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Memory and Narrative of Traumatic Events: A Literature Review

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This study presents a literature review of 22 studies published since 2004 that use linguistic procedures to evaluate narratives by persons who had suffered any traumatic event. The aim is to analyze the features of traumatic memories and, thus, how individuals construct and integrate their recall of what happened with other autobiographical memories. It uses cognitive theoretical models of posttraumatic stress disorder (PTSD) and their hypotheses about trauma memories as a framework. Findings reveal that trauma narratives are dominated by sensorial/perceptual and emotional details. The study of other narrative aspects (i.e., fragmentation, length, temporal context, and references to self) provides heterogeneous results. Results are discussed in light of the current state of PTSD research, exploring the principal hypotheses that have been proposed in cognitive theories to explain clinical findings.

Keywords: posttraumatic stress disorder (PTSD), trauma narrative, autobiographical memory, linguistic measure

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Research into posttraumatic stress disorder (PTSD) has focused on how individuals construct and integrate their recall of traumatic events with other autobiographical memories (e.g., memory about "my wedding day" or "my graduation test"). According to cognitive theories of PTSD, the emergence of psychological symptoms depends on whether the traumatic representation has been successfully assimilated and reconciled with the prior autobiographical information (Brewin, Dalgleish, & Joseph, 1996; Ehlers & Clark, 2000) or with the basic assumptions or preexisting schemata about the world and oneself (Janoff-Bulman, 1992). Therefore, several authors assume that traumatic memories in PTSD remain disjointed from other autobiographical memories (Foa, Molnar, & Cashman, 1995; Kleim, Wallott, & Ehlers, 2008). Based on this approach, it has been claimed that *special mechanisms*, such as peritraumatic dissociation, are involved in trauma memories, leading to processing failures (see Rubin, Boals, & Berntsen, 2008). Foa and Riggs (1993) explain that strong anxiety during encoding might result in disorganized memories that cannot readily be recovered. From a neuroanatomical view, failures in the functioning of structures such as the hippocampus and the frontal lobe could be involved in alterations of declarative memory (Bremner, Krystal, Southwick, & Charney, 1995).

On the other hand, a sense of reliving or *flashbacks* is a common feature of memory in PTSD. Flashbacks are involuntary memories that are triggered by perceptual cues and are dominated by vivid sensorial details. Theoretical models of PTSD have attempted to explain the relationships between *voluntary* and *involuntary* memories. Brewin et al. (1996) differentiate two memory systems that operate in parallel: (a) a *verbally accessible memory* (VAM) system and (b) a *situationally accessible memory* (SAM) system. The first one comprises voluntary memories that are integrated with other autobiographical memories, whereas the SAM system contains nonverbal information without a temporal context whose access is automatic. Thus, a premature inhibition of emotional processing can occur in PTSD, leading to enhanced encoding of SAM and reduced encoding of VAM. Ehlers and Clark (2000) conclude that processing during trauma may be predominantly *data-driven* (or *bottom up*) rather than *conceptual* (*top down*). Data-driven processing results in poor and fragmented memories dominated by sensory impressions. Due to isolation of trauma memories, an inability to establish a *self-referential perspective* (i.e., first-person perspective) and a temporal continuity (i.e., ordering events within a past context) is usual in PTSD.

Since it is not possible to recreate traumatic conditions in a laboratory, *narrative studies* are used as the main option to access the content of memories. Aiming to collect all of the narrative research conducted to date, O'Kearney and Perrott (2006) reviewed studies published from 1995 to 2004 that focused on the nature of trauma narratives in PTSD using either linguistic indices or self-rated measures. Results were classified based on whether they reported information about (a) sensory/perceptual and emotional language or conceptual/cognitive words (i.e., words indicating causal and insightful thinking); (b) narrative disorganization or fragmentation; (c) disruptive temporal context; and (d) nature of references to self. These authors found that traumatic narratives were dominated by sensorial/perceptual/emotional details. Sensorial aspects were particularly common in persons with strong dissociation and in descriptions of flashbacks. Van der Kolk and Fisler (1995) argue that traumatic memories are initially stored as

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sensory fragments that represent nonintegrated aspects of the event. Over time, the individual must construct a coherent narrative that explains what happened to him or her. On a related note, it is predicted that PTSD subjects will construct shorter trauma narratives because unconscious repression could occur that prevents explicit memory associations (see van der Kolk & Fisler, 1995). Foa et al. (1995) added that treatment could produce longer narratives of the event, perhaps reflecting a decrease in the patient's anxiety together with an increased ability to engage in the trauma processing.

Nonetheless, O'Kearney and Perrott (2006) noticed that not all cognitive hypotheses had sufficient support. Although evidence suggests that traumatic narratives by PTSD patients are disorganized and organized thoughts are increased in posttreatment narratives, the limitations and contradictions in the studies prevented definitive conclusions. Similarly, some studies pointed out that trauma narratives tend to show disturbances in event time, with high levels of present tense or spontaneous shifts from past to present, but these results were not consistent. Regarding the nature of self-perspective, only Klein and Janoff-Bulman (1996) examined this issue by employing linguistic measures. They found a deficient use of first-person pronouns in narratives of child abuse survivors, which could reflect a tendency to emphasize other persons versus themselves in their own history. Unfortunately, it does not provide sufficient evidence for an impoverishment in self-referential perspective.

