exposed individuals (Germain et al., 2008). We also investigated whether flashbacks experienced by individuals with PTSD would be described as more vivid, multisensory, detailed, and emotionally intense (Brewin, 2014a; Crespo & Fernández-Lansac, 2016) than those described by individuals who role-played PTSD and responded on the basis of widely prevalent sociocultural stereotypes. Finally, consistent with basic-mechanisms theories of trauma-related memory, we predicted that flashbacks experienced by individuals with PTSD would not be described as more fragmented than simulated flashbacks (Berntsen et al., 2003; Rubin, Deffler, et al., 2016; Zoellner & Bittenger, 2004).

Method

Participants

Undergraduate students (N = 1,692) were screened for PTSD using the Modified PTSD scale (MPSS-SR; Falsetti, Resnick, Resick, & Kilpatrick, 1993). Four hundred and fifteen eligible participants were recruited for Step 1 of the study; 261 elected not to participate further. One hundred and fifty-four participants participated in Step 1; 10 were excluded from further participation because of acute suicidality and 1 was excluded because of a history of epilepsy. The final sample (N = 143) was 32% men (n = 46) and 68% women (n = 97). The participants' average age was about 19 years (M = 19.09, SD = 1.88). The participants were 15% Asian/Asian American (n = 22), 4% African American (n = 6), 55% White/non-Hispanic (n = 79), 12% Hispanic/Latino (n = 17), 8% biracial (n = 12), and 5% Other (n = 7).

Compliance with ethical standards. This study was approved by the institutional ethics review board for research with human subjects. All procedures were conducted in accordance with the ethical standards of the institutional committee and with the World Medical Association Declaration of Helsinki (1964) and its later amendments or comparable ethical standards. Informed consent was obtained and documented from all participants included in the study.

Materials

Prescreening measure. The MPSS-SR (Falsetti et al., 1993) consists of 17 items that assess the frequency and severity of *DSM–IV* (APA, 2000) symptom criteria for PTSD. The MPSS-SR is a modified version of the PTSD Symptom Scale (PSS-SR; Foa, Riggs, Dancu, & Rothbaum, 1993). The MPSS-SR has demonstrated good reliability (internal consistency alpha =.96) and good convergent validity with the SCID-I (Falsetti et al., 1993). Scores on the MPSS-SR range from 0 to 119; in a community sample, a score of 46 or greater is indicative of the probability of PTSD. Previous studies have demonstrated adequate sensitivity and specificity in a clinical sample (89% and 65%, respectively; Coffey, Dansky, Falsetti, Saladin, & Brady, 1998).

Step 1 measures. The Suicide Behaviors Questionnaire-Revised (SBQ-R; Osman et al., 2001) assessed for current suicidality. Two self-report items assessed for a history of seizures and/or epilepsy. The Structured Clinical Interview for *DSM–IV* Axis I Disorders (SCID-I; First, Spitzer, Gibbon, & Williams, 2010) has been demonstrated to have high reliability and validity (Lobbestael, Leurgans, & Arntz, 2011). It is a gold-standard, clinician-administered, structured interview for diagnosing PTSD (Blake et al., 1995). Research personnel were trained to administer the SCID-I by reviewing the SCID-I User's Guide, viewing the SCID 101 training program, and role playing the SCID-I PTSD module. Practice SCID sessions were conducted; one assessor administered the SCID-I PTSD module while the other assessors simultaneously made their ratings. At the conclusion of the practice interviews, all assessors

compared their ratings and discussed disagreements in order to ensure consistency in application of diagnostic criteria and interview methodology.

Step 2 measures. The SLEEP-50 (Spoormaker, Verbeek, van den Bout, & Klip, 2005) is a brief self-report questionnaire on subjective sleep complaints and the presence of sleep disorders. The SLEEP-50 has shown good internal consistency, test-retest reliability, and sensitivity and specificity in detecting a variety of common sleep disorders (e.g., insomnia, narcolepsy) in the general population. The Dissociative Experiences Scale (DES; Bernstein & Putnam, 1986) is a widely used, 28-item self-report measure that assesses dissociative experiences in both clinical and nonclinical samples. The DES has good test-retest (r_{tt} = .84), split-half reliability (r = .83), and internal consistency (α = .95); the construct and criterion validity of the DES has been established in various studies (Bernstein & Putnam, 1986). The Brief Symptom Inventory (BSI; Derogatis & Melisaratos, 1983) is a 53-item, self-report psychological symptom inventory; it is a brief form of the Symptom Checklist (SCL-90; Derogatis, 1977). The BSI has been developed and used in a wide variety of settings and applications and has shown good reliability, convergent validity, and construct validity.

