



Universiteit
Leiden
The Netherlands

A memory like an elephant? The consistency of memory for emotional events.

Giezen, A.E. van

Citation

Giezen, A. E. van. (2007, November 8). *A memory like an elephant? The consistency of memory for emotional events*. Retrieved from <https://hdl.handle.net/1887/12420>

Version: Corrected Publisher's Version

License: [Licence agreement concerning inclusion of doctoral thesis in the Institutional Repository of the University of Leiden](#)

Downloaded from: <https://hdl.handle.net/1887/12420>

Note: To cite this publication please use the final published version (if applicable).

7

General

Discussion

The central focus of the present thesis was consistency of memory for an emotional event. We measured different aspects of memory consistency, completeness and accuracy, as well as a broad range of symptoms like posttraumatic stress reactions and psychological mechanisms like thought suppression and dissociation. The investigated samples included victims of recent violent assault, students with posttraumatic stress symptomatology and healthy volunteers. A review paper served as a theoretical background for the empirical studies presented in this thesis.

This chapter starts with a summary of the major findings reported in this thesis, followed by a discussion of the findings, methodological considerations as well as implications for clinical and legal practice. The thesis will be concluded with recommendations for future research.

Summary of the main findings

The studies presented in this thesis concentrate on memory for an emotional event, with a specific focus on completeness, consistency and accuracy of emotional memories and their predictors. In doing so, both field and laboratory studies were conducted.

Chapter 2 described a literature review that aimed to perform a systematic comparison of field and experimental research on consistency of memory for emotionally arousing events. The main results indicated that relatively few studies have been conducted on consistency of memory for emotional events. In the reviewed studies, consistency was not defined, measured and coded in a standardized way. Results were divergent. Some authors found that memories for an emotional event were stable, while others found dramatical changes in memory over time.

In the prospective field study (chapters 3 and 4), trauma victims were interviewed shortly after becoming victim of a violent assault, and again after 3 and 6 months. Completeness and consistency of memory for the traumatic event as well as psychiatric complaints and symptoms and psychological variables were assessed. Results on completeness of memory showed that central aspects were better recalled than peripheral aspects, and emotional aspects related to the assault were more completely recalled compared to situational aspects. More complete recall for emotional aspects and impaired recall of situational aspects appeared to be associated with peritraumatic dissociation at the time of trauma exposure. Over and above the effect of dissociation, thought suppression had the paradoxical effect of enhancing the recall of situational aspects of the assault.

With regard to consistency of memory (chapter 4), results showed that memory for violent assault is fairly consistent, with situational aspects being more consistently remembered than emotional aspects. Also central items were more consistently recalled than peripheral items. No significant amplification of memory was observed. Demographic and assault characteristics, as well as most of the psychological and psychiatric variables did not predict memory consistency. However, some evidence was found for higher levels of state and trait dissociation being associated with the absence of information. General dissociative tendencies were significantly related to inconsistent recall over time.

In addition to the field study, a laboratory study was conducted (chapter 5). Memory for emotional and neutral stimuli was assessed in both trauma victims and controls. The availability of an objective report made it possible to study also accuracy of memory and the relation between accuracy and consistency. In addition to the field study, the experimental study showed that memory for both emotional and neutral stimuli was quite consistent. Memory also became more accurate over time. Central aspects were more accurately and consistently remembered than peripheral aspects of both emotional and neutral information. A remarkable finding was that accuracy and consistency were highly correlated. Consistently recalled information was significantly more often accurately recalled, with the central aspects being better recalled than the peripheral aspects.