In addition to the paucity of studies, O'Kearney and Perrott (2006) reported that the inconclusive findings were primarily due to the lack of agreement about the operationalization and measurement of different narrative aspects, such as fragmentation. Fragmentation was often defined as a function of the number of repetitions, unfinished utterances, and speech fillers in the report, according to the model by Foa et al. (1995). However, not all of the authors valued these elements, and while some considered fragmentation and disorganization synonymous, others differentiated both concepts. O'Kearney and Perrott (2006) identified two dimensions of fragmentation, *cohesion* (connectedness) and *coherence* (conceptual organization), and noted the need of taking this distinction into account in the future. Other suggestions that stem from this revision refer to the need to consider the particular features of the population and of the traumatic experience (e.g., severity, distance in time, chronicity), to value the relationships between narrative aspects and other types of symptomatology (e.g., depressive symptoms), and, above all, to properly integrate the results into existing models.

Following this trail, the present study aims to update O'Kearney and Perrott's (2006) review. Essentially, the goal is to carry out a review of the empirical studies published since 2004 that analyze trauma narratives using linguistic procedures in order to explore (a) whether the principal cognitive hypotheses of PTSD have found sufficient empirical support and (b) whether the theoretical and methodological limitations identified by O'Kearney and Perrott (2006) have been overcome. For these purposes, results will be organized according to the main narrative characteristics studied to date: (a) fragmentation or disorganization, (b) length, (c) emotional and sensory/perceptual aspects, (d) temporal context, and (e) references to self. In accordance with cognitive models and O'Kearney and Perrott's (2006) results, it is expected that recent studies will support the hypothesis that trauma memories depend on special mechanisms by revealing differences between trauma narratives and narratives of other events in PTSD versus non-PTSD patients (i.e., trauma narratives in PTSD will show high fragmentation, short length, abundance of sensory details and emotions, and alterations in the narrator's temporal sense and sense of self). Likewise, it is expected that these studies will include some variables that have rarely been studied to date (e.g., death or dissociative words, time distance from the event, depression symptoms) and that could have an important impact on results.

Method

Search Strategy

The search was performed in the PsycINFO, MEDLINE, and PILOTS databases, using the keywords *narrative*, *autobiographic memory*, and *autobiographical memory*, combined with *posttraumatic* and *PTSD*. The reference lists from identified articles were also manually searched. The search focused on empirical studies that assessed trauma narratives by subjects with PTSD symptoms and that employed linguistic procedures; works that made use of cue words to retrieve memories were excluded to avoid directed narrative analyses. In addition, unlike O'Kearney and Perrott (2006), studies that valued narrative therapies (or written disclosure as psychological intervention) were also excluded. To select the contributions after O'Kearney and Perrott's (2006) review, only articles published after 2004 were considered.

Results

Characteristics of the Studies

Table 1 summarizes chronologically the 22 studies selected. As shown, most studies employed a cross-sectional design, and seven collected follow-up data. Typically, the studies compared two groups: PTSD and non-PTSD (or trauma vs. control); one study included a panic disorder (PD) group; one study included two groups classified by trauma nature (perpetrated vs. accidental); and two performed intercultural comparisons. Internarrative analyses were also conducted by comparing narratives about trauma with narratives about other life events. The sample size ranged from 5 to 177 subjects, with a total sample of 1,556. Their ages fluctuated, with a greater representation of ages around 20–30 years. Participants were mostly women, probably because they are commonly victims of certain traumatic experiences (e.g., assaults); the proportion of men was only higher in studies focused on combat situations and prisoners. A broad range of traumatic events were included: terrorist attacks (3), interpersonal violence or abuse (2), perpetration of violent crimes (1), traffic accidents (1), military training accidents (1), potentially traumatic experiences in nursing or midwifery (1), admission to the intensive care unit (ICU) (1), and experiences of childbirth for first-time mothers (1). Eleven studies involved individuals exposed to different traumatic experiences.

To collect the narratives, the most frequent procedure was recording and transcription (following Foa et al., 1995, participants were instructed to tell the story as vividly as possible, including details, thoughts, and feelings), although in eight studies, narra-

tives were requested in writing. One study (Tuval-Mashiach et al., 2004) used a semistructured questionnaire with open-ended questions. Self-report inventories were employed to assess PTSD symptoms and sometimes to assess individual beliefs about trauma memory. Nine studies applied the Linguistic Inquiry and Word Count (LIWC) by Pennebaker and Francis (1999) to measure the report length and the percentage of words in the text belonging to distinct semantic categories. O'Kearney, Hunt, and Wallace (2011) included the program Latent Semantic Analysis (LSA) to assess organization. It records the semantic similarities between two texts (in this case, the narrative of the traumatic event and of a related event).

Narrative disorganization/fragmentation. Jones, Harvey, and Brewin (2007) asked 131 traffic accident survivors (some with traumatic brain injury [TBI]) who suffered from acute stress disorder or PTSD to talk about the day of their accident following Foa et al.'s (1995) instructions. Four disorganization constructs were assessed based on the coding system by Foa et al. (1995) and the later adaptation by Halligan, Michael, Clark, and Ehlers (2003): (a) *repetitions*, (b) *nonconsecutive chunks*, (c) expressions of *confusion* (uncertainty with regards to memory), and (d) *global coherence* (also called *global organization*) of the report (on a 10-point scale ranging from 0 [*extremely coherent*] to 10 [*extremely incoherent*]). Regression analyses showed that repetitions, nonconsecutive chunks, and coherence at 1 week predicted PTSD severity 3 months after the event. Additional analyses indicated that nonconsecutive chunks and repetitions had the greatest impact on results, explaining 11% and 4% of the variance, respectively. More confusion was observed in participants with TBI.

