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Why Autobiographical Memories for Traumatic and Emotional Events Might Differ:

Theoretical Arguments and Empirical Evidence

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### Abstract

The authors review five arguments supporting the hypothesis that memories for traumatic and nontraumatic emotional events should be considered as qualitatively different recollections. The first argument considers the objective features of traumatic and emotional events and their possible influence on the formation of memories for these events. The second argument assumes that traumatic memories distinguish from emotional ones as trauma exposure is often associated with the development of psychological disorders involving memory disturbances. The third argument is that traumatic experiences are more likely than emotional experiences to be forgotten and recovered. The fourth argument concerns the possibility that emotional memories are socially shared more frequently than traumatic memories. A fifth argument suggests that trauma exposure may impair selected brain systems implicated in memory functions. Theoretical and empirical evidence supporting these claims is reviewed. In the conclusions, the authors illustrate future research directions and discuss some conceptual issues related to the definitions of traumatic event currently employed by memory researchers.

*Keywords:* Autobiographical Memory; Brain Memory System; Emotional Event; Recovered Memories; Traumatic Event.

## Why Autobiographical Memories for Traumatic and Emotional Events Might Differ: Theoretical Arguments and Empirical Evidence

Over the last two decades, an increasing number of cognitive and clinical researchers have been concerned with the characteristics and functions of autobiographical memory for traumatic experiences. This field of research has to do with how people encode, process, and retrieve highly stressful events occurring in the real-life, and how memory for these events may affect their health and psychological functioning (Brewin, 2007; Butler & Spiegel, 1997; Combs & DePrince, 2010; Freyd, 2001; McNally, 2003; van der Kolk, 1998).

In the literature on traumatic memory, there is a longstanding controversy regarding the similarities and differences between memories for traumatic experiences and memories for other life experiences, generically labelled as *nontraumatic* experiences. This controversy has promoted the constitution of three main theoretical perspectives on the nature and functions of traumatic memory. These perspectives can be labelled as follows: 1) *Trauma theory*, 2) *Trauma Superiority theory*, and 3) *Trauma Equivalency theory* (cf. Waters, Bohanek, Marin, & Fivush, 2012). Let's consider their main assumptions.

Researchers supporting the first two perspectives maintain that traumatic memories have "special" properties, namely they are qualitatively different from other kinds of autobiographical memories. However, Trauma theory and Trauma Superiority theory disagree in describing the psychological mechanisms underlying the formation of traumatic memories, as well as the phenomenological characteristics of these recollections (e.g., vividness, sensory components, memory quality). Trauma theory asserts that traumatic memories are more fragmented, disorganized, and less coherent compared to nontraumatic memories. Poorer memory for trauma has been linked to the activation of defense mechanisms such as, for example, dissociation and repression (Alpert, Brown, & Courtois,

1998; van der Kolk & Fisler, 1995; Terr, 1991; Whitfield, 1995). On the other hand, Trauma Superiority theory holds that traumatic events are remembered better than nontraumatic events. Specifically, traumatic memories are assumed to be “superior” to other memories since they would be recalled more vividly and accurately than the latter. Interestingly, researchers supporting this view (Peace & Porter, 2004; Porter & Peace, 2007) argue that memory for trauma might be enhanced because highly stressful experiences are processed differently on a cognitive and a neurological level. Other explanations provided by these researchers point to the possibility that having good memory for traumatic events might help trauma victims to avoid or to positively cope with similar experiences occurring in the future (on this topic see, also Sotgiu & Galati, 2007).

Contrary to both Trauma theory and Trauma Superiority theory, researchers supporting the Trauma Equivalency theory (Geraerts et al., 2007; Hembrooke & Ceci, 1995; Kihlstrom, 1995, 2006; Rubin, Dennis, & Beckham, 2011; Shobe & Kihlstrom, 1997) – also known as the *ordinary memory argument* (Brewin, 2007) – posit that traumatic and nontraumatic memories do not significantly differ with respect to their phenomenological characteristics. Furthermore, they assume that the psychological and neurobiological mechanisms underlying the formation, maintenance and forgetting of both types of memories are equivalent, if not identical. In other words, no matter what sort of traumatic events people experience in their life, the recollection of all such stressful occurrences can be explained by ordinary memory processes.

Which of the three aforementioned theoretical perspectives can be accepted as the best account of traumatic memory? Over the last years, many researchers made a valuable effort to provide theoretical arguments, experimental data, and clinical observations sustaining either the first, the second, or the third perspective (for reviews, see Brewin, 2007; Cordón, Pipe, Sayfan, Melinder, & Goodman, 2004; Sotgiu & Mormont, 2008).

Unfortunately, empirical research conducted thus far provided inconsistent findings so that the debate about the apparent uniqueness of traumatic memory is still open and presumably will continue in the near future. The aim of this article is to review some classical and new theoretical arguments, as well as empirical evidence, supporting the idea that traumatic and nontraumatic memories should be considered as two distinct types of autobiographical recollections. In particular, we will concentrate our analysis on the differences between traumatic memories and a specific category of nontraumatic memories, that is memories for emotional experiences or events. We decided to focus on this subcategory of nontraumatic memories because nontraumatic experiences constitute a rather vague concept including different categories of events (both emotionally charged and neutral) which can significantly distinguish one from the other. Instead, as we will explain in detail, emotional experiences represent a more homogeneous conceptual category with clearer boundaries. Noteworthy, the present review distinguishes from previous ones as we made a special effort to examine traumatic and emotional memory from an interdisciplinary perspective. Indeed, the article will review theory and research from different disciplines and fields of investigation, including cognitive psychology, clinical psychology, and the neurosciences. Another strength of the present review is that it jointly addresses theoretical and empirical issues, looking at connections between them.

