

# Culture and the Remembering of Trauma

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Clinical Psychological Science  
2014, Vol. 2(6) 696–713  
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sagepub.com/journalsPermissions.nav  
DOI: 10.1177/2167702614529763  
cpx.sagepub.com



## Abstract

This research investigated the influence of culture and posttraumatic stress disorder (PTSD) on global autobiographical remembering (Study 1a) and on the phenomenological properties (Study 1b) and memory-content variables (Study 1c) of trauma-specific autobiographical remembering. Australian, British, and Iranian trauma survivors with and without PTSD completed the Autobiographical Memory Test, Self-Defining Memory Task, and Autobiographical Memory Questionnaire and provided trauma- and negative-memory narratives. We found that there were pan-cultural deficits and distortions in the global autobiographical remembering of participants with PTSD (Study 1a). In addition, the presence of PTSD moderated the usual effect of culture on the phenomenological properties of the trauma memory (Study 1b). Finally, participants with PTSD, regardless of cultural background, had significantly fewer expressions of autonomy and self-determination in their autobiographical remembering than did those without PTSD (Study 1c). The findings suggest that pan-culturally, individuals with PTSD have similar disruptions and distortions in their autobiographical remembering.

## Keywords

culture, trauma, autobiographical memory, posttraumatic stress disorder

Received 2/17/14; Revision accepted 3/7/14

Autobiographical memory is central to current understandings of posttraumatic stress disorder (PTSD). That is, individuals with PTSD exhibit certain disruptions and distortions in their autobiographical remembering of the trauma event and show global differences in their profiles of more general autobiographical remembering (Brewin, 2011; Brewin, Dalgleish, & Joseph, 1996; Dalgleish, 2004; Ehlers & Clark, 2000). Although an impressive body of literature now exists in terms of the role of autobiographical remembering in PTSD, there remains a significant gap in this literature. Specifically, the majority of the literature pertains to trauma survivors from Western cultures, despite the increasing recognition that PTSD is observed in many different societies and cultures (Foa, Keane, Friedman, & Cohen, 2009) and substantial research in the area of cross-culture psychology that has suggested that everyday autobiographical remembering differs across cultures (Jobson, 2009a). Thus, the question remains, how does culture influence

the remembering of trauma and, thus, the etiology, maintenance, and treatment of PTSD?

The hallmark symptom of PTSD is the intrusive recollection of autobiographical memories of the trauma, which often occur as vivid, highly emotive, sensory-laden flashbacks, reliving experiences, intrusive thoughts and images, and nightmares (Brewin et al., 1996). Paradoxically, this elevated involuntary access to memories of the trauma is often accompanied by compromised voluntary access to coherent accounts of what happened during traumatic experiences (Brewin, 2011). Thus, the phenomenological properties of trauma accounts often include being fragmented, temporally disorganized, and laden with sensory-perceptual features (Brewin, 2011;

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Brewin et al., 1996; Foa, Molnar, & Cashman, 1995; Jelinek, Randjbar, Seifert, Kellner, & Moritz, 2009; Jones, Harvey, & Brewin, 2007; O'Kearney & Perrott, 2006).

These autobiographical-memory difficulties have been shown to extend beyond the trauma memory to more global autobiographical remembering. For instance, research has shown that individuals with PTSD have significant difficulties in providing specific autobiographical memories of everyday events (i.e., memories of discrete occasions that occurred at a particular time and place). Instead, PTSD sufferers tend to retrieve categoric over-general memories (OGMs; i.e., memories for collections of events; see Moore & Zoellner, 2007; Williams et al., 2007). Another example of a global autobiographical-memory difficulty relates to memories of experiences that significantly reflect and inform one's identity. Research has shown that when individuals with PTSD were asked to provide such "self-defining memories," their responses, compared with those of trauma survivors without PTSD, tended to be strongly associated with their trauma experience (Jobson & O'Kearney, 2008a; Sutherland & Bryant, 2005).

These autobiographical-memory disruptions can be conceptualized within our Self-Memory System model (SMS; Conway, 2005; Conway & Pleydell-Pearce, 2000). The SMS posits that a motivational hierarchy of goals (the working self) encodes and integrates memories into an autobiographical knowledge base—a hierarchically arranged database of memories with general summaries of broad categories of lifetime periods at the top and increasingly specific details of individual events at the bottom. Voluntary retrieval of specific event details requires navigating down this hierarchy. However, retrieval can also occur via direct, involuntary access to specific event representations in the memory hierarchy, thus bypassing the hierarchical search. The integration of autobiographical memories into the autobiographical knowledge base allows for elaboration of the memory, which enhances the first retrieval route and inhibits the second direct access route. The SMS proposes that trauma can pose a threat to current goals to which the working self cannot readily adapt. Thus, there are no currently active goals that can be used to integrate the trauma memory into the autobiographical knowledge base. Instead, the trauma memory remains an event-specific representation of the event and is not contextualized within the autobiographical knowledge base.

The SMS provides an account for the three autobiographical-memory disruptions mentioned earlier. First, given that the trauma memory is not integrated into the autobiographical knowledge base, it is difficult to retrieve the trauma memory using the hierarchical search because the memory lacks the requisite connections to other autobiographical memories. Rather, it is more likely to be

activated, involuntarily, via a direct retrieval route that operates via a close link between a given retrieval cue and the trauma-memory representations. Thus, PTSD sufferers experience frequent intrusive recollections alongside their compromised voluntary access to coherent accounts of the trauma memory. Second, in terms of OGMs, we have suggested elsewhere (see Williams et al., 2007) that in attempts to avoid the recollection of these specific details of the trauma, for PTSD sufferers, the hierarchical memory search can get diverted toward those higher-level generic representations of personal experience stored higher in the hierarchy of the autobiographical knowledge base that represent OGMs. An OGM retrieval style may create less affect than the recollection of specific episodic memories, given that remaining at this level of more general information reduces the impact of retrieving potentially emotional material. Such strategies, if successful in avoiding aversive consequences, will be negatively reinforced. In time, attempts to minimize the retrieval of specific memories, to reduce retrieval of memories that are painful and affect laden, can develop into an inflexible and habitual autobiographical retrieval pattern and, thus, a more generic form of avoidance. Consequently, not only do coherent details of the trauma itself become difficult to access voluntarily but all specific memory access becomes compromised as well. Third, the SMS emphasizes the need for self-consistency and coherence; the working self aims to reduce the inconsistency between desired goals and the trauma and minimize memories that challenge or threaten the coherence of the self-system. Coherence between the trauma and the self may be accomplished, to a point, through inhibition or distortion of the trauma memory. Over time, these inconsistencies can prove too psychologically demanding and may result in transformations to the existing self-concept that lead to the development of a self that is trauma centered and reflected in self-related remembering (Conway, 2005).

Prominent PTSD models (Brewin et al., 1996; Dalgleish, 2004; Ehlers & Clark, 2000; Horowitz, 1976; Janoff-Bulman, 1992) similarly suggest that the PTSD trauma memory is not well integrated or contextualized. For instance, the dual-representation theory (Brewin et al., 1996) suggests that there are two memory systems that operate in parallel, but one system can take precedence over the other at different times. The situationally accessible memory system is limited to material that was encoded using lower-level perceptual processing of the traumatic scene, such as sights and sounds, and, thus, can be accessed only involuntarily through situational reminders of the trauma. The verbally accessible memory system includes material that was consciously processed during the traumatic event and can be accessed through voluntary recall and described verbally. Ideally,

situationally accessible memories are integrated with verbally accessible memories to form an elaborate and coherent account of the trauma event. However, under extreme stress, the conscious processing that leads to verbally accessible memories is impaired, thereby resulting in the domination of the situationally accessible memory system (Brewin et al., 1996). As a result of very little information being encoded in the verbally accessible memory system, memories of the trauma are repeatedly brought to mind as sensory and emotional fragments. Given that the situationally accessible memory system does not use a verbal code, these memories are difficult to voluntarily communicate to others, and the memories do not necessarily interact with, and get updated by, other autobiographical knowledge.<sup>1</sup>

Culture influences autobiographical remembering through different social orientations, beliefs, and values, especially those pertaining to the self, despite significant individual and situational differences within a particular society (Ross & Wang, 2010; Wang & Ross, 2005). Western cultures tend to conceptualize the self as independent, autonomous, internally coherent, and a unique collection of internal attributes whose goals are to be unique, self-expressive, realize internal attributes, and promote individual goals (see Markus & Kitayama, 2010). Given that an individual's personal experiences are unique, memories of such experiences assist an individual in distinguishing himself or herself from others and contribute to this autonomous self-construal (Ross & Wang, 2010). In many cultures, such as those in Asia, Africa, and the Middle East (collectivistic cultures), however, a sense of uniqueness, independence, and autonomy is less relevant to one's self-concept. Instead, such cultures tend to emphasize relatedness, interdependence, and the way that the self attends to and fits in with others and the surrounding social context (Markus & Kitayama, 2010).