Buck, Kindt, van den Hout, Steens, and Linders (2007) also separately evaluated disorganization at utterance level and global coherence in 29 persons who had been admitted to the ICU. More organized thoughts were related to fewer PTSD symptoms ($r = -.44$) at 4 months posttrauma. In contrast, incoherence did not predict PTSD, although it did predict the development of depressive symptoms ($r = .33$). Using the same measures, Evans, Ehlers, Mezey, and Clark (2007) assessed disorganization in 105 prisoners who had perpetrated violent crimes. Forty-six percent of them reported distressing intrusive memories. Participants with intrusions showed greater disorganization of the assault narratives than the nonintrusion group, as indexed by utterance level scores and the global coherence rating ($p = .001$). Jelinek, Randjbar, Seifert, Kellner, and Moritz (2009) found, for the global coherence rating, that trauma memories were more disorganized in 26 persons with PTSD than in 55 without PTSD ($p = .02$). The effect of variables such as verbal intelligence was controlled. At utterance level, trauma narratives also tended to be more disorganized in PTSD, although results were not significant. However, there were no differences between groups in their nonautobiographical memories (free recall for three stories designed for this task). Further, the PTSD group rated their memories as more disorganized than the non-PTSD group. In a later experiment, Jelinek et al. (2010) added that unfinished thoughts increased when the PTSD group described the worst moment of trauma.

Hagenaars, van Minnen, and Hoogduin (2009) compared disorganization in trauma narratives by 21 PTSD patients with the panic-related memories from 25 PD patients. Disorganization was evaluated by the rater using an 11-point scale developed ad hoc (from 0 [*absent*] to 100 [*very much present*]). Data revealed that fragmentation was also present in the panic memories, with no significant differences between the two groups.

Contrary to the fragmentation hypothesis, Bennett and Wells (2010) found that disorganization (at utterance level) did not account for the variance in PTSD symptoms in 95 student nurses and midwives exposed to potentially traumatic experiences. Rumination processes played a more important role, mediating the relationship between beliefs about trauma memory and intrusive symptoms. In addition, Rubin (2011) did not find a relationship between three measures of narrative incoherence (*comprehension* as global coherence; the participant's own rating of coherence; and coherence as *context*, *temporal ordering*, and *theme* measures) and PTSD in 30 undergraduates. Also, there were no differences in coherence between traumatic and nontraumatic narratives. Although narratives by PTSD persons were more disorganized, the means for global disorganization measures were insignificant.

O'Kearney et al. (2011) showed an association between a low use of causal connections in memories and trauma-related avoidance ($r = .33$) in 47 trauma-exposed adults, a relationship that was not observed when considering overall PTSD symptoms. The only measure of disorganization that was correlated with the overall symptom severity was that provided by the own subject on a self-reported instrument ($r = .42$). Briddon, Slade, Isaac, and Wrench (2011) evaluated the disorganization evolution of childbirth narratives by 122 new mothers (some with PTSD symptoms). Self-reported disorganization at 6 weeks postpartum was associated with PTSD ($r = .27$) and specific responses to trauma (avoidance and intrusion) ($r = .36$) at that time point. However, there was no relation between a disorganized narrative within the first few days and self-reported disorganization and PTSD.

In a different way, Follmer Greenhoot, Sun, Bunnell, and Lindboe (2013) obtained a *narrative structure* factor, which included context and chronology indices that usually define narrative coherence, as well as the setting of the event. Although narrative structure was inversely related to both depression and PTSD in a sample of 177 undergraduates (with and without abuse experiences), other narrative aspects, such as references to the positive impact of the event, provided the best prediction for psychological adjustment. Finally, Römisch, Leban, Habermas, and Döll-Hentschker (2014) compared data from 14 traumatized (with a clinical diagnosis of PTSD) and nontraumatized women. Participants were asked to narrate their most distressing, most angering, and happiest event. Results showed that unfinished utterances tended to be frequent in distress narratives but that there were no significant differences between groups.

Altogether, results do not allow for definitive conclusions regarding the fragmentation hypothesis for traumatic memories; the problems identified in the 2006 review remain. Nonetheless, despite the heterogeneity of measures, new studies have underlined two fundamental fragmentation dimensions: (a) *disorganization*, encompassing specific structural elements and (b) *incoherence*, which offers a global index of the degree to which the report is weakly articulated or incomprehensible; this depends on the contextual and personal information provided. Table 2 comprises the most common approaches to both constructs as well as their most typical measures. As can be observed, disorganization and coherence sometimes overlap. The concept of global disorganization (also, in fact, called global incoherence) illustrates the fine line between the two constructs.

The fragmentation index used in the different studies affects outcomes. Although results tend to highlight the relationship between narrative disorganization and PTSD, the use of utterance level measures provided inconclusive evidence for the fragmentation hypothesis. Similarly, both the use of the global coherence scale and the assessment of coherence as comprehension have led to contradictory results. Self-reported disorganization has been associated with PTSD symptoms, although studies that measure it are scarce, because priority was given to linguistic procedures. On the other hand, according to O'Kearney and Perrott's (2006) suggestions, some studies have included tracking measures that enable the analysis of the relationship between changes in narrative organization and the PTSD evolution. Likewise, the study of the association between disorganization and PD or depressive symptoms suggests that this characteristic might not be exclusive to PTSD.