**In the following sections, we illustrate five** arguments which can explain why autobiographical memories for traumatic and emotional events might be considered as two distinct classes of recollections. These arguments refer to various aspects of the process of memorization of traumatic and emotional events occurring in the real life and are consistent with either the Trauma theory or the Trauma Superiority theory. More in detail, the first argument considers the differences between the objective features of traumatic and emotional events, as well as their possible influence on the formation and maintenance of

the memories for these events. The second argument assumes that traumatic memories distinguish from emotional memories as trauma exposure is often associated with the development of psychological disorders involving memory disturbances. The third argument is that traumatic experiences are more likely than emotional experiences to be forgotten and then recovered. The fourth argument concerns the possibility that emotional memories are shared with other people more frequently than traumatic memories. Last, the fifth argument is about neuroscience theory and research suggesting that trauma exposure may impair selected brain systems implicated in autobiographical memory functions. The concluding section of the article provides a critical discussion of the aforesaid arguments, illustrates some future directions of investigation, and highlights some critical issues related to the definitions and conceptualizations of traumatic event currently employed by memory researchers.

#### The Objective Characteristics of Traumatic and Emotional Events Are Different

One of the most fundamental reasons why traumatic and emotional memories might differ concerns the objective characteristics of the two classes of events to which they refer. Theoretical analyses of these characteristics have been carried out separately within the fields of trauma psychology and emotion psychology, respectively (cf. Sotgiu, 2011).

The most influential definition of the concept of traumatic event is that one provided by the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV-TR; American Psychiatric Association, 2000, p. 467; see also definitions included in the third edition of DSM, American Psychiatric Association, 1980, 1987). According to the authors of this **nosographic system**, traumatic events predict the onset of acute stress disorder (ASD), posttraumatic stress disorder (PTSD), as well as other psychiatric pathologies. Specifically, traumatic events are defined as highly stressful occurrences in which the life and physical safety of a person are at risk or there is a risk of death or threat to the physical integrity of

other people. Typical traumatic events include physical assaults, rapes, unexpected death of a loved one, car accidents, as well as natural disasters (e.g., floods, earthquakes, tornadoes) and human made catastrophes (e.g., industrial accidents, wars, terrorist attacks).

Importantly, some authors (Maier, 2007; Sotgiu, 2011) have expressed concerns about the appropriateness of the trauma definition included in the DSM-IV as it does not account for those life events (e.g., sudden divorce, discovering a partner's affair, being fired at work) that can be experienced and appraised as traumatic, even if they do not pose a serious threat to the life and physical safety of the person. However, other researchers (McNally, 2004; Weathers & Keane, 2007) have also underlined the risks linked to excessively broad conceptualizations of trauma.

With regard to the concept of emotional events, there is consensus among emotion psychologists in defining them as personal or social occurrences that are relevant for the well-being of the individual and affect his or her goals, needs, and interests (Niedenthal, Krauth-Gruber, & Ric, 2006). Following well-established conventions, emotionally charged events occurring in the everyday life of common people may be distinguished in two categories as a function of their positive or negative hedonic valence (Frijda, 1988; Russell & Carroll, 1999). *Positive emotional events* satisfy the individual's needs and goals, and this causes pleasant feelings. On the other hand, *negative emotional events* contrast the individual's plans and expectations, which leads to unpleasant feelings. To mention some examples, positive emotional events include going to a party, receiving a present, and passing an exam; however, negative emotional events include arguing with a friend, learning that a family member is ill, and failing an exam (Brandstätter & Elias, 2001; Scherer, Wallbott, & Summerfield, 1986). To further complicate the matter, there may be also specific everyday life situations in which people experience at the same time pleasant

and unpleasant feelings. However, these events do not occur so frequently (K. Scherer, Wranik, Sangsue, Tran & Scherer, 2004).

Importantly, traumatic and emotional events (either positive and negative) might be expected to play a different role in the autobiographical memory because they occur with a very different frequency. Large-scale epidemiological studies of people living in western countries (e.g., Breslau et al., 1998; de Vries & Olf, 2009; Rosenman, 2002; Sledjeski, Speisman, & Dierker, 2008) have shown that traumatic events – defined according to criteria indicated by the DSM – occur quite sporadically (the estimated mean number of traumas experienced during lifetime is comprised between 0 and 5). By contrast, a number of questionnaire and diary studies (Brandstätter & Elias, 2001; Oatley & Duncan, 1994; Scherer et al., 2004) have documented that positive and negative emotional events happen on a daily basis (on this topic, see also Sotgiu, 2010). It is arguable that infrequent traumatic experiences would leave a profound trace in the autobiographical memory as they constitute a turning point in the individual's life story and form a central component of his or her personal identity (Berntsen & Rubin, 2006; Conway, 2005). On the other hand, frequently occurring emotional events are expected to be less consequential and less cognitively salient, being remembered with a lower degree of accuracy. This hypothesis has found support in a longitudinal study by Peace and Porter (2004) investigating the consistency of traumatic and positive emotional memories in a community sample composed by 52 adults. Participants examined in this study were asked to recall both a personal traumatic experience and their most positive emotional experience referring to the past year in two interviews separated by approximately three months. Importantly, traumatic experiences examined in this study had a clinical significance. Indeed, to be eligible to participate in the study, subjects had to report moderate to severe levels of traumatic stress related to the recalled traumatic event, as resulting from the administration