Measures of psychological characteristics. The Acceptance and Action Questionnaire–II (AAQ-II), a 7-item self-report questionnaire, assesses psychological inflexibility or experiential avoidance and has satisfactory structure, reliability, and validity (Bond et al., 2011). Gámez, Chmielewski, Kotov, Ruggero, and Watson (2011) developed the Multifaceted Experiential Avoidance Questionnaire (MEAQ), a 62-item self-report measure of experiential avoidance. The MEAQ exhibited good internal consistency and discriminant validity (Gámez et al., 2011). The Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003) is a 15-item scale designed to assess dispositional mindfulness (open or receptive awareness of and attention to what is taking place in the present). The scale shows strong psychometric properties and has been validated with various samples. Finally, the Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006) is a 39-item self-report measure of mindfulness assessing five component skills: observing, describing, acting with awareness, nonjudging of inner experience, and nonreactivity to inner experience. The FFMQ has reasonable psychometric properties.

Flashback interview ratings. Given ongoing difficulties defining flashbacks and continued conceptual controversy, questions remain regarding the most appropriate way to assess flashbacks in individuals with PTSD (Brewin, 2014b). Previous studies have used frequency ratings (Duke et al., 2008), Likert-like self-report questions, ratings and behavioral observations of written trauma narratives (Hellawell & Brewin, 2004; Rubin, 2011), and semi-structured interviews (Rubin, Boals et al., 2008). Brewin et al. (2010) recommended assessing the duration, vividness, extent of reliving, and emotions accompanying intrusions, though these content areas reflect a special-mechanisms approach. Fragmentation, disorganization, length, emotional and sensory aspects, temporal context, and references to self are other commonly evaluated characteristics (Crespo & Fernández-Lansac, 2016).

Accordingly, the flashback interview (see Table 1) was designed for this study; it included Likert-like response questions regarding the experiential and sensory components of flashbacks, their frequency, and related distress and disruption. Participants who reported flashbacks were instructed as follows: "You've said that you sometimes find yourself acting or feeling as if the traumatic event were recurring . . . provide an honest, straightforward, and complete description of your experience of a flashback." Participants who did not report flashbacks were asked to convincingly portray the experience of flashbacks (see, for example, Bryant & Harvey, 1998); these participants were instructed as follows:

> Some people who have experienced a traumatic event have said that they sometimes find themselves acting or feeling as if the traumatic event were recurring; this experience is known as a flashback. In this next part of the study, you will be asked to role-play. I would like you to act as if you have had that experience, and I would like you to respond to the questions the way you believe a person who has had this type of experience would respond.

Role-playing participants were asked to try and make it difficult, if not impossible, to tell that they were role playing, and the interviewer was blind to the participant's diagnostic condition and group status. We created a flashback-severity score by summing items measuring the frequency (Question 6), functional impact (Question 7), and emotional distress (Question 8) caused by flashbacks. The flashback-severity score had acceptable internal consistency in our sample (Cronbach's alpha = .70).

Procedure and Design

Prescreening. Undergraduate students were screened for possible *DSM–IV–TR* (APA, 2000) PTSD symptoms using the MPSS-SR (Falsetti et al., 1993).

Step 1: screening/assignment of experimental conditions. Participants were first given a general description of the study and informed consent was obtained. The study was described as "a research study examining a variety of personality characteristics, behaviors, and psychological

Table 1. Flashback Interview Ratings

Item	Response				
	1	2	3	4	5
1. The imagery associated with the experiences is	*Not vivid at all*	*Less vivid than reality*	*As vivid as reality*	*More vivid than reality*	*Extremely vivid*
2. The sensations associated with the experiences are	*Absent*	*Minimal*	*Present*	*Significant*	*Extreme/ severe*
3. The emotions associated with the experiences are	*No emotions*	*Mild emotions*	*Moderate emotions*	*Strong emotions*	*Intense emotions*
4. To what extent is your flashback experience vague vs. detailed?	*Extremely vague*	*Somewhat vague*	*Average*	*Very detailed*	*Extremely detailed*
5. To what extent is your flashback fragmented vs. as in a scene from a movie?	*Extremely fragmented*	*Very fragmented*	*Somewhat fragmented*	*Minimally fragmented*	*Unfolds fluidly*
6. How often do you find yourself acting or feeling as if you were back in that situation?	*< 1×/mo.*	*2–4×/mo.*	*1–2×/week*	*3–7×/week*	*> 1×/day*
7. To what extent does reliving the {traumatic event} affect your work, school, or social functioning?	*Not at all*	*Minimally*	*Moderately*	*A great deal*	*Extremely*
8. To what extent is reliving the experience distressing?	*Not at all distressing*	*Slightly distressing*	*Moderately distressing*	*Significantly distressing*	*Extremely distressing*

symptoms; the study includes several questionnaires and interviews about personal characteristics and behaviors." Participants were screened with the SBQ-R in order to assess the risk of suicidality; individuals endorsing acute suicidality (SBQ-R ≥ 7; n = 10; Osman et al., 2001) were excluded from participation and were offered referral information for crisis and counseling resources. Subjects with a self-reported history of seizure and/or epilepsy (n = 1) were not eligible for further participation. Any individuals who did not meet requirements to participate further were compensated for their participation and were excluded from Step 2 of the study.