Narrative length. In general, a tendency toward longer reports was observed when participants described traumatic events compared with other life events (Beaudreau, 2007; Jelinek et al., 2009; Lindblom & Gray, 2010; O'Kearney et al., 2011; Römisch et al., 2014). The narrative length decreases over time (D'Andrea, Chiu, Casas, & Deldin, 2012; Dekel & Bonanno, 2013).

Beaudreau (2007) noted that longer trauma narratives among 104 community-dwelling adults were associated with better adjustment (lower distress scores) ($r = -.26$). Lindblom and Gray (2010) added that avoidance symptoms predicted trauma narrative word count in 88 victims of perpetrated traumas (in which a violation of trust occurs, as sexual abuse) and accidental ones ($p = .05$). Other studies (e.g., D'Andrea et al., 2012), however, did not support these results. Comparing narrative length of single traumas to repeated ones in 28 violence victims, Freer, Whitt-Woosley, and Sprang (2010) found no significant differences. Likewise, there were no differences between narratives of traumas experienced in childhood and in adulthood.

The 2006 review did not consider narrative length; therefore, no comparisons could be made. Although available data do not allow for confirmation of the relationship between PTSD and shorter reports, studies show significant differences in length between trauma and nontrauma narratives. Thus, long trauma narratives could reflect the need for the person to elaborate on what happened, which would favor positive adjustment. Contrary to this, and according to Lindblom and Gray's (2010) results, short narratives might indicate avoidance mechanisms associated with the development of PTSD.

Emotional and sensory/perceptual aspects. Using LIWC, Eid, Johnsen, and Saus (2005) found that negative emotional expressions by 120 soldiers exposed to training accidents explained part of the variance in posttraumatic symptoms at 2–3 weeks (6–8%) and in distress symptoms at 4 months (11%) after trauma. Positive emotional expressions were associated with better adjustment.

Buck et al. (2007) assessed the degree to which the narrative utterance units were perceptual or conceptual representations, noting that the former predicted PTSD ($r = .46$) and depression symptoms ($r = .57$) at 4 months. Similarly, the results obtained by Jones et al. (2007) and Beaudreau (2007) indicated that a larger number of sensory/perceptual words in trauma narratives was related to PTSD. Trauma narratives contained more sensory words than positive and neutral ones, and narratives with more body states and symptom references were associated with poorer adjustment ($r = .25$) and PTSD symptoms ($r = .27$) (Beaudreau, 2007). Persons with PTSD included more dissociative content in their narratives both immediately after the event ($p < .001$) and 3 months later ($p < .01$) (Jones et al., 2007). Jelinek et al. (2010) observed fewer cognitive words in the PTSD group than in the non-PTSD group for the worst moments of trauma ($p < .05$). Freer et al. (2010) found that *emotional tone* (the degree to which the participant used emotion to make an evaluative point or to signify meaning) increased in narratives of chronic traumas ($p = .037$) and traumas that had been experienced in early stages of development ($p = .041$). Lindblom and Gray (2010) stated that victims of perpetrated traumas were more likely than victims of accidental ones to exclude details. Also, females were more prone than males to include emotional details in their narratives ($p < .01$).

D'Andrea et al. (2012) analyzed with LIWC the emotional content of narratives about September 11 attacks by 40 undergraduates. In contrast to previous studies, the authors observed that the use of few anxiety-related words was related to PTSD symptoms ($r = -.43$) and that the use of many cognitive words was related to hyperarousal symptoms 5 months after the events ($r = .43$). It is important to note that religious words were also associated with worse adjustment. However, as the authors point out, the LIWC limitations may have influenced these results; expressions such as "Oh, my God" were considered religious, although they obviously have other connotations. Also focusing on September 11 memories, Dekel and Bonanno (2013) analyzed the narrative consistency (as changes in the content between narratives by the same person at two different time points) in 29 survivors. Results showed different patterns of evolution: using standardized questionnaires, resilient or recovered individuals tended to create more benign memories for subjective aspects of trauma (e.g., perceived danger) over time, while greater consistency (i.e., fewer changes) was observed in the chronic PTSD group. However, memories for the objective aspects did not change in the resilient–recovered group. Narratives by the chronic PTSD group included more death-related words ($p < .01$).

Römisch et al. (2014) studied the difference between perceptual and cognitive mental expressions as an indicator of what they call *immersion*, noting that narratives of traumatized women tended to be more immersive than nontraumatized ones. That is, for distress narratives, the trauma group showed lower difference scores (perceptual vs. cognitive terms) than the controls. Affect words differed by narrative valence ($p = .002$). Distress narratives contained fewer affect words than comparison narratives, and affect was correlated with lower avoidance ($r = -.39$). Greenhoot et al. (2013) found that negative emotions and sensory terms predicted more PTSD severity for participants with abuse experiences. To the contrary, positive emotions were related to less PTSD severity, and cognitive words predicted fewer psychological symptoms. Overall, lexical measures account for 31% of the variation in PTSD.

Generally, the studies support the findings described in the 2006 review on the narrative content. O'Kearney and Perrott (2006) concluded that the evidence shows an abundance of sensorial and emotional references in trauma narratives by those suffering from PTSD. Likewise, there was a certain level of support for the hypothesis that associates the development of PTSD with narratives that reflect dissociative experiences and include death-related

words. D'Andrea et al. (2012), however, observed an association between lower use of anxiety-related words and worse adjustment. The authors suggest that scarce references to symptoms do not indicate that the person does not experience them but rather their efforts to avoid them. The inverse relationship found by Römisch et al. (2014) between affect and avoidance could support this hypothesis.