of the *Impact of Event Scale* (Horowitz, Wilner, & Alvarez, 1979). Overall, findings from this study indicated that traumatic experiences were remembered more consistently over time relative to positive experiences. In particular, vividness and overall memory quality associated with traumatic experiences did not significantly change between the first and the second interview, whereas a decline was observed for positive experiences. A similar trend was found in a follow-up study of the same sample conducted 3 to 5 years after the first interview (see Porter & Peace, 2007). Taken together, these results are consistent with predictions from the Trauma Superiority theory. However, the interpretation of findings is limited because the authors did not collect data about participants' memories for negative (nontraumatic) emotional events.

#### Unlike Emotional Events, Traumatic Events Are Often Associated With Trauma-Related Psychological Disorders Affecting Memory Functioning

When comparing traumatic and emotional memories, it is important to keep in mind that the respective events to which they refer significantly differ not only in their objective features, but also according to their impact on health and psychological well-being of individuals. Exposure to traumatic events is often associated with symptoms of acute and chronic stress, as well as with severe psychological disorders, including depression, anxiety, substance abuse, ASD, PTSD, and dissociation (Fullerton & Ursano, 1997; Shalev, Yehuda, & McFarlane, 2000; Stewart, 1996). On the other hand, positive and negative emotional events, even if highly intense, usually result in short-lived experiences (Ekman, 1999; Lazarus, Kanner, & Folkman, 1980; Watson & Clark, 1994) and, consequently, most of time they do not have clinically significant long-term consequences. Importantly, the probability to develop trauma-related psychological disorders depends on a range of factors. They include the nature and severity of the traumatic event, peritraumatic dissociative reactions during or immediately following the event, lack of social support,

preexisting psychopathology, and family psychiatric history (Breh & Seidler, 2007; Brewin, Andrews, & Valentine, 2000; Norris et al., 2002; Ozer, Best, Lipsey, & Weiss, 2003; Rubonis & Bickman, 1991).

Since traumatic and mundane emotional events have a diverse impact on individuals' physical and psychological health, many clinical and cognitive researchers have dedicated great efforts at investigating memories for these events in clinical and healthy populations. Among the former, PTSD populations received the greatest attention, either at the theoretical or empirical level of analysis. We argue that this depends on two fundamental reasons. First, PTSD affects a significant part of people exposed to trauma, with estimated prevalence rates reaching up to 50% of the studied populations (e.g., Armenian et al., 2000; Yule et al., 2000). Second, and perhaps most important, one of the most distinctive characteristics of PTSD concerns the onset of relevant changes in everyday memory functioning. Indeed, it is well established that PTSD patients have to deal with recurrent intrusive trauma-related recollections and flashbacks, which manifest themselves over time periods longer than one month (American Psychiatric Association, 2000; Krans, Näring, Becker, & Holmes, 2009). These memories spontaneously arise during the everyday life of the traumatized individual, forcing him or her to relive the original traumatic event in the present and causing severe stress and anxiety symptoms which interfere with the person's social functioning. Moreover, it has been documented that a relevant proportion of PTSD patients exhibit significant memory disturbances, such as the inability to voluntarily recall important aspects of the trauma, the disorganization and fragmentation of trauma-related memories and overgeneral memory deficits (for recent reviews, see Bedard-Gilligan & Zoellner, 2012; Brewin, 2011; O'Kearney & Perrott, 2006).

The onset of traumatic memory disturbances in PTSD patients **indirectly provide support to** the Trauma theory's main assumption: i.e., Traumas are more poorly

remembered than nontraumatic events (cf. Waters et al., 2012). With this regard, a number of researchers have postulated the existence of special psychological mechanisms responsible for these memory disorders. According to Brewin, Dalgleish, and Joseph's (1996) dual representation theory of PTSD, traumatic memories associated with this disorder may be distinguished in two main categories depending on the conscious or unconscious processing of the trauma-related information (both at the time when the trauma originally happened and in subsequent time phases) and on its accessibility at the retrieval stage. Following this model, *verbally accessible memories* are conscious representations of the trauma that can be deliberately retrieved from the autobiographical memory and generally do not interfere with PTSD patients' mental health. On the other hand, *situationally accessible memories* constitute unconscious representations of the trauma that cannot be voluntarily recalled, but are "accessed automatically when the person is in a context in which the physical features or meaning are similar to those of the traumatic situation" (p. 676). Distressing, repetitive and unwanted flashbacks are typical examples of this second category of traumatic memories. Importantly, Brewin et al. suggested that situationally accessible memories preserve the same code (e.g., perceptual, physiological, motor) of the information processed during the original traumatic event. This may explain why the experience of relieving the trauma is so frequent among PTSD patients.