Several decades of research have demonstrated that these cultural differences influence autobiographical remembering. People from Western/individualistic cultures have been shown to provide more self-revealing, self-focused, and lengthier accounts of specific, personal everyday events than have people from collectivistic cultures who instead tend to focus on collective activities, social interactions, and significant others (e.g., Jobson, 2009b; Jobson & O'Kearney, 2008b; Wang, 2008; Wang & Conway, 2004; Wang, Leichtman, & Davies, 2000; see Ross & Wang, 2010, for review). These differences in memory-content variables reflect Western cultures' emphasizing a coherent, well-integrated life story with the individual cast as the "lead" because this affirms the self as an autonomous unit, whereas in collectivistic cultures, collective activities are often esteemed over this unique life story (Wang, 2001).

Although the cross-cultural study of autobiographical memory has tended to focus on the development of narrative in autobiographical memory, research has also demonstrated that the properties of autobiographical memories culturally differ (e.g., Rubin, Schrauf, Gulgoz, & Naka, 2007). For instance, Rubin et al. (2007) found that compared with American (an individualistic culture) participants, Japanese (a collectivistic culture) participants rated many of the phenomenological properties of their autobiographical memories significantly lower. Rubin et al. suggested that although the underlying mechanics of memory may be cross-culturally identical, there are cultural differences in how individuals assess and experience their memories. People from individualistic cultures may rate the phenomenological properties more highly than may those from collectivistic cultures, given that this aligns with individualistic cultures' stressing their unique autobiographical memories and with an autonomous self-construal's providing a strong motivation for individuals to attend to, encode, and reflect on their autobiographical personal experiences (Ross & Wang, 2010).

We have used the SMS to account for these cultural differences elsewhere (see Conway & Jobson, 2012; Jobson, 2009a). Individuals hold conceptual knowledge about the self in relation to others, which is influenced by the cultural conception of selfhood. A focus on interdependence versus independence in the self at the cultural level influences the content, organization, and phenomenological properties of an individual's autobiographical memory. Specifically, although people hold both independent and interdependent goals, one orientation is dominant depending on cultural influences. Such goals of the working self encode and integrate memories into the autobiographical knowledge base, which allows for culturally appropriate elaboration of memories. Thus, when autobiographical memories are retrieved, either independence or interdependence is emphasized, which, in turn, develops, expresses, and maintains the culturally valued self.

Several questions emerge when we consider these cross-cultural findings in the context of our current understandings of PTSD. The first two questions pertain to global aspects of autobiographical remembering. First, as outlined earlier, difficulties in providing specific memories have been shown to be associated with, and predictive of, PTSD (Moore & Zoellner, 2007). Research has demonstrated that specific autobiographical memories of personal unique experiences are emphasized in individualistic cultures, given that they function to differentiate the self from others and, thus, contribute to the independent self-construal (Jobson, 2009b; Ross & Wang, 2010; Wang, 2001, 2009; Wang & Conway, 2004). However, general memories tend to be emphasized in collectivistic

cultures because they generally feature social relations and conventions, thereby strengthening the interdependent self-construal (Ross & Wang, 2010). Therefore, an important question is whether the relationship between OGMs and PTSD still holds in collectivistic populations in which an OGM retrieval style may be perceived as less problematic.

Second, the SMS suggests that over time, to reduce inconsistencies between the trauma and self-concept (i.e., to maintain self-coherence), there can be transformations to the existing self-concept. This can lead to the development of a self-concept focused on the idea of being a victim of trauma or on emphasizing self-change since the event. The SMS suggests that any change in self will be motivated by a drive for self-coherence. Maintaining an internally coherent self is imperative in individualistic societies, and information inconsistent with this congruent self must go through repair work to align such information. However, people from collectivistic cultures tend to be much more capable of flexibility between social roles and tolerant of differences in their self in these roles (Suh, 2002). Therefore, a second question is whether the relationship between a trauma-defined self-concept and PTSD is evident in collectivistic populations.

The final two questions pertain to remembering of the trauma experience. The trauma memory of individuals with PTSD is considered to be poorly integrated and contextualized in the autobiographical knowledge base. This conceivably results in less opportunity for the usual cultural influences to exert themselves on the phenomenological properties and memory-content variables of the PTSD trauma memory, given that cultural influences on autobiographical remembering operate through language, encoding, integration, and elaboration of the memory and hierarchical retrieval processes (see Conway & Jobson, 2012; Jobson, 2009a). Therefore, the following questions arise: Are there similar disruptions in the phenomenological properties (i.e., being fragmented and laden with sensory-perceptual features) of the trauma memory across cultures? And are the memory-content variables of the PTSD trauma memory relatively immune to cultural influences (i.e., have less of the expected cultural emphasis on either autonomy or interdependence)?

The aim of the current research was to investigate whether PTSD and culture interact to influence these global and trauma-specific aspects of autobiographical remembering. Specifically, the research addressed the four research questions outlined earlier:

*Research Question 1:* Does the relationship between OGMs and PTSD still hold in collectivistic populations?

*Research Question 2:* Does the relationship between trauma-centered self-definition and PTSD still hold in collectivistic populations?

*Research Question 3:* Are there culturally similar disruptions in the phenomenological properties of the PTSD trauma memory?

*Research Question 4:* Are there cultural similarities in the memory-content variables of the PTSD trauma memory?

These research questions were investigated using samples of trauma survivors from individualistic and collectivistic cultures. It is important to note that although the same or overlapping sources were used in this research, to aid in the reporting of findings, the findings were divided into three substudies. Study 1a investigated the influence of PTSD and culture on global aspects of autobiographical remembering (Research Questions 1 and 2). Study 1b investigated the influence of PTSD and culture on the phenomenological properties of trauma-specific remembering (Research Question 3). And Study 1c investigated the influence of PTSD and culture on the memory-content variables of trauma-specific remembering (Research Question 4).

## Study 1a

Study 1a investigated the influence of PTSD and culture on OGMs and self-related autobiographical remembering. We first hypothesized that although there would be cultural differences in autobiographical-memory specificity (AMS), individuals with PTSD pan-culturally would engage in similar memory-avoidance strategies to manage the memory disruptions associated with PTSD, thereby resulting in OGMs. Second, we proposed that universally in the aftermath of trauma, the trauma memory of individuals with PTSD would not align with the desired goals of the self-concept and would be hard to integrate with previously held assumptions about the self and the world. Consequently, the trauma would become central to people's mental life as they struggle to resolve these discrepancies, thereby resulting in a great deal of time spent recalling these events and ruminating about them (Brewin, 2011; Horowitz, 1976; Janoff-Bulman, 1992). As a result, the trauma would become highly associated with the self-concept (Brewin, 2011), and the traumatic event would form a turning point in people's construction of their own identity and a cognitive reference point for the organization of autobiographical knowledge (Berntsen & Rubin, 2006). Therefore, it was hypothesized that pan-culturally, individuals with PTSD would also have more trauma-defined identities and personal memories than would those without PTSD. Finally,

it has been suggested that self-concept alterations result in poorer memory for experiences about one's past (Brewin, 2011). Therefore, Study 1a also investigated the relationship between the extent of a trauma-themed self-concept and degree of OGMs. It was hypothesized that there would be a significant negative correlation between higher ratings of a trauma-themed self-definition and reduced specificity of autobiographical memories.

## Method

**Participants.** Participants were British ( $n = 38$ ), Australian ( $n = 43$ ), and Iranian ( $n = 40$ ) trauma survivors living in their country of origin. Australia and Britain are considered individualistic cultures, whereas Iran is considered a collectivistic society (Hofstede, Hofstede, & Minkov, 2010). All participants had experienced a car accident, physical assault, or life-threatening illness that meets PTSD Criterion A in the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; text rev.; *DSM-IV-TR*; American Psychiatric Association, 2000).<sup>2</sup> All participants were recruited from the general community by posters in public places, advertisements in local newspapers, and contacts with organizations that provide treatment for trauma survivors.

Participants were allocated to one of two groups—those who met diagnosis for PTSD (the PTSD group) and those who did not meet diagnosis for PTSD (the no-PTSD group)—on the basis of their completion of the Posttraumatic Stress Diagnostic Scale (PDS; Foa, Riggs, Dancu, & Rothbaum, 1993). The PDS was developed to provide a brief self-report instrument to assist with the diagnosis of PTSD. Parts I and II contain trauma-screening questions that correspond to PTSD Criterion A in the *DSM-IV-TR*. Part III contains 17 items that assess PTSD symptoms. Participants are asked to rate these items, for the past month, on a scale from 0 (*not at all*) to 3 (*almost always*). The ratings of the items are summed to calculate a total severity score. The PDS then ascertains duration of the symptoms (Criterion E) and impairment of functioning (Criterion F). To be considered a positive screen on the PDS, a participant must meet Criterion A; endorse a broad enough range of symptoms to meet Criteria B (reexperiencing), C (avoidance), and D (increased arousal); have symptoms present for more than 1 month; and indicate that the disturbances are causing significant impairment in functioning (i.e., a screening diagnosis of PTSD is made only if all six *DSM-IV-TR* criteria are endorsed). The PDS has good convergent validity with the Structured Clinical Interview (R. L. Spitzer, Williams, & Gibbon, 1987; see also Foa et al., 1993); has good psychometric properties, including with Iranian populations (M. Mirzamani, Mohammadi, & Besharat, 2006; S.-M. Mirzamani, Mohammadi,

Mahmoudi-Gharaei, & Mirzamani, 2007); and has been used in previous research with Iranian participants (Kolassa et al., 2007). Internal consistency was excellent (Iran:  $\alpha = .97$ ; Australia:  $\alpha = .97$ ; Britain:  $\alpha = .91$ ).