Chapter 6 reports on a study investigating consistency of memory for childhood traumatic events in patients with a Borderline Personality Disorder (BPD) after long-term psychotherapy with Transference Focused Psychotherapy (TFP) and Schema Focused Therapy (SFT). Results showed

that the mean number of reported sexual, physical and emotional traumatic events did not change following treatment. Test-retest correlations of the trauma-interview also indicated high stability of the total number of sexual, physical and emotional events reported. The majority of the patients, however, did no longer report at least one of the 33 listed events after psychotherapy, and the majority reported at least one event that they had not mentioned before the start of treatment. These findings were not related to type of treatment or changes in suppression, intrusions, avoidance of intrusions, dissociative symptoms, depressive symptoms, and BPD symptoms following treatment.

The results of this thesis show that overall, memory for a recent violent assault, for sexual, physical and emotional traumatic events, and memory for emotional and neutral stimuli is fairly complete and consistent over time. Emotional state, psychiatric status and psychological variables, with the exception of (peritraumatic) dissociation, do not have a strong influence on completeness, consistency and accuracy of memory for emotional events.

Integration of findings

Completeness of memory

To obtain a complete account of an emotional event is almost impossible, but how complete are our memories for an emotional or even traumatic event? It seems that victims of assault are able to recall quite a lot of information, with emotional aspects being even more completely recalled than situational aspects and central aspects more completely recalled than peripheral aspects. The overwhelming emotions experienced while exposed to an emotional event might interfere with adequate encoding of the more situational aspects of the event. In analyzing predictors of completeness of recall, (peritraumatic) dissociation was positively associated with recall of emotional aspects, but negatively associated with recall of situational aspects. Apparently, higher levels of state dissociation while exposed to violence may enhance later recall of emotional information and impair recall of situational aspects.

Studies on the completeness of memory are scarce (Smeets, Candel, & Merckelbach, 2004; Halligan, Michael, Clark, & Ehlers, 2003). Our study is one of the first (see also Halligan et al., 2003; Harvey & Bryant, 1999) to observe a relationship between state and trait dissociation and repeated assessments of completeness of memory in traumatized individuals. Laboratory studies (Kindt & Van den Hout, 2003; Kindt, Van den Hout, & Buck, 2005) with objective tests of memory fragmentation did not observe an association between dissociation and memory fragmentation. It is important to make a distinction between objective memory performance and subjective evaluations of memory. In our field study subjects were not asked to evaluate their trauma memories with respect to memory quality or memory fragmentation, but to respond to specific questions in relation to a recent assault experience.

Dissociation is often said to be related to dysfunctional information processing. State dissociation may affect information processing leading to incoherence at the time of encoding and subsequent memory fragmentation at recall (e.g. Engelhard, Van den Hout, Kindt, Arntz, & Schouten, 2003). Halligan et al. (2003) found dissociation to be strongly related to a data-driven processing style, as opposed to a conceptually driven processing style. When processing of a traumatic event is data driven, than it is likely to be poorly organized and detailed information may be missing. Our findings on

completeness of memory suggest that in a high threat situation state dissociation denotes a primarily data-driven processing style, resulting in inadequate encoding and impaired recall of situational aspects and enhanced recall of emotional memory aspects, which is in line with findings reported by Ehlers and Clark (2000).

Thought suppression predicted the number of situational aspects recalled, but only after accounting for the effects of state and trait dissociation on completeness of situational memory. Apparently, independent of and above the effect of dissociation the tendency to suppress negative and unwanted thoughts may have paradoxical effects. Thought suppression actually enhances the frequency of these thoughts (Wenzlaff & Wegner, 2000). Thus, cognitive suppression of the assault probably will lead to recurrent thoughts and images of the assault and this process of repetition may enhance situational memory aspects of the assault.

Consistency

With regard to consistency of memory, a growing number of studies have investigated the extent to which people are consistent in their recall, but relatively few studies have been conducted including victims of a traumatic event. Among these studies, different terms and definitions are used to indicate consistency of memory. Although accuracy and consistency refer to different concepts, they are sometimes used interchangeably. In this thesis, consistency of memory was measured and defined in a standard way, using exactly the same instrument on at least two different occasions, in participants who personally experienced a traumatic event as well as in participants who were not personally involved.