Similar to the theoretical assumptions formulated by Brewin and colleagues (1996), other clinical researchers (e.g., Ehlers & Clark, 2000; Foa & Hearst-Ikeda, 1996; van der Kolk & Fisler, 1995) proposed that, in order to account for the traumatic memory disturbances associated with PTSD, it is necessary to focus on the psychological mechanisms responsible for the incomplete emotional and cognitive processing of trauma. Taking as reference Pierre Janet's (1889, 1909) pioneer work on traumatic memory, van der Kolk and Fisler (1995; see also van der Kolk, 1998), for example, maintained that

dissociative experiences and extreme arousal at the moment of the trauma may interfere with proper encoding and storage of trauma-related information, causing the development and maintenance of the well-known reliving, avoidance, and arousal symptoms qualifying for PTSD. Importantly, according to van der Kolk and Fisler, traumatic memories associated with PTSD are not integrated into the person's ordinary consciousness and lack a verbal narrative. Instead, they are organized on an implicit level and are retrieved as isolated fragments which take the form of automatic, somatosensory flashbacks.

Theoretical hypotheses put forward by van der Kolk and Fisler (1995) constitute the core assumptions of Trauma theory. These hypotheses found empirical support in a widely cited study conducted by the same authors and reported in the same article we cited. In this study, 46 adults with PTSD were recruited by newspaper advertisements inviting people who were haunted by traumatic memories to take part in an interview. After initial diagnostic assessment, participants were asked to recall a traumatic event that had had most effect on their lives as well as a highly emotional, but nontraumatic experience.

Characteristics of both memory types were assessed by means of the *Traumatic Memory Inventory*. This is a 60 item structured interview which investigates how people remember autobiographical life events at three different time periods: a) When the person first became aware of the event, b) when the recollection of the event was most intense, c) at the present time (for a detailed description of this instrument, see also van der Kolk, Hopper, & Osterman, 2001). Results revealed that none of the study participants reported being able to narrate a story about their traumatic experiences when they first became aware of the trauma. Instead, they initially recalled their traumatic experiences only as fragmentary flashbacks consisting of images, sounds, smells, and bodily sensations. Importantly, this form of memory was enhanced when participants perceived their recollections as most intense and was still present, even if to a lesser degree, at the time of the research interview.

By contrast, memories for emotional events (e.g., wedding, graduation, birth of a child), regardless of the time period to which they referred, were not organized on a sensory level and did not contain any flashbacks.

Although van der Kolk and Fisler's (1995) study has been the object of severe methodological criticisms (see, for example, Shobe & Kihlstrom, 1997), other researchers employed more advanced empirical strategies when comparing traumatic and nontraumatic emotional memories in PTSD groups. Berntsen (2001; Study 2), for example, conducted a diary study about the involuntary autobiographical memories of a group of 12 traumatized undergraduates who received a diagnosis of PTSD. Participants of this study were instructed to record, during an open-ended time period, a total number of 50 involuntary memories dealing with different sort of events, including traumatic events as well as emotional events, either pleasant or unpleasant. More in detail, they were asked to answer a set of questions concerning the content of their involuntary recollections at two distinct moments: a) Immediately after a memory occurred and b) at a self-chosen subsequent time in the same day. Overall, results indicated that involuntary traumatic memories were rated as more vivid and emotionally powerful than emotional memories and also had a higher probability to be accompanied by physical reactions during retrieval. Furthermore, Berntsen showed that approximately one third of the recorded traumatic memories could be classified as flashbacks basing on the participants' ratings of memory vividness, perceived impact of the memory on current mood, and presence of physical reactions at retrieval. However, contrary to van der Kolk and Fisler's (1995) findings illustrated previously, a not negligible proportion of flashback-like memories was also found among participants' recollections of nontraumatic positive and negative emotional events. In sum, Berntsen's study demonstrates that involuntary traumatic and emotional memories reported by PTSD patients significantly differ at the phenomenological level on a number of features.

However, flashbacks do not seem to be an exclusive characteristic of traumatic recollections.

#### Traumatic Experiences Are More Likely To Be Forgotten and Then Recovered

The argument addressed in the present section is linked to one of the most contentious, but intriguing debates in contemporary clinical and cognitive psychology. This debate – also dubbed the “memory wars” (Crews, 1995; Schacter, 1995) – concerns the reliability of *recovered memories*, namely the recollections of traumatic experiences that emerge in people’s autobiographical memory after extended periods in which they were partially or **completely** inaccessible to conscious retrieval.