**Measures.** Using the following five steps, we translated all measures into Farsi for use with the Iranian participants. First, two Iranian native speakers of Farsi, fluent in English, independently translated the measures into Farsi. Second, a back translation of the Farsi versions into English was conducted by a third independent bilingual clinical psychologist in Iran. Third, reconciliation of the forward-backward translations was performed by the authors. Fourth, the Farsi and English drafts were examined and reviewed by clinical psychologists for appropriateness. Finally, the measures were piloted on a convenience sample to assess ease of comprehension and possible ambiguity.

**AMS.** The gold-standard laboratory measure of AMS is the Autobiographical Memory Test (AMT; Williams & Broadbent, 1986; Williams et al., 2007). The AMT presents participants with lists of cue words and asks them to retrieve a specific memory for each word. The following cue words were used in a fixed order: happy, sorry, safe, angry, interest, clumsy, success, hurt, surprise, and lonely. Instructions to participants stated,

You will find a word at the top of each page. Please recall a memory of an event that happened to you which the word reminds you of. The event could have happened recently or a long time ago. It might be an important event or a trivial event. It is important that the memory you recall is of a specific event.

An example was provided, and participants were instructed to write their recalled memory down in the lined space beneath the word and were given 40 s to retrieve a memory. Memories were coded as specific if the memory was of an event that lasted less than a day and occurred at a distinct time and place. We developed a specificity ratio by dividing the total number of specific memories by the number of memories provided. If participants did not generate a memory in the allotted time, their responses were coded as omissions. Following prior studies, we coded nonspecific memories as categorical (a memory of conflating over numerous related events) and extended (a single episodic event that lasts longer than a day). Consistent with past studies, the focus of our analyses was specific memory scores (e.g., Neshat Doost et al., 2013). However, the pattern of results was the same if numbers of OGMs were substituted into the analyses. The AMT has been shown to

have adequate psychometric properties (Griffith et al., 2012). In the current study, two assessors, blind to the study's aims and PTSD-group allocation of participants, rated the memories for all participants. In addition, 20% of each data set was coded by an independent coder who was a trained Farsi-English bilingual researcher for intercoder reliability estimates. Interrater reliability was good ( $\kappa = .86$ ). Discrepancies between raters were resolved through discussion.

*Self-concept: Self-cognition, self-defining memories, and personal goals.* The influence of trauma on self-concept was assessed using a portfolio of widely used measures of identity that assess self-cognitions, self-defining memories (SDMs), and personal goals.

The Twenty Statement Test (TST; Kuhn & McPartland, 1954) was used to quantify trauma-related self-cognitions (e.g., Jobson & O'Kearney, 2008a). The TST asks respondents to provide 20 statements in response to the question "Who am I?" The TST has been shown to have adequate validity and reliability (Kuhn & McPartland, 1954; S. P. Spitzer, Couch, & Stratton, 1973) and has been used in previous research to examine self-definition (e.g., Bigner, 1971).

We used Singer and Salovey's (1993) method to assess SDMs. Participants were informed that

a self-defining memory is a memory from your life that you remember very clearly, is important to you and leads to strong feelings, that may be either positive or negative, or both. It is the kind of memory that helps you to understand who you are and might be the memory you would tell someone else if you wanted that person to understand you in a more profound way. They are memories that you feel convey powerfully how you have come to be the person you currently are. Please briefly write down 5 self-defining memories.

Singer and Salovey's method has been shown to have adequate psychometric properties (e.g., Blagov & Singer, 2004).

Following other researchers' measure of personal strivings (Jobson & O'Kearney, 2008a; Sutherland & Bryant, 2005), we assessed goals by instructing participants to "please provide 15 goals that you feel are important for you to achieve." Although the validity of this approach is yet to be assessed, the approach is based on Emmons's (e.g., 1986, 1989) measure of personal strivings.

Coding was approached as follows. Three independent trauma-themed ratios were developed—self-cognitions, SDMs, and goals—as in previous research (Jobson & O'Kearney, 2006, 2008a; Sutherland & Bryant, 2005). These ratios were formed by first coding each

response as trauma themed or not. To be coded as trauma themed, the response had to be directly and clearly related to trauma or survival; for example, for self-cognitions ("victim," "survivor," "scared," "damaged"), for SDMs (recalling a trauma event that is listed in Part 1 of the PDS's list of traumatic events; i.e., accident, natural disaster, nonsexual assault, sexual assault, military combat, child sexual abuse, imprisonment, torture, or a life-threatening illness), and for goals ("I want to survive," "I want to get over the trauma"). The total number of trauma-themed responses was tallied for each participant, and these totals were divided by the total number of self-cognitions, SDMs, and goals retrieved, respectively, to provide a trauma-themed ratio for each measure. Interrater reliability ( $\kappa$ ) was .90 for self-statements, .90 for SDMs, and .80 for goals.

*Trauma experiences.* To ensure both cultural and PTSD groups had experienced similar levels of lifetime exposure to traumatic events, we used the Trauma History Questionnaire (THQ; Green, 1996). The THQ is designed to assess exposure to a wide range of potentially traumatic events: crime-related events, general disaster and trauma, and unwanted physical and sexual experiences (Green, 1996). The psychometric properties are good (Mueser et al., 2001), and the THQ has been used cross-culturally (e.g., Jobson & O'Kearney, 2008a).

*Depression symptoms.* Given high levels of comorbidity between depression and PTSD, depression was measured using Part II of the Hopkins Symptom Checklist-25 (HSCL-25; Derogatis, Lipman, Rickels, & Cori, 1974). Part II of the HSCL-25 comprises 15 items that measure depression symptoms. Participants are required to indicate how much each symptom bothered them in the past week; responses are made on scales from 1 (*not at all*) to 4 (*extremely*). The HSCL-25 Depression subscale has good psychometric properties (Derogatis et al., 1974) and is regularly used in cross-cultural research (e.g., Jobson & O'Kearney, 2008a). Internal consistency was excellent (Iran:  $\alpha = .94$ ; Australia  $\alpha = .95$ ; Britain  $\alpha = .90$ ).

*Independence/interdependence.* The TST was also used in the current research to ensure the cultural groups did differ significantly in terms of independent/interdependent self-orientation. Researchers have frequently used the TST to examine and control for cultural differences in individuals' sense of self (e.g., Jobson & O'Kearney, 2008a; Wang, 2001). The 20 responses were coded into comparable categories of the independent-interdependent dichotomy. Self-cognitions were coded as independent (private) if the responses referred to personal qualities, attitudes, beliefs, or behaviors that were not related to other people (e.g., "I am intelligent"). Self-cognitions were coded as interdependent

**Table 1.** Participant Characteristics and Memory-Content Variables for Negative and Trauma Memories From Study 1c

Characteristic/variable	British		Australian		Iranian	
	No PTSD ( <i>n</i> = 22)	PTSD ( <i>n</i> = 16)	No PTSD ( <i>n</i> = 26)	PTSD ( <i>n</i> = 17)	No PTSD ( <i>n</i> = 20)	PTSD ( <i>n</i> = 20)
Age (years)	44.00 (13.16)	44.50 (15.03)	38.23 (14.09)	41.71 (11.00)	34.60 (11.90)	31.45 (10.93)
Gender (female), <i>n</i>	7	9	5	5	3	9
Task difficulty	4.68 (2.57)	4.06 (2.35)	4.39 (2.45)	5.02 (2.99)	4.85 (2.23)	5.85 (2.05)
Depression	25.29 (7.07)	39.18 (10.06)	22.76 (6.50)	37.11 (9.14)	18.93 (4.97)	37.95 (7.74)
PDS trauma type ( <i>n</i> )						
Accident	15	11	15	11	18	17
Assault	5	2	7	4	2	3
Illness	2	3	4	2	0	0
Trauma history						
Crime	1.71 (1.65)	1.19 (1.56)	1.45 (0.94)	2.10 (2.27)	1.08 (1.35)	1.53 (1.23)
Disaster	4.52 (1.72)	4.75 (2.41)	5.60 (2.03)	5.60 (2.68)	3.27 (2.88)	4.71 (2.20)
Sexual	0.86 (1.01)	1.06 (1.53)	1.00 (1.08)	1.15 (1.63)	0.54 (1.10)	1.59 (1.54)
PDS total	6.50 (5.18)	26.06 (6.39)	5.38 (7.70)	30.65 (9.07)	7.15 (4.21)	34.60 (7.66)
Memory-content variable						
Length						
Negative	68.14 (39.03)	66.00 (29.37)	131.34 (50.96)	109.29 (76.00)	61.37 (25.24)	41.79 (27.11)
Trauma	143.73 (52.74)	126.25 (48.31)	146.69 (52.59)	132.59 (69.78)	95.05 (36.68)	64.74 (25.03)
Autonomous orientation						
Negative	5.00 (3.25)	3.06 (2.11)	6.24 (3.48)	3.82 (2.16)	1.95 (0.52)	1.16 (0.60)
Trauma	5.05 (2.38)	2.50 (1.90)	5.76 (3.78)	3.82 (2.30)	1.90 (0.56)	1.74 (0.65)
Other-self ratio						
Negative	0.45 (0.43)	0.51 (0.51)	0.70 (0.47)	0.72 (0.49)	1.11 (0.41)	1.42 (0.58)
Trauma	0.98 (0.76)	0.60 (0.36)	0.85 (0.59)	0.67 (0.38)	1.20 (0.68)	1.54 (0.88)

Note: Unless indicated otherwise, the table presents means for each measure. Standard deviations are shown in parentheses. PTSD = posttraumatic stress disorder; PDS = Posttraumatic Stress Diagnostic Scale.

if they were collective self-cognitions (responses concerning particular groups or categories; e.g., "I am Iranian") or cognitions pertaining to interdependence, friendship, and relationships or to the sensitivity of others (e.g., "I am in love"). Each participant received an independent score, which was the ratio of independent statements divided by the number of self-cognitions provided. The TST has adequate psychometric properties (Kuhn & McPartland, 1954; S. P. Spitzer et al., 1973). Interrater reliability was good ( $\kappa = .83$ ).