Next, trained research personnel administered the SCID-I (First et al., 2010) PTSD module to ascertain diagnostic status. Approximately 13% to 16% of individuals exposed to traumatic events develop subthreshold PTSD symptoms, a pattern of symptoms that does not meet the current diagnostic threshold but results in significant negative impacts on quality of life and overall health care utilization (Brancu et al., 2016). A diagnosis of subthreshold PTSD is warranted when an individual meets all *DSM–IV–TR* (APA, 2000) criteria for intrusive symptoms (B symptoms) and either avoidant/numbing symptoms (C symptoms) or hyperarousal symptoms (D symptoms; Brancu et al., 2016). Given the significant public health impact of subthreshold PTSD (Pietrzak, Goldstein, Southwisk & Grant 2012a, 2012b; Zlotnick, Franklin & Zimmerman, 2002), Marshall et al. (2001) and others have recommended that subthreshold PTSD be considered in studies of trauma-exposed populations; accordingly, we followed Brancu et al.'s (2016) recommendations for identifying individuals with subthreshold PTSD symptoms (PTSS).

Eligible participants were assigned to an experimental condition on the basis of their responses to the SCID-I PTSD interview as follows: (a) PTSS/+FB (n = 45): individuals with a positive diagnosis of PTSD (n = 20) or subthreshold PTSD symptoms (n = 25; subthreshold PTSD = met *DSM–IV–TR* A criteria, B criteria, and either C criteria or D criteria; APA, 2000; Brancu et al., 2016) who reported flashbacks; (b) PTSS/−FB (n = 32): individuals with a positive diagnosis of PTSD (n = 14) or subthreshold PTSD symptoms (n = 18) but no history of flashbacks; (c) RES (n = 33): resilient individuals who experienced a highly aversive event but reported minimal symptoms of PTSD; and (d) CON (n = 33): individuals who had not experienced a highly aversive event.

Importantly, PTSS/+FB and PTSS/−FB groups did not differ on the proportion of individuals with subthreshold PTSD (χ^2 = .004, p = .95). Our groups (PTSS/+FB, PTSS/−FB, RES, & CON) did not significantly differ on age (F = .43, p = .73) or racial/ethnic composition (χ^2 = 23.84, p = .47); however, they did differ significantly in gender composition (χ^2 = 13.08, p = .004). There was a higher proportion of women in the PTSS/+FB and PTSS/−FB groups than in the RES and CON groups. This is consistent with previous findings that in the general population, women have higher rates of PTSD than men (McLean, Asnaani, Litz, & Hofmann, 2011; Stein, Walker, & Forde, 2000). In fact, in the National Comorbidity Survey, women were twice as likely as men to develop PTSD during their lifetime (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995).

Step 2: experimental protocol. Eligible participants completed self-report measures of psychological symptoms and

characteristics, including the BSI, DES, SLEEP-50, AAQ-II, MEAQ, MAAS, and FFMQ. These scales were administered in a counterbalanced order. The flashback interview was administered by personnel blind to condition/PTSD status. The PTSS/+FB group was asked to respond to flashback interview ratings in a straightforward manner. All other participants (PTSS/−FB, RES, CON) were asked to role play, portraying the experience of flashbacks as realistically as possible. Afterward, the experimenter led the participants through brief relaxation training to dispel any residual distress. Participants were provided with a list of referral information for community counseling and crisis resources and were then debriefed.

Statistical analyses

We conducted multivariate analyses of variance (MANOVAs) and multivariate analyses of covariance (MANCOVAs) to examine group differences in psychological symptoms and other characteristics. We followed up these analyses with planned comparisons, focusing on differences between participants with PTSD versus those without and differences between participants with PTSD with flashbacks compared to participants with PTSD without flashbacks. We also completed a MANOVA to explore group differences in flashback ratings between genuine flashbacks experienced by individuals with PTSS compared to simulated flashbacks by other comparison groups. Within each group (PTSS/+FB, PTSS/−FB, RES, & CON), men and women did not significantly differ in their responses to measures of psychological symptoms and characteristics; therefore, we did not use gender as a covariate for our main analyses.

Results

Measures of psychological symptoms and characteristics

Group differences in other psychological symptoms. We first explored group differences in self-reported PTSD symptoms (MPSS-SR; see Table 2).[1] Overall, there were significant differences in PTSD symptom severity across groups, $F(3, 139) = 19.24$, $p < .001$, $\eta_p^2 = .29$; large effect size (ES; Cohen, 1988). As expected, the PTSS/FB+ and PTSS/FB− groups reported relatively high levels of PTSD symptoms on the MPSS-SR, and using Tukey's honestly significant difference post hoc comparisons, we found that PTSS/FB+ ($M = 52.18$) and PTSS/FB− ($M = 48.56$) groups did not differ in their average PTSD symptoms severity, $p = .91$, 95% confidence interval (CI) = (−10.78, 18.01). PTSS/FB+ and PTSS/FB− groups reported significantly higher levels of PTSD symptoms than RES and CON groups, $F(1, 141) = 58.44$, $p < .001$, $\eta_p^2 = .29$, large