The role that cognitive words plays requires greater elucidation because some studies have shown that they are associated with PTSD and others with better adjustment. According to cognitive theory predictions, these words reflect a construction and rationalization process, which would indicate an effort to elaborate what happened and to integrate it with the rest of one's autobiographical memories. Thus, although the results were inconsistent, some studies reviewed in 2006 found an association between the use of causal or insight words and better function. Jelinek et al. (2010) note that LIWC does not allow researchers to distinguish whether cognitive words refer to organized or disorganized thoughts, which could explain the heterogeneity of the results. D'Andrea et al. (2012) add that the use of cognitive words may provide evidence of ruminative processes and fruitless attempts to assimilate what happened.

Temporal context. Beaudreau (2007) found, against expectations, a greater use of the present tense in narratives with neutral content in comparison with traumatic or positive narratives ($p < .01$). However, the kind of neutral event required (participants were asked to tell a story about their driver's test) does not allow for the extraction of conclusions because it could be considered an aversive experience. Jelinek et al. (2010) observed an increased use of the present tense when the person was relating the worst moment of the trauma, especially among the PTSD group ($p < .01$). Römisch et al. (2014) defined *dramatic speech* as the sum of frequencies of historical present tense in the past and of shifts of the reference temporal and spatial point. The amount of dramatic speech was higher among distress narratives by traumatized women and was correlated with PTSD symptoms ($r = .40$). Similarly, Greenhoot et al. (2013) found a relationship between links to the present and PTSD symptoms in abuse victims ($p < .001$).

Other authors did not analyze verbal tense, and some even required that the narratives be constructed in the present (e.g., Bennett & Wells, 2010). Nonetheless, a few new data help support the relationship between PTSD and the use of the present tense (or spontaneous changes in verb tense), which is in line with O'Kearney and Perrott's (2006) observations.

References to self. Tuval-Mashiach et al. (2004) studied the content evolution of trauma narratives by five men exposed to terrorist attacks. Using qualitative methods, they analyzed elements of *coherence* (which refers to the ability to establish a sense of continuity), *creation of meaning*, and *self-evaluation*. These three aspects are manifestations of cognitive mechanisms directed at integrating what occurred into the individual's personal history. More positive self-evaluations were associated with better recovery over time. However, the study implications are limited because of the sample size and the methodology employed.

In a later study with 33 trauma survivors (with and without PTSD) and 16 controls, Sutherland and Bryant (2007) noted that persons with PTSD tend to report more *self-defining memories* (memories relevant for personal identity) trauma-related ($p < .05$). They concluded that traumatic events had a decisive influence on how PTSD participants saw themselves. Trauma-related goals predicted the retrieval of trauma-related defining memories (explaining 37% of the variance). Jobson and O'Kearney (2006) observed in 26 Australian and 24 Asian students that the relationship between the degree of orientation (*autonomous* vs. *relatedness*) in trauma narratives and the degree of the individual's adjustment was modulated by cultural factors. Jobson (2011) indicated the same tendency in 101 trauma survivors: PTSD was associated with a less autonomous orientation (tendency to emphasize autonomy in memories) for individualistic cultures (i.e., Australia, New Zealand, Western Europe, and North America) ($p < .01$) and with a more autonomous orientation for collectivistic ones (i.e., Asia, Africa, the Middle East, and South America) ($p = .03$).

Using qualitative methods, Freer et al. (2010) found that 89% of the violence victims included in their narratives expressions that reflected the negative impact that the event had in their lives, and 43% described alterations in their sense of themselves. In turn, Lindblom and Gray (2010) noted that females were more likely to include details about other persons in their narratives, and Briddon et al. (2011) found that a lack of self-referential processing was associated with greater disorganization 6 weeks after the traumatic event ($r = .31$).

D'Andrea et al. (2012) emphasized the importance of feelings of belonging in American society after September 11. Their results showed that persons who used more "we" instances had a lower risk of PTSD ($r = -.44$). Finally, Greenhoot et al. (2013) concluded, in accordance with Tuval-Mashiach et al. (2004), that meaning indices such as *subjective perspective* (the degree to which the narrator describes a personal response) or references to the positive impact of an event predict reduced PTSD ($p < .001$) and depression symptoms ($p < .05$).

O'Kearney and Perrott (2006) observed that there was not enough evidence to conclude that trauma narratives by PTSD patients have an impoverished self-referential perspective. However, recent studies have made notable advances in this respect, although they have taken very different perspectives. In general, the individual's self-defined role in the narrative has been analyzed by assessing elements that provide evidence of individual or collective involvement (i.e., personal pronouns or expressions that emphasize personal autonomy vs. social interaction). It has been shown that the relationship between these elements and PTSD is modulated by cultural factors, even by gender. Furthermore, it has been suggested that, at least in collective tragedies, narratives that express collectivity feelings may reveal a greater sense of social support, which helps to soften the stress impact on the individual's mental health. In a different vein, one frequently encounters expressions in trauma narratives that communicate the consequences of the event for individuals' daily lives, the image they have of themselves, and their way of understanding the world. Also, some studies show that certain events, by their nature, have a greater impact than others on the individual's belief system. In this regard, Freer et al. (2010) note that experiences of partner abuse or mistreatment tend to be particularly affecting for the individual because they break the trust on which intimate personal relationships are built.