**Procedure.** Ethical approval was obtained from Australian National University (Australia), National Health Service Research Ethics Committee (England), and Tarbiat Moallem University and Tehran Medical University (Iran). Participants met with the researchers and completed the goal task, AMT (only the British and Iranian groups completed the AMT), SDM assessment, PDS, HSCL-25, THQ, and TST and provided demographic information. To assess study difficulty and to ensure that the groups did not differ significantly in terms of task understanding and responding, we asked participants to rate "how hard they found the study"; responses were made on a scale from

1 (*not at all*) to 10 (*extremely*). Participants received the equivalent of 10 pounds for their participation.

## Results

**Participant characteristics.** Participant characteristics are presented in Table 1. A chi-square analysis showed that the groups did not differ significantly in terms of gender. Two 3 (Culture: Australia, British, Iranian)  $\times$  2 (PTSD status: PTSD, no PTSD) analyses of variance (ANOVAs), with age and task difficulty as the dependent variables, were used to assess group differences. The main effects and interaction were nonsignificant for reported task difficulty. In terms of age, although the PTSD main effect and interaction were also not significant, there was a culture main effect,  $F(2, 115) = 7.57$ ,  $p = .001$ ,  $\eta_p^2 = 0.12$ ; the British,  $t(76) = 3.92$ ,  $p < .001$ ,  $d = 0.88$ , and the Australian,  $t(81) = 2.45$ ,  $p = .02$ ,  $d = 0.54$ , groups were significantly older than the Iranian group. Given that age may have had an influence on autobiographical remembering, the analyses were also conducted including age as a covariate. The results tended to be comparable throughout.

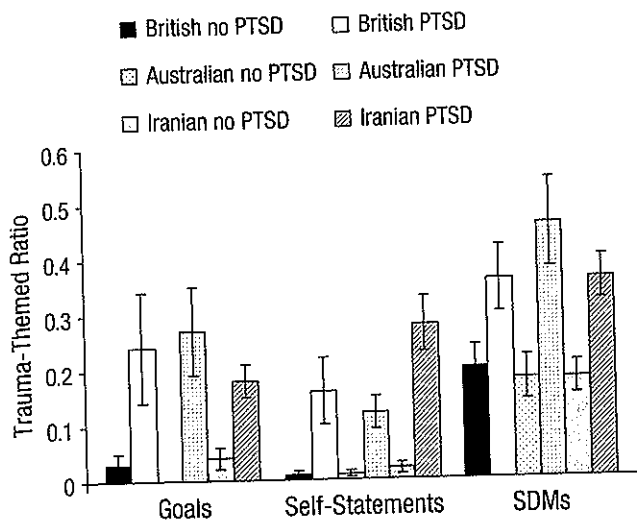


Fig. 1. Participants' trauma-themed ratio means for goals, self-statements, and self-defining memories (SDMs). Error bars represent 1 SE above and below the mean. PTSD = posttraumatic stress disorder.

Three 3 (Culture: Australia, British, Iranian)  $\times$  2 (PTSD status: PTSD, no PTSD) ANOVAs, with THQ trauma history, depression, and PTSD symptoms as the dependent variables, were completed. In terms of trauma history, the main effects and interaction were nonsignificant. In terms of depression, the culture main effect and interaction were also not significant. However, as expected, the PTSD main effect was significant; the PTSD groups were significantly more depressed than were the no-PTSD groups,  $F(2, 114) = 128.43, p < .001, \eta_p^2 = .53$ . For PTSD symptoms, the interaction was significant,  $F(2, 115) = 3.35, p = .04, \eta_p^2 = .06$ . Follow-up analyses revealed that as expected, the PTSD groups scored significantly higher than did the no-PTSD groups—British:  $t(36) = 10.42, p < .001, d = 3.36$ ; Australian:  $t(41) = 9.80, p < .001, d = 3.00$ ; Iranian:  $t(38) = 14.05, p < .001, d = 4.44$ . The no-PTSD groups did not differ significantly, and the Australian PTSD group did not differ significantly from the British or Iranian PTSD groups. However, the British PTSD group had significantly fewer PTSD symptoms than did the Iranian PTSD group,  $t(34) = 3.57, p = .001, d = 1.21$ . A chi-square analysis showed that the groups did not differ significantly in terms of PDS trauma type.

To confirm that there were the expected cultural differences in our sample in independent/interdependent self-orientation, we compared groups on the proportion of independent self-statements on the TST. This analysis revealed that although the Australian and British groups did not differ in proportion of independent self-statements, participants from the individualistic cultures had a significantly higher proportion of independent self-statements ( $M = 0.76, SD = 0.19$ ) than did participants in

the collectivistic group ( $M = 0.66, SD = 0.22$ ),  $t(119) = 2.53, p = .01, d = 0.49$ .

**Research Question 1: AMS.** To investigate the influence of culture and PTSD on AMS, we conducted a 2 (Culture: British, Iranian)  $\times$  2 (PTSD status: PTSD, no PTSD) ANOVA with proportion of specific memories as the dependent variable. Consistent with previous cross-culture research, results showed that the individualistic group ( $M = 0.55, SD = 0.25$ ) provided a significantly higher proportion of specific memories than did the collectivistic group ( $M = 0.49, SD = 0.18$ ),  $F(1, 74) = 4.48, p = .04, \eta_p^2 = .06$ . As hypothesized, the PTSD groups ( $M = 0.39, SD = 0.23$ ) provided a significantly lower proportion of specific memories than did the no-PTSD groups ( $M = 0.61, SD = 0.21$ ),  $F(1, 74) = 20.19, p < .001, \eta_p^2 = .21$ . The interaction was not significant ( $F < 1$ ), thus providing no support for the effect of PTSD on reducing AMS differences across cultures.

**Research Question 2: Self-concept.** To investigate trauma centeredness, we conducted a 3 (Culture: Australia, British, Iranian)  $\times$  2 (PTSD status: PTSD, no PTSD) multivariate analysis of variance, with proportion of trauma-themed goals, self-statements, and SDMs as the dependent variables. Figure 1 shows the means for ratings of trauma-themed self-concept. The multivariate effect of culture was not significant, Wilks's Lambda = .91,  $F(6, 224) = 1.73, p = .12, \eta_p^2 = .04$ . The multivariate effect of PTSD was significant, Wilks's Lambda = .58,  $F(3, 112) = 26.65, p < .001, \eta_p^2 = .42$ . Follow-up univariate analyses revealed that, as hypothesized, compared with the no-PTSD groups, the PTSD groups had a significantly higher proportion of trauma-themed goals,  $F(1, 114) = 28.78, p < .001, \eta_p^2 = .20$ , self-statements,  $F(1, 114) = 46.86, p < .001, \eta_p^2 = .29$ , and SDMs,  $F(1, 114) = 28.78, p < .001, \eta_p^2 = .20$ . The multivariate effect of the interaction was not significant, Wilks's Lambda = .92,  $F(6, 224) = 1.69, p = .13, \eta_p^2 = .04$ . Therefore, regardless of cultural group, participants with PTSD had significantly higher ratings of a trauma-themed self-concept than did those without PTSD.

**Research Question 3: Relationship between AMS and self-concept.** A correlation analysis was used to examine the relationship between AMS and trauma-themed self-concept (as indexed on the TST). We found a significant, negative correlation between the ratings of a trauma-themed self-concept and proportion of specific memories retrieved,  $r(76) = -.27, p = .02$ .