Recovered memories have received the greatest attention among clinical researchers studying autobiographical memories of childhood traumas and, specifically, sexual abuses. Although empirical studies conducted on this issue have been often criticized by cognitive researchers investigating false memories (e.g., Loftus, 1993; Loftus & Davis, 2006), there is now increasing evidence that people with no recollection of childhood sexual abuses may uncover memories for such remote events during psychotherapy, as well as within other nontherapeutic settings. Indeed, a great number of retrospective studies of both clinical groups (Briere & Conte, 1993; Chu, Frey, Ganzel, & Matthews, 1999; Gold, Hughes, & Swingle, 1999; Herman & Schatzow, 1987; Loftus, Polonsky, & Fullilove, 1994) and random samples from the general population (Elliott, 1997; Elliott & Briere, 1995; Wilsnack, Wonderlich, Kristjanson, Vogeltanz-Holm, & Wilsnack, 2002) have repeatedly shown that a relevant proportion of adults with a self-reported history of childhood sexual abuse recognize that there was a time in their life when they had partially or completely forgotten their childhood traumatic experiences. This was also found in a national survey of 330 randomly selected psychologists, some of whom reported being abused as children (Feldman-Summers & Pope, 1994). Furthermore, several prospective studies (Ghetti et al.,

2006; Williams, 1995) conducted on adult populations with a documented history of childhood sexual abuse have confirmed that a not negligible percentage of victims report having recovered their trauma after a period of forgetting. Interestingly, authors of these studies also found that some participants could not recall their previously documented traumas at all, thus suggesting that these recollections were unavailable or temporarily inaccessible (on this topic, see also Goodman et al., 2003; Widom & Morris, 1997).

While discussing all the literature relevant to the recovery memory debate is beyond the scope of this article (for systematic and critical reviews, see Brewin & Andrews, 1998; Dalenberg, 2006; Brown, Schefflin, & Whitfield, 1999; Geraerts, Raymaekers, & Merckelbach, 2008; Gleaves, Smith, Butler, & Spiegel, 2004; Lindsay & Briere, 1997; Loftus & Davis, 2006; Read, 1999), in the following we will focus on the theoretical and empirical reasons that have motivated a relatively high number of researchers to assume that traumatic recovered memories are a special category of autobiographical recollections qualitatively different from nontraumatic emotional memories. Importantly, these researchers directly contributed the development of an extreme version of the Trauma theory. Indeed, they went well beyond the core assumption of this theory (i.e., traumas are more poorly remembered than nontraumatic events) and argued that there are some specific circumstances in which traumatized individuals are not able to access their trauma-related experiences.

Perhaps, one of the most important reasons why traumatic recovered memories have been assumed to **qualitatively** differ from emotional memories has to do with the explanation of the self-reported or empirically inferred amnesia for traumatic experiences. Starting from Sigmund Freud's classical theory on the aetiology of hysteria and neurosis (Breuer & Freud, 1895/1955; Freud, 1915/1957), a number of researchers (e.g., Fredrickson, 1992; Herman & Schatzow, 1987; Terr, 1991) have posited that people

partially or entirely forgetting their personal traumatic experiences do so as a result of a repression mechanism which is activated exclusively in the context of painful and overwhelming life circumstances and operates outside the person's consciousness. Specifically, it has been argued that repression would act as a self-defense system as it protects the psychological integrity of the individual against the harmful feelings and thoughts associated with the recollections of trauma. Unfortunately, memory researchers have encountered serious problems in demonstrating the existence of such mechanism at the empirical level (on this topic, see Loftus, 1993; Loftus & Davis, 2006). That might be one of the key reasons why many authors (e.g., Chu et al., 1999; Dalenberg, 2006; Holmes et al., 2005; van der Kolk & Fisler, 1995) preferred to explain the phenomenon of traumatic recovered memories by means of the alternative concept of dissociation. Similar to repression, dissociation is hypothesized to be a psychological defense contrasting the negative impact of trauma and resulting in the disconnection of intolerable trauma-related recollections from other nonharmful memories (cf. Yates & Nasby, 1993). However, the two concepts have also been distinguished either at the theoretical or empirical level. For example, Alpert and colleagues (1998) have suggested that dissociation differs from repression since it is

“(a) only partially and alternately out of consciousness (rather than existing deeply in the unconscious), (b) able to exert different types of influence on nondissociated processes, (c) empirically associated with actual traumatic events or particular attention strategies, rather than with hypothesized warding off of unacceptable impulses or fantasies, and (d) amenable to being used more descriptively and less inferentially than either repression or the whole concept of unconscious mechanisms of defense (Spiegel & Cardena, 1991)” (p. 963).



Beyond the various conceptualizations of the psychological mechanisms responsible for the delayed recall of traumatic experiences, one might wonder if memory recovery is a unique trauma effect or if it also occurs in the case of emotional events. Few studies attempted to provide an answer for this crucial question. Let's return to the van der Kolk and Fisler's (1995) investigation about characteristics of traumatic and personally significant emotional memories reported by PTSD patients. The interview administered in this study also included an item asking participants if they had always been aware that both the recalled traumas and emotional events truly happened. The analysis of responses indicated that 42% of the 36 participants with a childhood trauma reported having suffered partial or total amnesia for their trauma at some time in their lives. By contrast, no participant claimed to have had periods of forgetting for their emotional experiences. Similar results were found by Peace, Porter, & ten Brinke (2008) in a study involving a clinical sample of 44 women with a documented history of sexual victimization. Participants of this investigation were asked to recall and describe three personal events: A sexual abuse or assault, a nonsexual trauma, and a positive emotional event. Findings demonstrated that 20% of sexual traumas and 5% of other reported traumas were associated with claims of temporary amnesia for the traumatic experience (i.e., there was a period of time when participants did not remember the event, even if they tried to recall it); by contrast, no such claims were found in the case of positive emotional events. As we have previously observed when discussing Peace and Porter's (2004; Porter & Peace, 2007) studies, conclusions drawn from this last investigation should be considered with caution since the authors did not assess memories for negative (nontraumatic) emotional events.