Table 2. Group Differences on Psychological Symptoms and Characteristics

	PTSS/+FB	PTSS/−FB	RES	CON	Overall[a]			PTSS/+FB vs. PTSS/−FB[b]		
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*F* (*df*)	*p*	η_p^2	*F* (*df*)	*p*	η_p^2
MPSS total	52.18 (26.04)	48.56 (14.64)	21.27 (26.11)	19.33 (25.85)	19.24 (3, 139)	< .001	.29	.50 (1, 75)	.48	.007
MPSS reexperiencing	16.98 (8.50)	16.47 (5.96)	6.73 (9.02)	6.15 (8.39)	19.29 (3, 139)	< .001	.29	.09 (1, 75)	.77	.001
MPSS avoidance	21.16 (11.18)	19.19 (8.23)	9.45 (12.25)	8.70 (11.20)	12.95 (3,139)	< .001	.22	.71 (1, 75)	.40	.01
MPSS hyperarousal	16.78 (11.64)	17.84 (12.24)	9.09 (16.50)	7.36 (15.91)	4.96 (3,139)	.003	.10	.15 (1, 75)	.70	.002
General severity (GSI)	1.30 (.79)	1.07 (.63)	0.51 (.44)	0.49 (.34)	16.97 (3,138)	< .001	.27	1.72 (1, 75)	.19	.02
General distress (PSDI)	3.84 (3.56)	3.30 (3.38)	2.05 (1.05)	1.83 (1.25)	4.84 (3,138)	.003	.10	.84 (1, 75)	.36	.01
Sleep complaints (SLEEP-50)	96.56 (24.34)	91.59 (15.94)	72.37 (14.46)	70.73 (12.00)	10.42 (3,138)	< .001	.18	1.03 (1, 75)	.31	.01
Dissociative experiences (DES)	23.20 (15.21)	24.38 (15.55)	12.41 (12.15)	10.92 (7.39)	6.07 (3,138)	.001	.12	.11 (1, 75)	.74	.001
Pathological dissociation (DES-T)	14.28 (13.54)	13.09 (13.99)	7.50 (12.05)	5.30 (5.64)	19.64 (3,138)	< .001	.30	.14 (1,75)	.71	.002

Note: PTSS = threshold or subthreshold posttraumatic stress disorder (PTSD) symptoms; FB = flashback; RES = resiliient; CON = control; MPSS, modified PTSD scale; GSI = General Severity Index; PSDI = Positive Symptom Distress Index; DES, Dissociative Experiences Scale; DES-T = DES-Taxon.

[a]Multivariate test of significance: Pillai's Trace $F(20, 118) = 2005.96$, $p < .001$, $\eta_p^2 = .997$. [b]Multivariate test of significance: Pillai's Trace $F(11, 65) = .89$, $p = .56$, $\eta_p^2 = .13$.

ES; RES (M = 21.27) and CON (M = 19.33) groups did not significantly differ in PTSD symptom severity, p = .99, 95% CI = (−13.39, 17.27). These analyses confirmed that our group assignment resulted in clinical and comparison groups that significantly differed on their levels of PTSS severity.

Next, we examined overall group differences in other psychological symptoms. As predicted, group differences in trauma exposure and PTSS were associated with differences in psychological symptoms, including dissociative symptoms and sleep complaints. Overall, there were significant differences in other psychological symptoms between those reporting current PTSS (PTSS/+FB & PTSS/−FB) compared with those who did not report PTSS (RES & CON), $F(20, 118) = 2058.30$, $p < .001$, $\eta_p^2 = .99$, large ES. Participants who reported clinically significant PTSS (PTSS/+FB & PTSS/−FB) reported significantly greater general psychopathology severity (GSI), $F(1, 140) = 46.27$, $p < .001$, $\eta_p^2 = .25$, medium ES, general distress (PSDI), $F(1, 140) = 29.30$, $p < .001$, $\eta_p^2 = .17$, medium ES, general dissociative experiences (DES), $F(1, 140) = 29.11$, $p < .001$, $\eta_p^2 = .17$, medium ES, pathological dissociative symptoms (DES-Taxon), $F(1, 140) = 13.23$, $p < .001$, $\eta_p^2 = .09$, small ES, and sleep complaints (SLEEP-50), $F(1, 140) = 57.79$, $p < .001$, $\eta_p^2 = .29$, large ES, than those who did not report PTSS (RES & CON). When GSI was used as a covariate in a MANCOVA, individuals with PTSS (PTSS/+FB & PTSS/−FB) still reported significantly more sleep complaints than those without PTSS (RES & CON), $F(1, 140) = 12.67$, $p = .001$, $\eta_p^2 = .08$, small ES. In the MANCOVA, the difference in dissociative experiences was no longer significant, but it trended in the direction of greater dissociation in individuals with PTSS (PTSS/+FB & PTSS/−FB) versus those without (RES & CON), $F(1, 140) = 3.14$, $p = .08$, $\eta_p^2 = .02$, small ES.