## Discussion

Study 1a investigated the influence of PTSD and culture on global aspects of autobiographical remembering. First,



we found that the individualistic groups provided a significantly higher proportion of specific memories than did the collectivistic group. This supports previous research (e.g., Jobson, 2009b; Wang, 2009) and the proposition that the retrieval of specific autobiographical memories is valued in individualistic cultures, given that they function to differentiate the independent self from others (Wang & Conway, 2004). However, despite this cultural difference, individuals in the PTSD groups, across cultures, provided a significantly lower proportion of specific memories than did those in the no-PTSD groups. Therefore, OGMs seem to be a pan-cultural cognitive marker of PTSD. Second, we found that pan-culturally, the nature of the self-concept can be influenced by trauma. The findings suggest that, again, regardless of one's cultural background, transformations to the existing self-schema may occur posttrauma in an attempt to reduce the inconsistency between the trauma memory and desired goals of the self (Conway, 2005). At a universal level, trauma may dominate much of a PTSD sufferer's life, which results in the trauma experience's becoming highly associated with the self-concept and autobiographical knowledge (Brewin, 2011). Third, we found that the extent to which the self-concept was defined by trauma was significantly associated with difficulties retrieving specific autobiographical memories. This supports the notion that self-concept alterations can result in poorer memory for experiences about one's past (Brewin, 2011). In sum, the findings of Study 1a suggest that PTSD has the potential to result in pan-cultural deficits in global autobiographical remembering.

### Study 1b

Study 1b investigated whether culture and PTSD interact to influence the phenomenological properties of the trauma memory itself. As outlined earlier, cultural influences on autobiographical remembering are considered to operate through language, encoding, organization, and retrieval processes (Conway & Jobson, 2012; Jobson, 2009a). However, the PTSD models suggest that the PTSD trauma memory is encoded using lower-level perceptual processing, is not integrated and contextualized into the autobiographical knowledge base, and is less associated with verbal access, which results in certain disruptions in phenomenological properties (Brewin et al., 1996; Conway, 2005). Consequently, there should be limited opportunities for the expected cultural elaboration and integration of the trauma memory (Jobson, 2009a), and rather similar distortions should be evident. We hypothesized that PTSD would moderate the usual effect of culture on the nature of the trauma memory, thereby resulting in the trauma memory of individuals with PTSD having specific disruptions that would be relatively immune to cultural influences.

In addition, it has been asserted that the proposition made by PTSD models, that trauma memories are fragmented as a result of a lack of integration and contextualization of the PTSD trauma memory, is contradicted by the fact that the trauma memory of individuals with PTSD tends to be highly integrated into the overall life story and self-concept of the person (as found in Study 1a). Such authors have claimed that this contradiction indicates that the trauma memory is in fact too well integrated into the life story and one's identity (Rubin, Boals, & Berntsen, 2008). In response to this, Brewin (2011) claimed that this argument is based on a failure to distinguish between conceptual knowledge and episodic memory; specifically, that it is possible, and often a feature of clinical samples, that the trauma experience dominates much of one's mental life while at the same time one's memories of specific distressing scenes are as far as possible excluded from consciousness and, thus, remain fragmented and disconnected. To examine these claims, we investigated the relationship between trauma-themed self-concept (from Study 1a) and trauma-memory fragmentation.

Therefore, in Study 1b, we addressed the following two research questions: Are there cultural differences in the degree of distortion and disruption in the phenomenological properties of the PTSD trauma memory? What is the relationship between the extent to which the self-concept is trauma themed and the degree of trauma-memory fragmentation?

### Method

**Participants and procedure.** The same participants from Study 1a provided trauma- and negative-memory narratives. After providing these narratives, the British and Iranian participants completed the Autobiographical Memory Questionnaire (AMQ; Rubin, Schrauf, & Greenberg, 2003; and, thus, only these groups were included in Study 1b). The order of the trauma- and negative-memory tasks was counterbalanced. Narratives and the AMQ were provided following the PDS task outlined in the Study 1a section.

**Phenomenological properties.** Participants were asked to think about the trauma event they identified on the PDS and a negative, nontraumatic event (selected as a comparison memory) that had taken place in their lives. To ensure participants engaged with these retrieved memories prior to rating the memories for their phenomenological properties, we asked participants to write about these events "in as much detail as you can. All your writing will be completely confidential. As you write do not worry about punctuation or grammar, just write as much as you can and include thoughts, feelings, reflections, etc." (Jobson, 2011).

To investigate the phenomenological properties of these memories, after each narrative, we had participants complete the AMQ (Rubin et al., 2003). The AMQ measures the concepts considered as those that describe autobiographical memories (Rubin et al., 2003) and has been used in research to sample a wide range of properties of autobiographical memories (e.g., Rubin et al., 2003; Sheen, Kemp, & Rubin, 2001; Talarico & Rubin, 2003). Participants respond to 18 statements about recollection (i.e., reliving and travelling back in time), sensory components of the memory (i.e., visual, spatial, and auditory imagery), language (i.e., the event being remembered in words and coherently), remembering (i.e., a rating of remembering rather than just knowing it happened), fragmentation (i.e., parts of the memory that are missing), belief (i.e., belief in accuracy of the memory), rehearsal (i.e., thinking and talking about the event), emotional valence, and intensity on 7-point rating scales. These separate subscales were used as indices of these different aspects of memory phenomenology. The AMQ has been used in studies with other cultural groups (Rubin et al., 2007) and in studies investigating the properties of trauma memories (Rubin, Feldman, & Beckham, 2004). The AMQ has adequate psychometric properties (Rubin et al., 2003), and in the current study, internal consistency was good (sensory:  $\alpha = .86$ ; language:  $\alpha = .73$ ; recollection:  $\alpha = .79$ ).

## Results

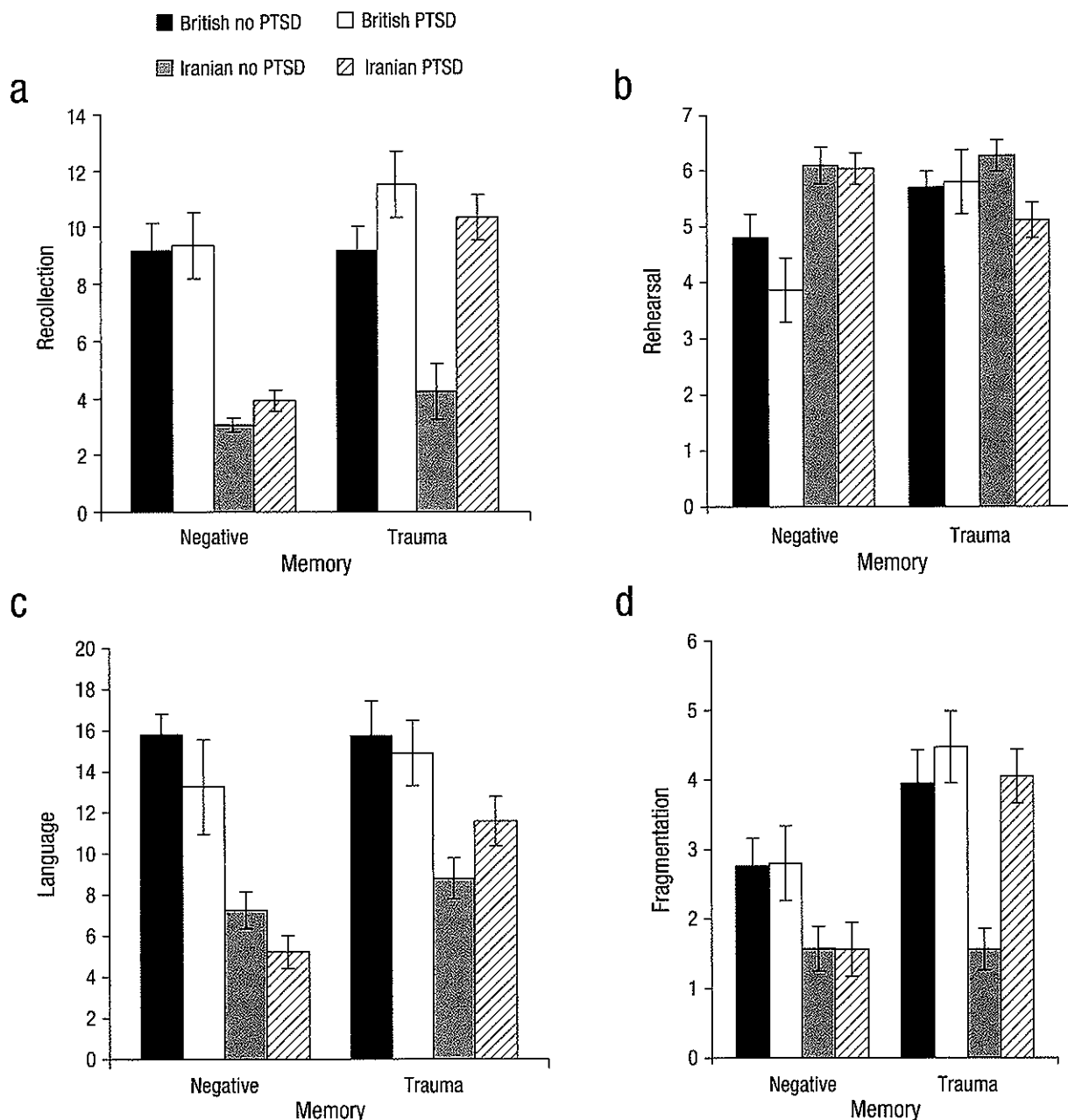
**Research Question 1: Phenomenological properties.** To investigate the influence of culture and PTSD on the phenomenological properties of the PTSD trauma memory, we conducted 2 (Memory: trauma, negative)  $\times$  2 (Culture: British, Iranian)  $\times$  2 (PTSD status: PTSD, no PTSD) mixed ANOVAs, with phenomenological properties (subscales on the AMQ) as the dependent variables. Support for our hypothesis that the presence of PTSD would moderate the usual effect of culture on the nature of the memory of the trauma, but not for other negative personal memories, would be indicated by a three-way interaction between culture, memory type, and PTSD on a given AMQ subscale.