Although several authors (e.g. Van der Kolk & Fisler, 1995) have stated that emotional arousal may interfere with the construction of declarative memory and that information can become available at a later stage, for example as commissions, no amplification of memory was found. In accordance with these results, no evidence was found that psychotherapy resulted in memory amplification for childhood trauma. At first sight, memory for violent assault, emotional stimuli and childhood trauma was fairly consistent. However, memories for childhood traumatic events were not that consistent. Although the total number of reported childhood traumatic events remained stable over time, changes from yes to no and from no to yes were found, comparable with commissions and omission errors, indicating less consistent memories for childhood events compared to consistency of memory for a recent traumatic event. This difference can be explained by the amount of exposure to a traumatic event. Single exposure to an event is more likely to be remembered (e.g. Wagenaar, 1986) than repeated exposure. Subjects who have been repeatedly abused may use a general event schema. A person who has been abused repeatedly may have difficulty remembering the details of particular episodes of abuse, because similar events tend to merge into a general event schema (Linton, 1975). Once-salient events become less memorable when more and more similar events are experienced (Linton, 1975). Participants may lose access to specific event memories although retaining more generic personal memories containing the gist of events or a schema of the events (Bartlett, 1932). Most of the separate occasions are forgotten and only the more invariant properties of the event are retained.

It was stated in chapter 2 that exposure to more severe trauma, a higher degree of personal involvement and the severity of symptoms present may lead to more consistent memories or memory amplification over time. These factors may be related to consistency or amplification of trauma reports over time because more severe and personally experienced events are expected to have more impact and therefore will be more emotionally arousing. Emotional arousal is believed to enhance memory for stressful events (Christianson & Safer, 1995). Also, experiences that are less accessible (e.g., through PTSD, dissociation, denial or thought suppression) may become conscious later on (Melchert & Parker, 1997; Terr, 1991). In the case of PTSD, individuals with frequent intrusive memories may gradually recall memories of the event as a result of involuntary re-experiencing of the event (Southwick, Morgan, Nicolaou, & Charney, 1997). Results from this thesis are not in agreement with these explanations. Based on our results, consistency seems unrelated to the emotionality of the event or (PTSD) symptoms present.

With regard to the central and peripheral aspects of memory reports, the central and critical details were more complete, consistently and accurately remembered than peripheral details. The higher degree of consistency for the central core of information compared to the specific details concurs with the literature (Cahill & McGaugh, 1995; Christianson, 1992; Herlihy, Scragg, & Turner, 2002; Heuer & Reisberg, 1990; Schacter, 1996). The less consistent recall of the emotional aspects of a traumatic event is in line with findings by Christianson and Safer (1995) and Zoellner, Sacks, and Foa (2001), who state that central factual information of an emotional event is relatively well retained, whereas memory reports for emotions seem to be fairly inaccurate and unstable over time. Because in the field study the emotional aspects were recalled very complete, but not so consistent, reports on the emotional aspects may be at a higher risk for inaccuracy of reports.

Demographic and assault characteristics, as well as most psychological and psychiatric variables were not found to be predictive of memory consistency. Dissociation appeared to be the only significant predictor of memory consistency. The absence of a relationship of most psychological and psychiatric symptoms with memory consistency was not in line with our expectations. We expected the presence of symptoms to be of influence to the consolidation and retrieval of memory for the emotional event. A high level of symptoms in reaction to a traumatic event appears to be associated with amplification of memory. Prior studies showed that trauma-related symptoms negatively influence the consistency of memory for a traumatic event (Herlihy et al., 2002; King et al., 2000; Roemer, Litz, Orsillo, Ehlich, & Friedman, 1998; Schwarz, Kowalski, & McNally, 1993; Southwick et al., 1997; Wyshak, 1994; Zoellner et al., 2001). On the contrary, Spinhoven, Bean, and Eurelings-Bontekoe (2006) found a positive association between psychopathology and consistency of memory. Their results showed that unaccompanied refugee minors with low levels of posttraumatic stress showed a high level of inconsistencies in the form of omissions. They interpret this finding by stating that forgetting traumatic experiences can be seen as some sort of psychological adjustment. Maybe participants fail to report information because they no longer want to be emotionally disturbed by them. The absence of a relationship of psychopathology and memory consistency in this thesis may be explained by the population used. The above mentioned studies which found an amplification of memory in participants with high levels of complaints mainly included victims of war-zone exposure