Group differences in mindfulness and experiential avoidance. We next examined overall group differences in experiential avoidance/psychological inflexibility and mindfulness (see Table 3). As predicted, group differences in PTSD and trauma exposure were associated with significant differences in experiential avoidance and mindfulness. Overall, there were significant differences in experiential avoidance and mindfulness between those reporting current PTSS (PTSS/+FB & PTSS/−FB) compared with those who did not report PTSS (RES & CON). Participants with PTSS (PTSS/+FB & PTSS/−FB) reported greater psychological inflexibility and experiential avoidance (AAQ-II), $F(1, 140) = 42.32$, $p < .001$, $\eta_p^2 = .23$, medium ES, (MEAQ), $F(1, 140) = 17.03$, $p < .001$, $\eta_p^2 = .11$, small ES, less dispositional mindfulness (MAAS), $F(1, 140) = 38.39$, $p < .001$, $\eta_p^2 = .22$, medium ES, and lower levels of mindfulness skills (FFMQ), $F(1, 140) = 13.71$, $p = .001$, $\eta_p^2 = .09$, small ES, than those without PTSS (RES & CON). Specifically, individuals with PTSS (PTSS/+FB & PTSS/−FB) reported significantly lower scores on three of five component mindfulness skills including describing, $F(1, 140) = 4.70$, $p = .03$, $\eta_p^2 = .03$, small ES, acting with awareness, $F(1, 140) = 19.58$, $p < .001$, $\eta_p^2 = .12$, small ES, and nonjudging of inner experience, $F(1, 140) = 18.35$, $p < .001$, $\eta_p^2 = .12$, small ES; there were no group differences on observing or nonreactivity component skills. In a MANCOVA with GSI as a covariate, individuals with PTSS (PTSS/+FB & PTSS/−FB) still had significantly higher scores on the AAQ-II, $F(1, 138) = 7.00$, $p = .01$, $\eta_p^2 = .05$, small ES, and significantly lower scores on the MAAS, $F(1, 138) = 4.50$, $p = .04$, $\eta_p^2 = .03$, small ES, than those without PTSS (RES & CON); the differences on the MEAQ and the FFMQ (total and component skills) were no longer significant.

Differences between participants with versus without flashbacks. In general, there were very few significant differences between participants with clinically significant PTSS with flashbacks (PTSS/+FB) compared with those with PTSS without flashbacks (PTSS/−FB). The groups did not significantly differ on specific psychological symptoms (e.g., sleep complaints, dissociative experiences), general distress/pathology severity (GSI/PSDI), overall PTSD symptom severity, or PTSD symptom cluster severity (see Table 2). In addition, individuals with PTSS with and without flashbacks did not differ in overall trait mindfulness (MAAS and FFMQ) or experiential avoidance/psychological inflexibility (MEAQ and AAQ-II; see Table 3). There was a nonsignificant trend toward higher levels of nonreactivity in PTSS/−FB compared to PTSS/FB+, $F(1, 75) = 3.21$, $p = .08$, $\eta_p^2 = .04$, small ES.

Flashback interview ratings

Next, we examined overall group differences on the ratings of genuine (PTSS/+FB) versus simulated flashbacks (PTSS/−FB, RES, CON; see Table 4).[2] We found overall differences in the qualities of genuine (PTSS/+FB) versus role-played flashbacks (PTSS/−FB, RES, CON). However, we found that there were no significant differences between genuine ratings of flashbacks (PTSS/+FB) compared with ratings of simulated flashbacks by individuals with PTSS (PTSS/−FB; see Table 4 for F, p, η_p^2). Instead, there were significant differences between the ratings of flashbacks by individuals with PTSS (PTSS/FB+ & PTSS/FB−) and those without PTSS (RES & CON). Specifically, there were significant differences in the sensory intensity, $F(1,135) = 7.64$, $p = .007$, $\eta_p^2 = .05$, small ES, emotional intensity, $F(1,135) = 7.79$, $p = .006$, $\eta_p^2 = .06$, small ES, frequency, $F(1,135) = 9.20$, $p = .003$, $\eta_p^2 = .06$, small ES, functional