The Culture  $\times$  Memory Type  $\times$  PTSD interactions were significant for the following AMQ variables: recollection,  $F(1, 71) = 3.85, p = .05, \eta_p^2 = .05$ , rehearsal,  $F(1, 70) = 5.85, p = .02, \eta_p^2 = .08$ , language,  $F(1, 70) = 4.44, p = .04, \eta_p^2 = .06$ , and fragmentation,  $F(1, 70) = 4.60, p = .04, \eta_p^2 = .06$  (see Fig. 2 for autobiographical-memory phenomenological properties for each of the four AMQ variables). Follow-up analyses of these interactions showed that for both the trauma and the negative memories, compared with the collectivistic no-PTSD group, the individualistic no-PTSD group

reported higher recollection, fragmentation properties, and language—recollection negative memory:  $t(38) = 6.70, p < .001, d = 2.11$ ; recollection trauma memory:  $t(40) = 4.99, p < .001, d = 1.86$ ; fragmentation negative memory:  $t(38) = 2.74, p < .01, d = 0.88$ ; fragmentation trauma memory:  $t(40) = 4.80, p < .001, d = 1.47$ ; language negative memory:  $t(38) = 9.35, p < .001, d = 1.48$ ; language trauma memory:  $t(40) = 6.02, p < .001, d = 1.82$ . The individualistic no-PTSD group had significantly less rehearsal than did the collectivistic no-PTSD group for the negative memory,  $t(38) = 2.59, p = .01, d = 0.83$ .

For those participants with PTSD, for the negative memory, the individualistic group reported significantly higher properties of recollection,  $t(33) = 5.59, p < .001, d = 2.11$ , fragmentation,  $t(32) = 2.48, p < .02, d = 0.81$ , and language,  $t(32) = 5.72, p < .001, d = 1.61$ , and significantly lower levels of rehearsal,  $t(33) = 3.21, p < .01, d = 1.19$ , than did the collectivistic group. However, for the trauma memory, the individualistic and collectivistic PTSD groups did not differ significantly in terms of recollection,  $t(33) = 0.39, n.s., d = 0.50$ , fragmentation,  $t(33) = 0.89, n.s., d = 0.22$ , language,  $t(33) = 2.37, n.s., d = 0.55$ , and rehearsal,  $t(32) = 1.42, n.s., d = 0.48$ . In addition, we found that the PTSD trauma memory had significantly greater recollection,  $F(1, 150) = 36.37, p < .001, \eta_p^2 = .19$ , and fragmentation,  $F(1, 149) = 29.66, p < .001, \eta_p^2 = .17$ , compared with the other three memories (i.e., PTSD negative, no-PTSD trauma, and no-PTSD negative; we also obtained this result when we examined each cultural group separately).<sup>3</sup>

**Research Question 2: Self-concept and fragmentation.** To investigate Research Question 2, we used a hierarchical multiple regression analysis. This explored the role of PTSD status and fragmentation as predictors (Step 1) of trauma-themed self-concept and fragmentation as a moderator of the relationship between PTSD status (i.e., PTSD vs. no PTSD; included as an interaction term: PTSD  $\times$  Fragmentation) and trauma-themed self-concept (Step 2; Holmbeck, 1997). Fragmentation scores were mean centered prior to the construction of the interaction terms to minimize any problems of multicollinearity and to aid the interpretation of the results (Holmbeck, 2002). A significant amount of variance was accounted for by PTSD status and fragmentation on Step 1 ( $R^2 = .27, p < .001$ ). As expected on the basis of our findings in Study 1a, PTSD status significantly predicted trauma-themed self-concept,  $b = 0.51, SE = 0.11, \beta = 0.50, t(70) = 4.66, p < .001$ . However, there was no support for a predictive relationship between fragmentation and trauma-themed self-concept,  $b = 0.01, SE = 0.03, \beta = 0.06, t(70) = 0.51, n.s.$  The interaction term did emerge as a significant predictor of

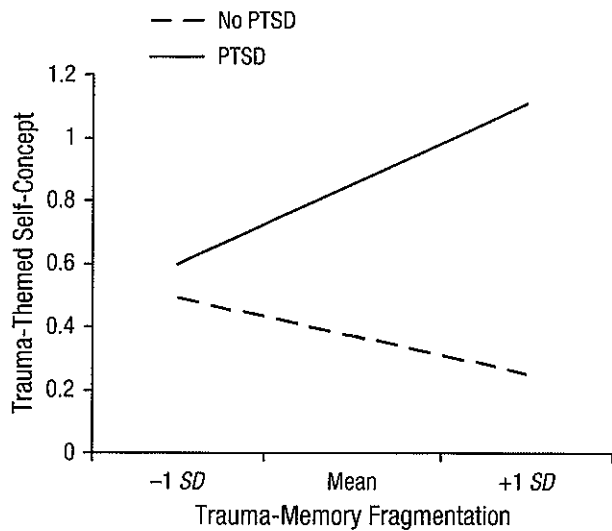


**Fig. 2.** Autobiographical-memory phenomenological properties (negative memory vs. trauma memory) for recollection (a), rehearsal (b), language (c), and fragmentation (d) for the British and Iranian PTSD and no-PTSD groups. PTSD = posttraumatic stress disorder.

trauma-themed self-concept,  $\Delta R^2 = .11$ ,  $b = 0.18$ ,  $SE = 0.05$ ,  $\beta = 0.45$ ,  $t(69) = 3.54$ ,  $p = .001$ . The nature of the interaction was explored in greater detail using the method of simple slopes (Holmbeck, 2002; see Fig. 3 for results). The simple slope was significant for participants with PTSD,  $b = 0.12$ ,  $t(69) = 3.10$ ,  $p < .01$ . The direction of the slope indicates that trauma-themed self-concept tended to be higher at higher levels of fragmentation for this sample. The simple slope was nonsignificant for participants without PTSD,  $b = -0.06$ ,  $t(69) = 1.80$ ,  $p = .08$ .

## Discussion

Study 1b investigated whether culture and PTSD interact to influence the phenomenological properties of the trauma memory (relative to another negative memory). As hypothesized, the results suggested that the PTSD trauma memory is somewhat different in its phenomenological properties. Specifically, for both trauma and negative memories, the individualistic no-PTSD group reported significantly higher recollection, language, and fragmentation properties and significantly less rehearsal



**Fig. 3.** Simple slopes for trauma-themed self-concept of trauma survivors with and without posttraumatic stress disorder (PTSD) at 1 *SD* below the mean, the mean, and 1 *SD* above the mean of self-reported trauma-memory fragmentation.

than did the collectivistic no-PTSD group. For individuals with PTSD, the autobiographical remembering of the negative memory also showed these same cultural differences. These findings illustrate that people from individualistic cultures tend to rate the phenomenological properties associated with their autobiographical memories more highly than do people from collectivistic cultures. This aligns with individualistic cultures' stressing their unique autobiographical memories to a greater extent than do collectivistic cultures, thereby affirming the self as an independent unit (Ross & Wang, 2010). The only property that the collectivistic group scored higher on was rehearsal, which may reflect collective activities' (such as talking to others) being esteemed in collectivistic cultures (Wang, 2001).

However, it is important that there was no support for any cultural differences in recollection, fragmentation, rehearsal, and language for the PTSD trauma memory. The PTSD trauma memory also had significantly greater recollection and fragmentation compared with the other three memory types (i.e., PTSD negative memory, no-PTSD trauma memory, and no-PTSD negative memory). In addition, we found that although participants with and without PTSD, regardless of cultural background, did not differ significantly in terms of remembering, intensity, and sensory properties associated with the negative memory, participants with PTSD had significantly greater remembering, intensity, and sensory ratings associated with their trauma memories than did those without PTSD. These findings support PTSD models' suggestion that there is something unique about the phenomenological properties of the PTSD trauma

memory, given that the properties were culturally similar and contained similar distortions.

In terms of the second aim of Study 1b, trauma-memory fragmentation did appear to moderate the degree to which the self-concept was trauma themed. In trauma survivors with PTSD, higher trauma-memory fragmentation was associated with a greater degree of trauma-themed self-concept. Therefore, our findings support the proposition made by PTSD models that both trauma-memory fragmentation and trauma centrality to self-concept are possible. Specifically, that it is possible for the trauma experience to dominate much of one's mental life while at the same time memories of specific distressing scenes are as far as possible excluded from consciousness and, thus, remain fragmented and disconnected (Brewin, 2011).