#### Emotional Memories Are Shared More Frequently Than Traumatic Memories

Another fundamental reason why autobiographical memories for traumatic and emotional events might differ has to do with their sharing with other people. It is well

known that traumatized people – particularly those suffering from PTSD – may attempt to intentionally forget or avoid thinking and talking about their most unpleasant experiences in order to cope with the trauma (Brewin et al., 1996; Christianson & Engelberg, 1997; Koutstaal & Schacter, 1997; Terr, 1991). On the contrary, there is a large body of theoretical and empirical evidence indicating that people exposed to emotional events are prone to talk about their experiences and feelings with other significant persons. This process – which has been referred to as the *social sharing of emotion* – generally takes place in the minutes, hours, and days immediately following an emotional event, and it may also continue during the subsequent weeks or months, even if with a decreasing frequency (for an overview, see Rimé, 2004, 2009).

Three empirical investigations – two following a within-subjects design (Byrne, Hyman, & Scott, 2001; Peace et al., 2008) and one using a between-subjects approach (Tromp, Koss, Figueredo, & Tharan, 1995) – partially support the claim that people tend to share their emotional experiences more frequently than their traumas. In one of the two studies following a within-subjects approach (already illustrated in the previous section), Peace and colleagues (2008) found that the frequency with which participants reported having talked about their personal experiences was higher for positive emotional events relative to either sexual or nonsexual traumas. However, the difference between the social sharing ratings referred to positive experiences and nonsexual traumas did not reach the statistical significance. This could be due to the limited size of the investigated sample. A similar pattern of results emerged in a study of a nonclinical sample of female university undergraduates which was also based on a within-subjects design (Byrne et al., 2001). The authors of this investigation examined the participants' recollections of three different life events, including the worst traumatic event they experienced and a very negative event and a very positive event that occurred within 1 or 2 years of the traumatic event. Overall,

findings indicated that there were some differences in the extent to which participants shared their autobiographical experiences with their family. More in detail, it emerged that positive emotional events were talked about more frequently than negative events, which in turn were shared more frequently than traumatic events. However, posthoc analyses revealed that the observed differences were statistically significant only for the comparison between positive and traumatic events. Also in this case, we note that statistically significant differences could emerge in a larger sample of participants. **Last**, Tromp and colleagues (1995) followed a between-subjects design to investigate the autobiographical memories of a community sample of women. Importantly, participants of this study were initially screened about their past experiences of sexual victimization. Then, women with a rape experience were asked to remember their most recent or most significant experience of this kind. On the contrary, women without such experience were asked to recall another intense emotional life event, either positive or negative. Similar to Byrne et al. and Peace et al.'s studies, the comparison between groups indicated that memories for positive and negative emotional experiences were talked about more frequently than rape memories. As noted by Tromp and colleagues, this was an expected result since rape victims do not easily find persons with whom to share their sexual traumas; moreover, they may be unwilling to disclose these experiences (cf. Koss, 1985).

When considering the above discussed studies, it should be kept in mind that they differently contributed to the debate about the uniqueness of traumatic memories. Indeed, while Tromp et al. (1995) demonstrated that sexual traumas are more poorly remembered than emotional events, in the Peace et al.'s (2008) study an opposite pattern of results emerged. Furthermore, Byrne et al. (2001) reported mixed findings which are difficult to interpret.

Beside these discrepancies, it is important to note that sharing one's own experiences (both traumatic and emotional) with other people could affect the content of these experiences, namely how they are reconstructed in the autobiographical memory. For example, if the sharer and the sharing partner are close friends, the latter may help the former to reappraise his or her past negative experiences in ways that are less upsetting, thus favouring an alternative memory representation of them which might also include significant distortions and inaccuracies. By contrast, a diverse memory outcome will result if the sharer and the sharing partner are not good friends or compete for something. Importantly, these reconstructive memory processes are not expected to operate in the case of nonshared experiences. New research on autobiographical memories for traumatic and emotional events is needed in order to test these hypotheses.

#### Traumatic Events Are More Likely To Selectively Impair Brain Memory Systems

The claim that traumatic and emotional memories might differ has found some consensus also within the domain of neurosciences. In this field, several researchers posit that traumatic stress interferes with the ordinary functioning of the cerebral systems responsible for the encoding, storage, and retrieval of information concerning autobiographical events. Metcalfe and Jacobs (1996, 1998), for example, developed a theoretical model of traumatic and emotional memory that postulates the existence of two different brain memory systems operating in parallel: A "cool" cognitive system, based in the hippocampus, and a "hot" emotional system, based in the amygdala. In ordinary circumstances, the cool system is hypothesized to record the contextual details of personal events; on the other hand, the hot system is assumed to be involved in the recording of the emotional aspects of experience, with special attention to information concerning fearful and unpleasant stimuli. Importantly, the Metcalfe and Jacobs' model predicts that the cool and hot systems differently respond to high stress levels associated with traumatic events.