Table 3. Group Differences on Psychological Characteristics

	PTSS/ +FB	PTSS/ −FB	RES	CON	Overall[a]			PTSS/+FB vs. PTSS/−FB[b]		
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*F*(*df*)	*p*	η_p^2	*F* (*df*)	*p*	η_p^2
Experiential avoidance (AAQ-II)	25.49 (10.52)	25.84 (7.64)	16.31 (8.96)	16.18 (5.89)	13.76 (3, 138)	< .001	.23	.03 (1, 75)	.87	.000
Experiential avoidance (MEAQ)	212.56 (36.58)	212.06 (33.03)	185.53 (43.15)	190.94 (21.20)	6.38 (3, 138)	< .001	.12	.004 (1, 75)	.95	.000
Trait mindfulness (MAAS)	3.44 (.95)	3.54 (.74)	4.31 (.78)	4.33 (.68)	12.77 (3, 138)	< .001	.22	.25 (1, 75)	.62	.003
Mindfulness skills (FFMQ)	111.11 (20.86)	111.5 (17.17)	122.09 (21.79)	124.21 (15.68)	4.75 (3,138)	.003	.09	.008 (1, 75)	.94	.000
Observing (FFMQ)	24.82 (5.79)	24.19 (4.73)	22.38 (6.26)	23.45 (5.42)	1.28 (3, 138)	.28	.03	.26 (1, 75)	.61	.003
Describing (FFMQ)	24.82 (7.73)	22.59 (7.07)	26.22 (7.55)	26.91 (6.75)	2.19 (3, 138)	.09	.05	1.67 (1, 75)	.20	.02
Acting with awareness (FFMQ)	23.24 (7.29)	23.84 (5.55)	28.19 (6.23)	28.06 (5.29)	6.50 (3, 138)	< .001	.12	.15 (1, 75)	.70	.002
Nonreactivity (FFMQ)	15.87 (4.42)	17.53 (3.36)	17.53 (3.54)	17.09 (3.61)	1.71 (3, 138)	.17	.04	3.21 (1, 75)	.08	.04
Nonjudgment (FFMQ)	22.36 (8.55)	22.34 (6.70)	27.78 (8.14)	28.70 (6.57)	6.24 (3, 138)	.001	.12	.30 (1, 75)	.59	.004

Note: PTSS = threshold or subthreshold posttraumatic stress disorder (PTSD) symptoms; FB = flashback; RES = resiliient; CON = control; AAQ-II = Acceptance and Action Questionnaire–II; MEAQ = Multifaceted Experiential Avoidance Questionnaire; MAAS = Mindful Attention Awareness Scale; FFMQ, Five Facet Mindfulness Questionnaire.
[a]Multivariate test of significance: Pillai's Trace $F(20, 118) = 2005.96$, $p < .001$, $\eta_p^2 = .997$. [b]Multivariate test of significant: Pillai's Trace $F(9, 67) = .81$, $p = .61$, $\eta_p^2 = .10$.

impact, $F(1,135) = 19.00$, $p < .001$, $\eta_p^2 = .12$, small ES, and distress, $F(1,135) = 12.47$, $p = .001$, $\eta_p^2 = .09$, small ES, associated with flashbacks.

Discussion

Our study was one of the few to examine the phenomenology and correlates of flashback experiences in research that controlled for posttraumatic stress symptoms and considered sociocultural influences on flashback reports. As we made plain in the introduction, whether flashbacks are a distinct memory phenomenon or not has been the subject of intense debate. One of our most consistent findings, which we elaborate below, was the lack of differences in key measures between PTSS participants as a function of whether or not they experienced flashbacks and the lack of differences in features participants described in reference to genuine versus simulated flashbacks.

These null outcomes, along with our finding of consistent differences across measures as a function of PTSS group status, arguably lean more toward the basic-mechanisms than the special-mechanisms account of flashbacks. More specifically, individuals with PTSS, regardless of the presence or absence of flashbacks, reported significantly more psychological symptoms compared to individuals without PTSS. Consistent with previous literature (Germain et al., 2008), even when general distress levels were controlled for, PTSS were associated with an increase in sleep disturbances. Contrary to our predictions, neither sleep complaints nor dissociative symptoms distinguished individuals with PTSS and flashbacks from those with PTSS without flashbacks. Although we found consistent evidence of the links between PTSD symptoms and sleep complaints, we did not find any psychopathological correlates that differentiated individuals with PTSS with flashbacks from those with PTSS without flashbacks. Many individuals with PTSS do not report flashbacks, and we did not find any evidence of differences in other psychological symptoms that may predict the development of flashbacks in individuals with PTSS; instead, individuals with PTSS with flashbacks were similar in many ways to individuals with PTSS without flashbacks.

We did, however, document a number of differences as a function of PTSS status. As predicted from previous literature (Shorey et al., 2014), individuals with PTSS scored lower on measures of mindfulness and higher on measures of experiential avoidance (Meyer et al, 2013; Seligowski et al., 2016) than individuals without PTSS. Several recent studies have demonstrated that participation in a mindfulness-based treatment program led to reductions in PTSD symptoms (Kearney, Mcdermott, Malte, Martinez, & Simpson, 2012; Stephenson et al.,