### Study 1c

Study 1c investigated whether culture and PTSD interact to influence other aspects of the same trauma- and negative-event memories; in this study, the focus was on indices of their content. As previously outlined, people from individualistic cultures, compared with those from collectivistic cultures, have been shown to have lengthier memories with greater autonomous orientation and less other-focus (Ross & Wang, 2010). It has been suggested that these cultural influences operate through language, encoding, organization, and retrieval processes (Jobson, 2009a). However, as also outlined earlier, the PTSD models suggest that for the PTSD trauma memory, these processes are disrupted (Brewin et al., 1996; Conway, 2005). This should result in potentially limited opportunities for the expected cultural elaboration and integration of the PTSD trauma memory (Jobson, 2009a). Therefore, we hypothesized that we would find the usual cultural differences in the memory-content variables of the negative memories and in the trauma memories of participants without PTSD; however, for the PTSD trauma memory, the content variables would be similar and there would be less of the expected cultural emphasis on autonomy and interdependence.

### Method

**Procedure.** The narratives provided in Study 1b were coded for autonomous orientation and other-self focus. All coding was performed on participants' responses in their original language and was based on a scheme that has been tested extensively in previous studies and has been accepted as a valid method for the measurement of the influence of self-construal on autobiographical remembering (e.g., Jobson & O'Kearney, 2008b; Wang, 2001; Wang & Conway, 2004).

**Autonomous orientation.** Participants' tendency to express self-determination and autonomy in their memories was indexed using the autonomous-orientation variable. The number of occurrences of the following instances was counted and combined to produce an autonomous-orientation score for each participant: (a) personal needs, desires, or preferences; (b) personal dislikes or avoidance; (c) personal evaluations, judgments, or opinions regarding other people, objects, or events; (d) retaining control over one's own actions and resisting group or social pressure; and (e) personal achievement or competency.

**Other-self ratio.** The other-self ratio has been used as an index of the degree to which participants provide nonegotistic memories and, thus, their social orientation. To obtain the other-self ratio, we counted the number of times participants mentioned other people and themselves in their memories. An other-self ratio was calculated for each participant by dividing total "other" by total "self" mentions.

**Reliability.** Australian, British, and Iranian researchers, one from each background, coded the data. Discussions were conducted to ensure that the same definitions were applied to the three data sets. An independent coder, who was a trained Farsi-English bilingual researcher for intercoder reliability estimates, coded 20% of each data set. Raters were blind to hypotheses, and discrepancies were resolved through discussion. Interrater reliability was good ( $r = .88$ ).

## Results

Table 1 shows means for the memory-content variables. In terms of length of the memories, only the Memory Type  $\times$  Culture interaction was significant,  $F(2, 113) = 8.90, p < .001, \eta_p^2 = .14$ . The individualistic groups, compared with the collectivistic group, had significantly longer memories—negative:  $t(117) = 4.26, p < .001, d = 0.95$ ; trauma:  $t(118) = 5.03, p < .001, d = 1.11$ . Trauma memories were also significantly longer than the negative memories—individualistic:  $t(80) = 6.14, p < .001, d = 0.66$ ; collectivistic,  $t(37) = 6.90, p < .001, d = 0.90$ . To partial out the possible influence of baseline differences in memory length, we included length as a covariate.

To investigate the influence of culture and PTSD on the memory-content properties of the trauma memory, we conducted 2 (Memory: trauma, negative)  $\times$  3 (Culture: Australian, British, Iranian)  $\times$  2 (PTSD status: PTSD, no PTSD) mixed analyses of covariance, with memory-content properties as the dependent variables and length of memories as a covariate. As in Study 1b, support for our hypothesis that the presence of PTSD would moderate the usual effect of culture on the memory content of

the trauma memory, but not for other negative personal memories, would be indicated by a three-way interaction between culture, memory type, and PTSD. Contrary to our hypothesis, across our coding domains, the Culture  $\times$  Memory Type  $\times$  PTSD interactions were nonsignificant.

**Other-self ratio.** Only the culture main effect was significant,  $F(2, 112) = 13.15, p < .001, \eta_p^2 = .19$ ; the individualistic groups had significantly less other-focus in their memories than did the collectivistic group,  $F(1, 116) = 18.50, p < .001, \eta_p^2 = .14$ .

**Autonomous orientation.** Only the PTSD  $\times$  Culture interaction was significant,  $F(2, 112) = 3.46, p = .04, \eta_p^2 = .06$ . The individualistic no-PTSD groups had significantly greater autonomous orientation in their autobiographical remembering than did the collectivistic no-PTSD group,  $F(1, 63) = 15.75, p < .001, \eta_p^2 = .20$ . However, the PTSD groups did not differ significantly,  $F(1, 49) = 4.18, n.s., \eta_p^2 = .08$ . The PTSD groups contained significantly less emphasis on autonomy and agency in their remembering than did the no-PTSD groups—individualistic:  $F(1, 78) = 15.69, p < .001, \eta_p^2 = .17$ ; collectivistic:  $F(1, 35) = 8.09, p < .01, \eta_p^2 = .18$ .

## Discussion

Study 1c investigated the memory-content variables of the PTSD trauma memory. We found no evidence to suggest that the PTSD trauma memory was different in terms of its memory-content variables. Rather, we found similar cultural differences in the negative and trauma memory-content variables; participants from collectivistic cultures had shorter, less egocentric memories compared with the individualistic groups. We did, however, find that PTSD and culture interacted to influence autonomous orientation in overall autobiographical remembering; although the individualistic no-PTSD groups, compared with the collectivistic no-PTSD group, had the expected higher levels of autonomous orientation in their autobiographical remembering, the PTSD groups did not significantly differ. In addition, we found that individuals with PTSD had less autonomous orientation in their overall autobiographical remembering than did those in the no-PTSD groups. These findings suggest pan-cultural influences of PTSD on expressions of self-determination and autonomy in autobiographical remembering. This may indicate a threatened sense of autonomy after trauma in individuals with PTSD (Herman, 1992; O'Kearney & Perrott, 2006).

## General Discussion

This research investigated the influence of culture and PTSD on autobiographical remembering. There were

three main findings. First, we found pan-cultural deficits and distortions in the global autobiographical remembering of participants with PTSD. Study 1a showed that participants with PTSD retrieved significantly fewer specific memories and significantly more trauma-themed personal memories than did those without PTSD. Second, in Study 1b, we found evidence that suggests that the PTSD trauma memory was different in terms of its phenomenological properties. Specifically, cultural differences were evident in the phenomenological properties of the negative and trauma memories of participants without PTSD. However, for participants with PTSD, although these cultural differences were still evident in their negative memories, there were cultural similarities in the phenomenological properties (i.e., recollection, language, fragmentation, and rehearsal) of the trauma memories. In addition, the PTSD trauma memory had significantly greater recollection and fragmentation compared with the other memory types, and participants with PTSD, regardless of culture, reported greater sensory and remembering properties for the trauma memory than did those without PTSD. The third main finding was that there was no evidence to suggest that PTSD moderated the usual effect of culture on the memory-content variables of the trauma memory. Rather, participants with PTSD pan-culturally had fewer expressions of self-determination and autonomy in their autobiographical remembering than did those without PTSD (Study 1c).

A question that arises from these latter two findings concerns why the PTSD trauma memory is unique in terms of its basic phenomenological properties but not in terms of its memory-content variables. In response to this, it is worth considering how memory representations of events are connected to their associated memory narratives (Gauer, Alencastro, & Gomes, 2010). Although most accounts assume that the way narratives are recounted resembles the way events are represented in memory, the little research that has investigated the relationship between the subjective, phenomenological qualities of memories and the narrative aspects of reporting autobiographical memories has tended to find few relationships between the two (Gauer et al., 2010). Therefore, in the current study, the narratives and the AMQ may be capturing different elements of autobiographical remembering. Providing a narrative requires participants to present a qualitative, free-response account of what happened; it is the reporting of autobiographical memories. Cultural variations in self-construal have been shown to characterize and shape the reporting of autobiographical memories since its development in early childhood (e.g., Han, Leichtman, & Wang, 1998). Thus, by adulthood, one holds a dominant narrative structure, which aligns with local habits relevant to personal remembering and general rules of social interaction (Han et al., 1998). Therefore,

it is not all that surprising that when individuals with PTSD are asked to recall these experiences in their native language, these dominant narrative structures are employed. The phenomenological properties, however, are the subjective, phenomenological qualities of the memories experienced by the individual when recalling the memories. They reflect how individuals assess and experience their memories and, thus, the properties may reflect the distortions and disruptions in the properties of PTSD trauma memory experienced by the PTSD sufferer. In addition, such properties are perceived to be the products of component processes, with each process occurring in a separate behaviorally and neurally defined system (see Rubin, 2006). Therefore, it is possible that for individuals with PTSD, these neural and behaviorally defined systems may be affected, thereby resulting in similar distortions.

The research reported here is some of the first to integrate PTSD theories with current cross-cultural understandings of autobiographical remembering. With regard to theory, this is an important step, given that autobiographical memory has a central focus in the prominent theoretical models of PTSD (e.g., Brewin et al., 1996; Dalgleish, 2004; Ehlers & Clark, 2000), and although culture has been shown to profoundly influence autobiographical remembering (Jobson, 2009a), there has been very little consideration of this literature in these formulations. The findings suggest the cross-cultural applicability of the following three assertions made by the PTSD theories: PTSD trauma memories are different from other forms of autobiographical memories, global autobiographical remembering is affected, and self-concept can become altered and dominated by thoughts and memories of the trauma (Brewin, 2011).