Discussion

Since O'Kearney and Perrott (2006) carried out their review, studies that evaluate trauma narratives have proliferated. Recent findings support some of the hypotheses revised in 2006, especially those related to the content characteristics of trauma memories and their relationship with PTSD. Thus, in alignment with cognitive theories of PTSD, evidence shows that trauma narratives are dominated by sensorial/perceptual aspects when compared with narratives of other life experiences and that sensory details are related to posttraumatic symptoms. This finding is consistent with the idea that deficits in encoding facilitate involuntary memories, which are rich in sensory and emotional content (Brewin et al., 1996; Ehlers & Clark, 2000). However, it is unclear whether flashbacks were experienced during the narrative tasks, and the way in which perceptual and autobiographical memories interact with each other needs to be explained. The updated version of the dual representation theory of PTSD proposes that during trauma, the encoding of contextualized episodic memories is weakened, whereas the encoding of perceptual memories is strengthened. Therefore, individuals are able to deliberately retrieve contextualized representations, but reminders of the trauma also lead to automatic retrieval of perceptual representations, with a sense of reliving the event (Brewin, 2014). Alternatively, from the *basic* (vs. special) *mechanisms view*, an increase in sensorial and emotional content is not explained on the basis of different memory systems but in terms of increased memory availability because emotional events are more central to one's life history and thus more rehearsed (Rubin et al., 2008). Further, it should be noted that although trauma narratives show a predominance of sensory/perceptual details, this does not mean that these details are necessarily precise. Amygdala activity at retrieval can lead a person to overestimate the memory vividness and the accuracy of details that one remembers (Kensinger & Schacter, 2008).

Negative emotions, but not general affect, were related to more PTSD symptoms, at least within the first moments after trauma. This suggests, according to Eid et al. (2005), that narratives could be used to index the emotional processing of trauma, helping to identify individuals with early intense responses and those who are then most likely to develop later stress reactions. Verbal emotional expressions have been associated to emotional facial expressions, and coherence between the two can reflect an extreme emotional reactivity (Negrao, Bonanno, Noll, Putnam, & Trickett, 2005).

Because, from cognitive theories of PTSD, an impaired voluntary recall of the event is a core characteristic of the disorder, authors agree that the ability to elaborate about the traumatic event is associated with a better adjustment. According to Brewin et al. (1996), flashbacks remain in PTSD patients because they cannot tolerate reexperiencing trauma details and, hence, reencoding into episodic memory is never achieved. Memory elaboration entails placing the event in a specific temporal and personal context, which implies an increase of the number of associations with related experiences within the autobiographical memory base (Halligan et al., 2003). Studies reviewed have found that narrative aspects such as fragmentation, length of report, verbal tenses, or references to self provide valuable information to understand how memory is represented and how the individual copes with the traumatic experience. Generally, two evolution patterns have been underlined: one that involves avoidance responses to prevent overwhelming feelings and that is related to the development of PTSD symptoms, and another that implies a mental effort for constructing and integrating the trauma memory with other autobiographical memories and that predicts a better adjustment. Indeed, longitudinal studies point out that trauma memory is dynamic and that some language changes in the event description are linked to the course of trauma outcome (e.g., Dekel & Bonanno, 2013). This relationship is modulated by several factors, such as gender or the individual's sociocultural context (e.g., Jobson, 2011).

On that basis, fragmented narratives should reflect disorganized trauma memories linked to PTSD development. Unfortunately, though some recent studies have supported the fragmentation hypothesis, this issue remains controversial for several reasons. First, as O'Kearney and Perrott (2006) noticed, the absence of a common conceptual framework for fragmentation construct prevents the reconciliation of the results. It is necessary to clearly distinguish between organization and coherence but also to consider the distinct elements of disorganization separately (e.g., repetitions, nonconsecutive chunks, disorganized thoughts, or connectives) because they may have a differential effect on results. In the same way, self-reported disorganization and narrative disorganization should not be confused, because a lack of convergence is usually found between lexical markers and participants' assessments of their memory qualities (Greenhoot et al., 2013). Further, the procedures developed to date have not clarified the nature of the link between traumatic memories and PTSD, although fragmented narratives could appear as a consequence of the condition or, on the contrary, contribute to its etiology. Gray and Lombardo (2001) added that anxiety during disclosing could interfere with the narrative elaboration, activating avoidance mechanisms. A reduction in anxiety levels likely leads to more coherent and complete narratives. Moreover, studies of the relationship between fragmentation and non-PTSD symptoms (e.g., depressive symptoms) have questioned the idiosyncrasy of the alterations underlying PTSD, with different disorders possibly sharing similar memory changes.

Other common limitations across studies refer to the frequent use of convenience samples, in which participants had low levels of PTSD symptoms, there was a scarcity of longitudinal designs, or assessments were conducted long after the event. Also, studies need to explore the link between the nature and severity of the event and the narrative differences beyond the development of symptoms. For example, Lindblom and Gray (2010) found that more betrayal was associated with less detailed narratives but also that more PTSD symptoms were found in perpetrated trauma victims in comparison with accidental trauma victims. When symptoms were controlled, the effect of the type of trauma was insignificant. Therefore, a possible explication is that narrative differences do not depend so much on the nature of the event as on the fact that some events are more prone than others to lead to symptoms and, with this, more memory disturbances.

Regarding the methodology employed, attempts to adopt an operative measure for narrative domains have led to the use of computerized analysis procedures, such as LIWC, that ignore context. Thus, the use of these tools must be enhanced with complementary valuations by raters that take into account different language connotations.