More in detail, the authors assume that, under acute stress, the hot system significantly increases its activity, thus becoming hyper-responsive to the fear-provoking features of the event. In contrast, the cool system is expected to interrupt its normal activity as a consequence of the traumatic stress and to operate in a dysfunctional manner. It is concluded that traumatic memories resulting from these altered patterns of encoding are retrieved as isolated fragments without a coherent narrative and contextual information, and significantly differ from emotional memories formed under ordinary circumstances (see also Nadel & Jacobs, 1998). These conclusions are in accordance with the Trauma theory.

It is worth noting that the theoretical predictions made by Metcalfe and Jacobs received support in a number of experimental and clinical studies involving both animals and humans. Indeed, it has been found that exposure to acute and chronic stress, as well as induced conditions of high levels of stress hormones (e.g., glucocorticoids), impairs the hippocampus health, thus altering its memory functions linked to the retrieval of spatiotemporal and declarative information (Brown et al., 2004; de Quervain et al., 2003; Dorey, Piérard, Chauveau, David, & Béracochéa, 2012; Krugers et al., 1997; Minni et al., 2012). At the same time, there is also evidence that laboratory-induced stress and exposure to emotionally arousing stimuli enhance the amygdala activity, facilitating the encoding of emotional aspects of experience and increasing the probability that this information will be stored in and retrieved from the long-term memory (Cahill et al., 1996; Hamann, Ely, Grafton, & Kilts, 1999; Ritchey, Dolcos, & Cabeza, 2008; Roozendaal, Brunson, Holloway, McGaugh, & Baram, 2002; Roozendaal, Schelling, & McGaugh, 2008; for comprehensive reviews on these topics, see de Quervain, Aerni, Schelling, & Roozendaal, 2009; Roozendaal, 2002).

Studies investigating the neural correlates of PTSD are also of particular interest for the present article. Beginning with Bremner et al.'s (1995) study of Vietnam combat

veterans suffering from PTSD, an elevated number of neuroimaging studies (Bremner et al., 1997, 2003; Lindauer et al., 2004; Stein, Koverola, Hanna, Torchia, & McClarty, 1997; Villarreal et al., 2002; Wignall et al., 2004) have demonstrated that trauma-exposed PTSD patients show a significant reduction in the volume of their hippocampus relative to control subjects. Specifically, in a recent meta-analysis of 13 studies using magnetic resonance imaging, Smith (2005) estimated that PTSD individuals had a 6.6% smaller right hippocampal volume and a 6.9% smaller left hippocampal volume in comparison with well-matched control participants, encompassing both trauma-exposed individuals who did not develop PTSD and subjects without significant trauma exposure. Further meta-analytic studies conducted by Kitayama, Vaccarino, Kutner, Weiss, and Bremner (2005) and Karl et al. (2006) reached similar results.

To conclude this section, it should be noted that neuroanatomical abnormalities in the hippocampus structure are often associated with factors other than trauma exposure, such as for example substance abuse, depression, and aging. While it has been shown that these personal and clinical conditions may play an effective role in modifying the normal morphology of hippocampus (see, for example, Campbell, Marriott, Nahmias, & MacQueen, 2004), studies of PTSD patients minimizing or controlling for their possible confounding effects (e.g., Bremner et al., 1997; Lindauer et al., 2004) seem to indicate that the phenomenon of hippocampal volume reduction is specific to PTSD or, at least, is more strongly correlated with the severity of PTSD symptoms relative to other conditions (cf. Villarreal et al., 2002). Based on this and related arguments, some neurobiology researchers (e.g., Elzinga & Bremner, 2002) have proposed that hippocampal atrophy resulting from trauma exposure should be considered as one of the possible determinants of the memory disturbances (e.g., fragmented memories, partial and full amnesia) frequently observed in PTSD patients.

## Summary and Conclusions

In the preceding sections, we reviewed five main arguments in favour of the thesis that autobiographical memories for traumatic and emotional events should be considered as qualitatively different types of recollections. Overall, there seems to be good reasons to accept this thesis. First, traumatic and emotional memories might differ because they are formed in response to classes of events (i.e., traumatic and emotional events) which pose different risks and challenges to people's survival, occur with a diverse frequency, and are supposed to occupy a very different place within the individual's personal history. Second, while both positive and negative emotional events typically do not have clinical consequences on the person's health, traumatic experiences may be associated with the development of either short- or long-term psychological disorders, some of which (e.g., dissociation, PTSD) directly involve memory dysfunctions. Third, it has been claimed that traumatic experiences, but not emotional ones, may give place to phenomenon of recovered memories, namely they can emerge in the autobiographical memory after relatively long periods of partial or total amnesia **from** their occurrence. Fourth, emotional memories are hypothesized to be shared with other persons with a higher frequency relative to traumatic memories. Lastly, it has been assumed that traumatic events, as compared to emotional ones, are more likely to impair selected brain systems and structures directly implicated in the regulation of memory functions.