First, PTSD models suggest that PTSD trauma memories are different from other forms of autobiographical memories. They explain the compromised voluntary access to coherent accounts of the trauma by suggesting that there is a breakdown in everyday processes; high levels of stress alter the operation of autobiographical memory (Brewin, 2011). Specifically, the trauma memory is disconnected from contextual information that normally associates a sensory memory with time, place, and other autobiographical memories. Consequently, retrieval strategies based on higher meaning are difficult to use, which results in problematic intentional recall (Conway & Pleydell-Pearce, 2000). The cross-cultural literature has suggested that cultural influences on autobiographical remembering operate through language, encoding, contextualization, organization, and retrieval processes (Conway & Jobson, 2012; Jobson, 2009a; Wang & Conway, 2004). When integrating these two bodies of literature, a lack of contextualization and integration of the PTSD trauma memory should result in cultural influences'

being reduced and autobiographical remembering distortions' being culturally similar.

In support of this, we found that although cultural differences were evident in the phenomenological properties of the memories of participants without PTSD and for the negative memories of those with PTSD, there were cultural similarities in the phenomenological properties of the PTSD trauma memory. Trauma-focused therapies, which are derived from these PTSD models, target the trauma memory in attempts to elaborate and integrate the memory (Ehlers & Clark, 2000). Given our findings, such interventions may be warranted in individuals from collectivistic cultures. In support of such interventions, some research has demonstrated that exposure-based therapies are effective cross-culturally (Paunovic & Ost, 2001). However, a question arises: Does memory integration of people from collectivistic cultures need to differ from that of people from individualistic cultures, given that other autobiographical memories culturally differ in content and organization?

Second, researchers have theorized that for individuals with PTSD, global autobiographical remembering is also affected. Individuals with PTSD are proposed to have reduced AMS, given that an OGM retrieval style develops as a cognitive avoidance strategy in response to distressing memories of the traumatic experience (Williams et al., 2007). However, cross-cultural research has demonstrated that specific autobiographical memories are emphasized in individualistic cultures because they function to differentiate the self from others, whereas general memories tend to be emphasized in collectivistic cultures because they generally feature social relations and conventions (Ross & Wang, 2010). Our findings suggest that individuals with PTSD from both cultural groups have reduced AMS, which suggests that even in collectivistic cultures, in which AMS is less emphasized, individuals with PTSD may be making similar attempts at avoidance.

Moreover, cognitive models of autobiographical memory claim that individuals hold conceptual knowledge about the self that influences, and is influenced by, the retrieval of episodic memories (Conway, 2005). Trauma has the potential to threaten perceived self-agency (Herman, 1992; O'Kearney & Perrott, 2006). Given that the self encodes, organizes, and retrieves autobiographical memories, our finding that overall autobiographical remembering of participants with PTSD contained fewer expressions of self-determination and autonomy may indicate these threats to self-agency. Furthermore, because autobiographical remembering, in turn, develops, expresses, and maintains the self (Wang & Conway, 2004), the continuous recall of memories that lack autonomy may result in internal threat to the self, thereby maintaining PTSD symptoms (Ehlers & Clark, 2000).

Third, the self-concept of individuals with PTSD can become dominated by thoughts and memories of trauma. Thus, in the aftermath of trauma, the trauma memory of individuals with PTSD, regardless of cultural background, may not align with the desired goals of the self-concept and may be hard to integrate with previously held assumptions about the self and the world. Consequently, the trauma becomes central to people's mental life as they struggle to resolve these discrepancies, which results in the trauma's becoming highly associated with the self-concept (Brewin, 2011). Negative changes in self-concept have been shown to predict a poorer response to exposure in patients receiving treatment (Ehlers et al., 1998). Thus, the findings highlight the importance of considering self-concept in PTSD interventions. However, it is potentially important that such interventions consider the influence of trauma on not only private aspects of self but also public and communal aspects, as well as the influence of culture on self-concept.

"Culture" encompasses a broad range of values, belief systems, behaviors, and social structures (Cohen, 2009). In the current study, individuals were from different nationalities that have been shown to be either individualistic (Britain and Australia) or collectivistic (Iran; Hofstede et al., 2010). These groups differed significantly in terms of proportion of independent self-statements provided on the TST, which, according to Wang (2001), is "a test widely used to assess variation in the organization and salience of self-information across cultural groups . . . and is regarded as a reliable measure for indexing the cultural construal of self in the dimension of independence-interdependence" (p. 222). In addition, researchers who have similarly studied autobiographical remembering have accounted for differences in the content and structure of the memories in terms of cultural differences in self-construal (Ross & Wang, 2010). However, although this approach has been used in a large proportion of research, it has its limitations; it assumes that these proxies for individualism-collectivism are stable over time, accurate across life domains, and relevant to individual assessment (Oyserman, Coon, & Kemmelmeier, 2002). Moreover, the groups selected differ on a broad range of other cultural dimensions, which may have influenced findings. Therefore, a next step for future research is to investigate the influence of explicitly measured cultural variables at the individual level (e.g., using a portfolio of self-construal, acculturation, and other measures) and to correlate this assessment with individual outcomes. This would allow for greater clarification concerning the influence of culture on the development and maintenance of PTSD.

Another avenue for future research is to adopt an approach, based on social-cognition research, which

involves priming independent/interdependent self-orientation prior to assessing their effect on the dependent variables reported in this research, thus attempting to create an experimental analogue-type approach (Osyerman et al., 2002) to investigating the influence of self-construal on the autobiographical remembering of trauma. Finally, research has demonstrated that cultural differences in self-construal influence many other psychological processes (e.g., appraisals, information processing, emotion) central to PTSD (Jobson, 2009a). Therefore, future research should also be extended to consider these processes.

Additional shortcomings of the current research include the following. First, our samples were modestly sized; however, they were suitably powered. Second, given that this was the first research to investigate these issues using a cross-country design, we used the PDS as a measure of PTSD. Although the PDS has good convergent validity with the Structured Clinical Interview, future research should use a structured clinical interview to derive formal diagnoses. Third, trauma experience may have influenced findings. However, there were no group differences in trauma exposure, traumas in all groups were predominately car accidents, and the findings were equivalent when only car-accident trauma survivors were included in the analyses. Future research would benefit, however, from more closely matched trauma experiences (e.g., comparing memories of individuals from different cultural groups who have undergone the same trauma experience). Finally, the cross-sectional design precludes causal inferences. In summary, the findings suggest that the autobiographical remembering of individuals with PTSD appears to be culturally similar in terms of disruptions and distortions.

### Author Contributions

L. Jobson developed the study concept. All authors contributed to the study design. L. Jobson, A. R. Moradi, and V. Rahimi-Movaghar collected the data. L. Jobson conducted the primary analyses and drafted the initial version of the manuscript, which was revised by A. R. Moradi, T. Dalgleish, and M. A. Conway. All authors approved the final version of the manuscript for submission.

### Declaration of Conflicting Interests

The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

### Funding

L. Jobson is funded by a Postdoctoral Research Fellowship award from the National Institute for Health Research (NIHR). This article presents independent research funded by the NIHR. The views expressed are those of the authors and not

necessarily those of the National Health Service, the NIHR, or the Department of Health.

### Notes

1. The verbally accessible memory system more recently has been referred to as contextual memory (C-memory), which is abstract, and its contextually bound representations are known as C-reps. Similarly, the situationally accessible memory system has more recently been referred to as low-level sensation-based memory (S-memory), and its corresponding representations are called S-reps (see Brewin, Gregory, Lipton, & Burgess, 2010, for further details).
2. To control for potential influence of varying trauma types, we also conducted the analyses using only car-accident trauma survivors. A similar pattern of results emerged.
3. In addition, the Memory Type  $\times$  PTSD interactions were significant for remembering,  $F(1, 71) = 10.18, p < .01, \eta_p^2 = .13$ , intensity,  $F(1, 70) = 6.43, p = .01, \eta_p^2 = .08$ , and sensory properties,  $F(1, 70) = 18.37, p < .001, \eta_p^2 = .21$ . Follow-up analyses showed that for the negative memory, there was no significant difference between PTSD and no-PTSD groups in terms of remembering (PTSD:  $M = 3.75, SD = 1.43$ ; no-PTSD:  $M = 4.12, SD = 0.85$ ), intensity (PTSD:  $M = 3.48, SD = 1.65$ ; no-PTSD:  $M = 3.35, SD = 1.44$ ), or sensory detail (PTSD:  $M = 17.67, SD = 5.84$ ; no-PTSD:  $M = 18.36, SD = 4.82$ ). However, for the trauma memory, individuals with PTSD reported significantly greater remembering ( $M = 5.21, SD = 1.78$ ),  $t(75) = 2.16, p = .03, d = 0.64$ , intensity ( $M = 4.84, SD = 1.81$ ),  $t(75) = 2.79, p < .01, d = 0.33$ , and sensory ( $M = 26.07, SD = 6.48$ ),  $t(75) = 4.15, p < .001, d = -1.05$ , ratings than did those without PTSD (remembering:  $M = 4.17, SD = 1.47$ ; intensity:  $M = 3.48, SD = 1.70$ ; sensory:  $M = 19.62, SD = 6.34$ ).

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