In summary, despite the significant findings obtained, there is still a long road to travel. Although evidence shows that trauma

narratives have specific characteristics, there is not enough support to conclude that memories in PTSD depend on special mechanisms, as the cognitive models argue. It is necessary for future studies to concentrate on the preparation of valid and operative linguistic measurements and to integrate the results into a common theoretical model. In spite of the difficulties that it entails, the study of trauma narratives provides, in the words of O'Kearney and Perrott (2006), "an important window into understanding the nature of PTSD" (p. 91). Analyzing trauma narratives enables us to understand the memory disturbances linked to PTSD and thus to develop increasingly effective psychological interventions to promote trauma adaptation.

References

Beaudreau, S. A. (2007). Are trauma narratives unique and do they predict psychological adjustment? *Journal of Traumatic Stress, 20,* 353–357. http://dx.doi.org/10.1002/jts.20206

Bennett, H., & Wells, A. (2010). Metacognition, memory disorganization and rumination in posttraumatic stress symptoms. *Journal of Anxiety Disorders, 24,* 318–325. http://dx.doi.org/10.1016/j.janxdis.2010.01.004

Bremner, J. D., Krystal, J. H., Southwick, S. M., & Charney, D. S. (1995). Functional neuroanatomical correlates of the effects of stress on memory. *Journal of Traumatic Stress, 8,* 527–553. http://dx.doi.org/10.1002/jts.2490080403

Brewin, C. R. (2014). Episodic memory, perceptual memory, and their interaction: Foundations for a theory of posttraumatic stress disorder. *Psychological Bulletin, 140,* 69–97. http://dx.doi.org/10.1037/a0033722

Brewin, C. R., Dalgleish, T., & Joseph, S. (1996). A dual representation theory of posttraumatic stress disorder. *Psychological Review, 103,* 670–686. http://dx.doi.org/10.1037/0033-295X.103.4.670

Briddon, E., Slade, P., Isaac, C., & Wrench, I. (2011). How do memory processes relate to the development of posttraumatic stress symptoms following childbirth? *Journal of Anxiety Disorders, 25,* 1001–1007. http://dx.doi.org/10.1016/j.janxdis.2011.06.008

Buck, N., Kindt, M., van den Hout, M., Steens, L., & Linders, C. (2007). Perceptual memory representations and memory fragmentation as predictors of post-trauma symptoms. *Behavioural and Cognitive Psychotherapy, 35,* 259–272. http://dx.doi.org/10.1017/S1352465806003468

D'Andrea, W., Chiu, P., Casas, B., & Deldin, P. (2012). Linguistic predictors of post-traumatic stress disorder symptoms following 11 September 2001. *Applied Cognitive Psychology, 26,* 316–323. http://dx.doi.org/10.1002/acp.1830

Dekel, S., & Bonanno, G. (2013). Changes in trauma memory and patterns of posttraumatic stress. *Psychological Trauma: Theory, Research, Practice, and Policy, 5,* 26–34. http://dx.doi.org/10.1037/a0022750

Ehlers, A., & Clark, D. M. (2000). A cognitive model of posttraumatic stress disorder. *Behaviour Research and Therapy, 38,* 319–345. http://dx.doi.org/10.1016/S0005-7967(99)00123-0

Eid, J., Johnsen, B. H., & Saus, E. R. (2005). Trauma narratives and emotional processing. *Scandinavian Journal of Psychology, 46,* 503–510. http://dx.doi.org/10.1111/j.1467-9450.2005.00482.x

Evans, C., Ehlers, A., Mezey, G., & Clark, D. M. (2007). Intrusive memories in perpetrators of violent crime: Emotions and cognitions. *Journal of Consulting and Clinical Psychology, 75,* 134–144. http://dx.doi.org/10.1037/0022-006X.75.1.134

Foa, E. B., Molnar, C., & Cashman, L. (1995). Change in rape narratives during exposure therapy for posttraumatic stress disorder. *Journal of Traumatic Stress, 8,* 675–690. http://dx.doi.org/10.1002/jts.2490080409

Foa, E. B., & Riggs, D. (1993). Posttraumatic stress disorder in rape victims. In J. Oldham, M. Riba, & A. Tasman (Eds.), *American psychiatric press review of psychiatry* (Vol. 12, pp. 273–303). Washington, DC: American Psychiatric Press.

Follmer Greenhoot, A., Sun, S., Bunnell, S. L., & Lindboe, K. (2013). Making sense of traumatic memories: Memory qualities and psychological symptoms in emerging adults with and without abuse histories. *Memory, 21,* 125–142. http://dx.doi.org/10.1080/09658211.2012.712975

Freer, B. D., Whitt-Woosley, A., & Sprang, G. (2010). Narrative coherence and the trauma experience: An exploratory mixed-method analysis. *Violence and Victims, 25,* 742–754. http://dx.doi.org/10.1891/0886-6708.25.6.742

Gray, M., & Lombardo, T. (2001). Complexity of trauma narratives as an index of fragmented memory in PTSD: A critical analysis. *Applied Cognitive Psychology, 15,* S171–S186. http://dx.doi.org/10.1002/acp.840

Hagenaars, M. A., van Minnen, A., & Hoogduin, K. A. (2009). Reliving and disorganization in posttraumatic stress disorder and panic disorder memories. *Journal of Nervous and Mental Disease, 197,* 627–630. http://dx.doi.org/10.1097/NMD.0b013e3181b08bdf

Halligan, S. L., Michael, T., Clark, D. M., & Ehlers, A. (2003). Posttraumatic stress disorder following assault: The role of cognitive processing, trauma memory, and appraisals. *Journal of Consulting and Clinical Psychology, 71,* 419–431. http://dx.doi.org/10.1037/0022-006X.71.3.419

Janoff-Bulman, R. (1992). *Shattered assumptions: Toward a new psychology of trauma*. New York, NY: Free Press.