Table 4. Group Differences on Flashback Interview Ratings

	PTSS/ +FB	PTSS/ −FB	RES	CON	Overall[a]			PTSS/+FB vs. PTSS/−FB[b]		
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*F* (*df*)	*p*	η_p^2	*F* (*df*)	*p*	η_p^2
FB vividness	3.4 (1.03)	3.6 (.97)	3.28 (.77)	3.16 (.85)	1.31 (3,133)	.28	.03	.74 (1, 71)	.39	.01
FB sensory intensity	3.09 (1.23)	3.2 (1.16)	2.25 (1.11)	2.91 (1.16)	4.34 (3,133)	.006	.09	.13 (1, 71)	.72	.002
FB emotional intensity	3.6 (.96)	3.87 (.68)	3.34 (.90)	3.22 (1.01)	3.19 (3,133)	.03	.07	1.67 (1, 71)	.20	.02
FB detail	3.56 (.85)	3.33 (1.12)	3.66 (.75)	3.37 (.94)	.89 (3,133)	.45	.02	.94 (1, 71)	.34	.01
FB coherence	3.56 (1.12)	3.43 (1.14)	3.59 (1.13)	3.34 (1.04)	.36 (3,133)	.78	.01	.22 (1, 71)	.64	.003
FB frequency	2.05 (1.15)	1.77 (.86)	1.31 (.74)	1.59 (.76)	4.14 (3,133)	.008	.09	1.27 (1, 71)	.26	.02
FB impact	2.86 (1.17)	2.6 (.93)	2.03 (.93)	1.97 (.93)	6.71 (3,133)	<.001	.13	1.03 (1, 71)	.31	.01
FB distress	3.23 (1.17)	3.47 (1.04)	2.7 (1.18)	2.63 (.98)	5.38 (3,133)	.005	.09	.77 (1, 71)	.38	.01

Note: PTSS = threshold or subthreshold posttraumatic stress disorder (PTSD) symptoms; FB = flashback; RES = resiliient; CON = control.
[a]Multivariate test of significance: Pillai's Trace $F(24, 384) = 2.18$, $p = .001$, $\eta_p^2 = .12$. [b]Multivariate test of significant: Pillai's Trace $F(8, 64) = 1.31$, $p = .26$, $\eta_p^2 = .14$.

2017), and Stephenson et al. (2017) found that changes in acting with awareness and nonjudging were associated with improvement in PTSD symptoms overall and reductions in reexperiencing symptoms specifically. Our findings support the association between mindfulness skills and PTSD symptoms. Our study provides additional evidence of the potential clinical utility in mindfulness-based interventions and treatment adjuncts for PTSD. However, contrary to our expectations, neither trait mindfulness nor experiential avoidance predicted who would develop flashbacks upon exposure to similarly traumatic and distressing events.

We found that individuals with significant PTSS who did not report personal experiences with flashbacks provided role-played ratings of flashbacks that were very similar to genuine flashback experiences. More specifically, we did not find differences in vividness, sensory involvement, and level of detail (Brewin, 2014a; Crespo & Fernández-Lansac, 2016), which is arguably not consistent with the predictions of the special-mechanisms approach. Likewise, participants without PTSS portrayed several characteristics of flashbacks (e.g., vividness, detail) in ways that were consistent with genuine flashback experiences; these findings imply that many elements of the flashback experience are conveyed in sociocultural narratives of flashbacks. Similarly, Bryant and Harvey (1998) found that participants simulating PTSD were able to accurately portray trauma intrusions, suggesting that aspects of trauma memories are readily accessible to comparison participants. As a whole, these findings are arguably largely consistent with the basic-mechanisms view, which posits that elements of flashbacks are inherent in all autobiographical memories to varying degrees, which allows them to be convincingly simulated by all participants in many ways.

Nevertheless, we found that participants without PTSS underestimated the sensory and emotional intensity, frequency, and functional and emotional impact of flashbacks. This finding suggests that whereas the elements of flashbacks are available to role-playing participants via prevailing sociocultural beliefs about flashbacks and their similarity to other forms of autobiographical memory, these participants, nevertheless, did not succeed in simulating the impact of flashbacks on individuals who experience genuine trauma, PTSS, and related impairments. Although flashbacks may in fact be a partially socially constructed phenomena, they are nonetheless associated with significant distress and impairment, which appears to be somewhat underestimated by individuals without personal experience.

As predicted, our results were consistent with the notion that intrusive flashbacks are experienced as vivid, emotionally intense and distressing, and detailed in sensory information; these findings are consistent with both special-mechanisms and basic-mechanisms approaches, which both posit that flashbacks are vivid, emotionally charged, and rich in sensory information (Berntsen et al., 2003; Brewin et al., 2010). In line with our hypothesis, we did not find that genuine flashbacks

were more fragmented/less coherent than simulated flashbacks (Berntsen et al., 2003; Rubin, 2011). In contrast with several previous studies (Halligan et al., 2003; Jelinek et al., 2009), we did not find evidence that flashbacks were described as fragmented/incoherent. Instead, our findings were consistent with basic-mechanisms theory and previous studies that have failed to observe fragmentation of trauma-related memory (Berntsen et al., 2003; Rubin, 2011). Thus, we found support for one (i.e., PTSD is associated with involuntary intrusion of detailed, emotionally intense memories), but not both (i.e., trauma-related memories are fragmented and/or incoherent) assumptions of dual-representation theory and cognitive theories of PTSD (Brewin et al., 1996; Brewin et al., 2010; Ehlers & Clark, 2000).