As we have illustrated throughout the article, the five arguments summarized above have found support in a number of studies conducted in the fields of cognitive psychology, clinical psychology, as well as neurosciences. However, it is worth noting that research conducted thus far differently contributed to the characterization of the theoretical debate about the nature of traumatic memory. More in detail, while empirical evidence in favour of the first argument is compatible with the Trauma Superiority theory, studies corroborating

the second, the third, and the fifth argument provide support for the Trauma theory. As it has been said, research concerning the fourth argument found contradictory results; therefore, it is unclear which theory (i.e., Trauma theory, Trauma Superiority) could best account for the reported differences in the social sharing of traumatic and emotional memories.

Taken together, the studies reviewed in the present article suggest that there is not at the present a single theoretical approach able to fully explain all the available data about differences between traumatic and emotional memories. Instead, either the Trauma theory or the Trauma Superiority theory provide *ad hoc* explanations for data collected from various typologies of participants and in different research contexts. We argue that our understanding of the special nature of traumatic memories would greatly benefit from the formulation of an unified and comprehensive theory able to jointly account for the various findings we have presented. However, in order to attain this goal, we believe that researchers should first resolve two main problems that characterize the current empirical literature.

The first problem has to do with the choice of types of autobiographical memories to be investigated. As it has been illustrated in the previous sections, some researchers (e.g., Tromp et al., 1995) compared memories for traumatic events with memories for both emotionally negative events and positive ones. However, other authors (e.g., Peace & Porter, 2004) employed simplified research designs in which only traumatic and positive emotional memories were compared. We contend that the latter empirical strategy does not allow to investigate the entire spectrum of affective experiences, thus obscuring potential similarities and differences between memories for them. Hopefully, future researchers will jointly assess how people recall all the three classes of events we mentioned (i.e., traumatic events, nontraumatic emotionally negative events, and positive ones). As a result, when



sufficient data collected using this strategy will be available, studies following a meta-analytic approach could shed light on the distinctive features of traumatic and emotional memories, providing at the same time indications on what are the factors affecting these characteristics. **Furthermore, studies of this kind could permit future researchers to test the hypothesis that memories for traumatic and emotional events might differ only quantitatively (e.g., in terms number of details) rather than qualitatively.**

A second problem of the current empirical literature is that, when assessing memories for personally traumatic events, researchers exclusively analyzed the negative side of these experiences (e.g., PTSD, dissociation, memory disorders) . Indeed, a recent corpus of research has documented that a significant proportion of trauma victims report positive life changes in the aftermath of trauma. These changes (e.g., enhanced interpersonal relationships, a greater sense of personal strength and resilience, a richer spiritual life) directly derive from the experience of trauma and have been collectively referred to as *posttraumatic* or *adversarial growth* (for a reviews, see Linley & Joseph, 2004; Tedeschi & Calhoun, 2004). We argue that future researchers should investigate how posttraumatic growth influence memory for traumatic experiences. Indeed, it is possible that people who are positively responding to trauma would recall their traumatic experiences in a unique way relative to individuals in other conditions. Researchers should also consider the complex relationship between positive emotions and autobiographical memory. For example, Barbara Fredrickson's (1998, 2001) broaden-and-build theory assumes that positive emotions broaden people's momentary thought-action repertoires; we argue that this might have specific effects on the individuals' ability to access and report their past experiences. Altogether, these issues deserve attention in future studies implementing self-report instruments which will assess the positive consequences of both traumatic and emotional events.

To conclude, we recognize that the great part of the studies discussed in the present review refer to clinical or quasi-clinical populations. Indeed, researchers investigating autobiographical memory in healthy groups (e.g., Bohanek, Fivush, & Walker, 2005; Butler & Wolfner, 2000; Porter & Birt, 2001; Waters et al., 2012) have found that recollections of traumatic and emotional events (either positive or negative) are similar with respect to relevant memory characteristics, including vividness, intensity of emotional responses, and overall memory quality. These findings suggest that the special nature of traumatic memories might concern only those life experiences directly impairing the mental health of trauma victims, thus having a clinical relevance for these individuals and their therapists. Another possible explanation of the discrepant results obtained from clinical and nonclinical studies points to the specific traumas recalled by people with and without trauma-related disorders. It is arguable that, when questioned about their past traumatic experiences, trauma-exposed people who do not develop trauma-related disorders would report personal events which significantly differ in their content from the ones reported by clinical subjects. This assumption has found indirect support in a study of healthy undergraduates conducted by Butler and Wolfner (2000). Participants of this research were asked to recall and describe the most traumatic event they experienced before the age of 13. Results indicated that only 8% of the reported events qualified as DSM-IV potential traumatic stressors, while the remaining part referred to other distressing experiences not commensurable with the ones mentioned in the DSM-IV. These findings point to the necessity to better delimitate the boundaries of the concept of traumatic event. Specifically, future researchers should clarify if the concept of traumatic event is a clinically-defined construct to be used exclusively in clinical contexts or if it can also be employed when describing the personal events occurring in the life of healthy people. Empirical studies investigating how nontraumatized people and trauma victims – with and without clinical

disorders – define the concept of *traumatic event* may provide valuable information on this issue. In turn, results from these studies could affect the definitions of trauma formulated by researchers at the theoretical and empirical level, thus promoting the reciprocal understanding between researchers, trauma victims, and common people when they talk about traumatic experiences.

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