Jelinek, L., Randjbar, S., Seifert, D., Kellner, M., & Moritz, S. (2009). The organization of autobiographical and nonautobiographical memory in posttraumatic stress disorder (PTSD). *Journal of Abnormal Psychology, 118,* 288–298. http://dx.doi.org/10.1037/a0015633

Jelinek, L., Stockbauer, C., Randjbar, S., Kellner, M., Ehring, T., & Moritz, S. (2010). Characteristics and organization of the worst moment of trauma memories in posttraumatic stress disorder. *Behaviour Research and Therapy, 48,* 680–685. http://dx.doi.org/10.1016/j.brat.2010.03.014

Jobson, L. (2011). Cultural differences in levels of autonomous orientation in autobiographical remembering in Posttraumatic Stress Disorder. *Applied Cognitive Psychology, 25,* 175–182. http://dx.doi.org/10.1002/acp.1660

Jobson, L., & O'Kearney, R. (2006). Cultural differences in autobiographical memory of trauma. *Clinical Psychologist, 10,* 89–98. http://dx.doi.org/10.1080/13284200600939892

Jones, C., Harvey, A. G., & Brewin, C. R. (2007). The organisation and content of trauma memories in survivors of road traffic accidents. *Behaviour Research and Therapy, 45,* 151–162. http://dx.doi.org/10.1016/j.brat.2006.02.004

Kensinger, E. A., & Schacter, D. L. (2008). Memory and emotion. In M. Lewis, J. M. Haviland-Jones, & L. F. Barrett (Eds.), *Handbook of emotions* (pp. 601–617). New York, NY: Guilford Press.

Kleim, B., Wallott, F., & Ehlers, A. (2008). Are trauma memories disjointed from other autobiographical memories in posttraumatic stress disorder? An experimental investigation. *Behavioural and Cognitive Psychotherapy, 36,* 221–234. http://dx.doi.org/10.1017/S1352465807004080

Klein, I., & Janoff-Bulman, R. (1996). Trauma history and personal narratives: Some clues to coping among survivors of child abuse. *Child Abuse & Neglect, 20,* 45–54. http://dx.doi.org/10.1016/0145-2134(95)00114-X

Lindblom, K., & Gray, M. (2010). Relationship closeness and trauma narrative detail: A critical analysis of betrayal trauma theory. *Applied Cognitive Psychology, 24,* 1–19. http://dx.doi.org/10.1002/acp.1547

Negrao, C., II, Bonanno, G. A., Noll, J. G., Putnam, F. W., & Trickett, P. K. (2005). Shame, humiliation, and childhood sexual abuse: Distinct contributions and emotional coherence. *Child Maltreatment, 10,* 350–363. http://dx.doi.org/10.1177/1077559505279366

O'Kearney, R., Hunt, A., & Wallace, N. (2011). Integration and organization of trauma memories and posttraumatic symptoms. *Journal of Traumatic Stress, 24,* 716–725. http://dx.doi.org/10.1002/jts.20690

O'Kearney, R., & Perrott, K. (2006). Trauma narratives in posttraumatic stress disorder: A review. *Journal of Traumatic Stress, 19,* 81–93. http://dx.doi.org/10.1002/jts.20099

Pennebaker, J., & Francis, M. (1999). *LIWC: Linguistic inquiry and word count*. Austin, TX: University of Texas.

Römisch, S., Leban, E., Habermas, T., & Döll-Hentschker, S. (2014). Evaluation, immersion, and fragmentation in emotion narratives from traumatized and nontraumatized women. *Psychological Trauma: Theory, Research, Practice, and Policy, 6,* 465–472.

Rubin, D. C. (2011). The coherence of memories for trauma: Evidence from posttraumatic stress disorder. *Consciousness and Cognition, 20,* 857–865. http://dx.doi.org/10.1016/j.concog.2010.03.018

Rubin, D. C., Boals, A., & Berntsen, D. (2008). Memory in posttraumatic stress disorder: Properties of voluntary and involuntary, traumatic and nontraumatic autobiographical memories in people with and without posttraumatic stress disorder symptoms. *Journal of Experimental Psychology: General, 137,* 591–614. http://dx.doi.org/10.1037/a0013165

Sutherland, K., & Bryant, R. A. (2007). Autobiographical memory in posttraumatic stress disorder before and after treatment. *Behaviour Research and Therapy, 45,* 2915–2923. http://dx.doi.org/10.1016/j.brat.2007.08.009

Tuval-Mashiach, R., Freedman, S., Bargai, N., Boker, R., Hadar, H., & Shalev, A. Y. (2004). Coping with trauma: Narrative and cognitive perspectives. *Psychiatry, 67,* 280–293. http://dx.doi.org/10.1521/psyc.67.3.280.48977

van der Kolk, B. A., & Fisler, R. (1995). Dissociation and the fragmentary nature of traumatic memories: Overview and exploratory study. *Journal of Traumatic Stress, 8,* 505–525. http://dx.doi.org/10.1002/jts.2490080402

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