Notably, the experience of flashbacks appears to shift during treatment for PTSD. For example, Hackmann and Holmes (2004) reported that the frequency, vividness, associated distress, and sense of "nowness" diminished during cognitive–behavioral therapy (CBT) for PTSD. Speckens, Ehlers, Hackmann, and Clark (2006) likewise found that imaginal reliving of traumatic memories during CBT for PTSD led to gradual reductions in the perceived reliving in the present, distress, and vividness of flashbacks. Given the increased interest in and empirical support for mindfulness-based treatment for PTSD, our study provides additional evidence that one of the mechanisms purportedly targeted by these interventions (mindfulness skills) is inversely related to PTSD symptom severity; therefore, mindfulness-based approaches appear to be another reasonable avenue for reducing the severity and impact of PTSD symptoms, including flashbacks.

Considerable variation exists in how flashbacks are defined. Indeed, whereas some definitions highlight the alleged fragmentary nature of flashbacks (Hellawell & Brewin, 2002), others, such as Pitman's (1988), do not, and some researchers (Berntsen, 2001) have suggested that flashbacks could be produced by positive events. Moreover, the line between a flashback and "ordinary" intense and vivid memories is at best fuzzy and may not exist at all, as basic-mechanisms theorists have argued. Accordingly, it could be argued that the notion of a flashback is so vague that it lacks any discriminatory value, which could constitute a reason why we failed to discern differences across conditions. Clearly, future researchers should provide specific and theoretically grounded definitions of flashbacks and determine whether varying the definition of a flashback presented to participants affects research outcomes.

Limitations

Our findings should be considered in light of several limitations. Our study was cross-sectional in nature, and we lack prospective/longitudinal data to arrive at conclusions about timing and causation of various symptoms. We included undergraduate students, so our findings may not generalize to other populations, and we did not collect data on income, education, or socioeconomic status. Our study design does not permit comparisons between flashbacks and other types of memories (e.g., ordinary autobiographical memories, autobiographical memories of highly positive events, or nonflashback trauma-related memories), so we are unable to compare our results to other studies with this design (Crespo & Fernández-Lansac, 2016; Rubin, 2011); indeed, there is no clear consensus on appropriate comparisons for flashbacks and other trauma-related memories. Because we did not include a comparison to other nonflashback trauma memories, it is unclear whether the role-playing participants underestimated the impact of flashbacks specifically or whether role-playing participants would similarly underestimate the impact of trauma-related memories more broadly.

In addition, questions remain regarding the most appropriate way to assess flashbacks in individuals with PTSD. We do not have a clear understanding of how participants understand typical probes such as, "Have you ever suddenly acted or felt as if the event(s) was happening again?" and whether alternative wordings would yield different or more accurate answers. Although we evaluated basic- and special-mechanisms approaches, we could have more thoroughly compared the two theories if we had included more measures (e.g., Centrality of Events Scale; Berntsen & Rubin, 2006; Autobiographical Memory Questionnaire, Rubin, Boals et al., 2008) that were not derived from special-mechanism approaches, which should be considered in future studies. Finally, although we designed our role-play instructions to be similar to widely used diagnostic interview questions (SCID; First et al., 2010), as we noted above, the way flashbacks are defined to participants in simulation studies may affect the correspondence between simulated and genuine flashback narratives (Bryant & Harvey, 1998).

Conclusions and Future Directions

Our study contributes to the understanding of the conceptualization, phenomenology, and correlates of flashbacks in individuals with PTSS, an essential yet relatively understudied area (Brewin, 2014b; Kvavilashvili, 2014). We replicated previous studies observing that trauma-related flashbacks are vivid, sensory-detailed, emotionally intense, and distressing. We also found that individuals not suffering from PTSS tend to underestimate the emotional and functional impact of flashbacks. Our findings suggest the relevance of continuing to develop therapeutic techniques to manage flashbacks

given the frequency and level of functional impact observed in our sample. Our study also suggests that there may be meaningful connections between PTSD symptoms and mindfulness. Future research should continue to examine the utility of clinical approaches aimed at enhancing mindfulness skills and increasing psychological flexibility.

Action Editor

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Author Contributions

S. J. Lynn developed the study concept. Both authors contributed to the study design. Data collection was performed by A. Malaktaris. A. Malaktaris performed the data analysis and interpretation under the supervision of S. J. Lynn. A. Malaktaris drafted the manuscript, and S. J. Lynn provided critical revisions. Both authors approved the final version of the manuscript for submission.

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Notes

1. As expected, individuals with subthreshold PTSD reported lower levels of psychological symptoms, lower levels of trait mindfulness, and higher levels of psychological inflexibility/experiential avoidance than those who met full diagnostic criteria for PTSD. Individuals with subthreshold PTSD also reported significantly higher levels of psychological symptoms and mindfulness and lower levels of psychological inflexibility/experiential avoidance than those without PTSS (RES & CON). Previous research has found that there is no difference in levels of impairment between those with PTSD and subthreshold PTSD (Zlotnick et al., 2002), and we chose to combine these groups.

2. Individuals with PTSD and individuals with subthreshold PTSD did not differ in their ratings of genuine flashbacks (PTSS/+FB) nor their role-played ratings of flashbacks (PTSS/−FB). PTSD versus subthreshold PTSD did not significantly differ in the severity of reexperiencing symptoms.

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