and refugees. It is a possibility that in those groups other processes are of influence, like the need to be acknowledged.

Dissociation appeared to be the only significant predictor of memory consistency. This result concurs with findings of the field study as reported in chapter three in which it was found that both general dissociative tendencies and peritraumatic dissociation during assault resulted in a less complete recall of situational aspects of the trauma and with those of several other studies which found that state dissociation may affect information processing leading to incoherence at the time of encoding and subsequent memory fragmentation at recall (e.g. Engelhard, Van den Hout, Kindt, Arntz & Schouten, 2003). Our study extends these findings by showing that not only completeness or fragmentation of memory but also consistency of recall is affected by dissociation. Interestingly, these results indicate that dissociation is not only confined to the realm of subjective reality denoting a subjective evaluation of memory functioning (Kindt et al., 2005), but proves to be associated with actual memory performance over time.

Consistency and accuracy

Consistency is often used as a proxy for memory accuracy. Can this be recommended based on the outcomes of the thesis? In order to assess memory accuracy, an 'objective' assessment of facts has to be available, which is often not the case. Laboratory research allows verification of reported facts, making it possible to study both accuracy and consistency, and their relationship.

With regard to accuracy of recognition memory, half of the questions in the laboratory study described in chapter 5 were answered accurately. Furthermore, results show that repeated memory testing led to hypermnesia. After a delay of 2 weeks, free recall and recognition memory became significantly more accurate. With regard to the increased accuracy rates on the recognition memory task, a testing effect is a likely explanation. The first memory test has a positive effect when the same information is tested later on. It is also possible that at the time of the second memory test, participants choose the alternative that seems like a reasonable guess.

The most remarkable finding of our study however is the high correlation between accuracy and consistency. The level of consistency between the two memory accounts was significantly related to the accuracy ratings at both assessments. Although our way of questioning and scoring is comparable to theirs, our findings are only partly in line with results by Smeets et al. (2004) and Brewer, Potter, Fisher, Bond, and Luszcz (1999). Smeets et al. (2004) did not find a significant correlation between accuracy and consistency. Brewer et al. (1999) did find a moderate correlation of .30 for overall accuracy and consistency. When the correlation between accuracy and consistency is significant, we still do not know if consistency could be used as an indicator for memory accuracy. When looking at the combined accuracy and consistency scores, results showed that when information is consistently recalled, the central aspects are more often also accurately recalled, in contrast to the peripheral aspects. It is important to note that not all consistently recalled information is also accurate. Furthermore, results show that when information is inconsistently recalled it is more often inaccurately recalled, but still can be accurate, and may even become more accurate with repeated testing. One should be careful using consistency as a proxy for accuracy. The outcome of

this thesis does not fully support the notion that consistent answers are accurate. When using consistency as a proxy for accuracy, this could be done best for the more central aspects of a memory report.

Biological underpinnings

Apart from psychological problems, experiencing traumatic stress can have long term neurobiological effects on the structure and functioning of the brain. Glucocorticoids are responsible for these adverse effects, particularly to the hippocampus. Prolonged stress results in excess exposure to glucocorticoids (Sapolsky, 1996). The hippocampus is known to be critically important for explicit or declarative memory (Schacter et al., 1995). Negative effects of stress on the hippocampus can lead to smaller hippocampal volume and deficits in hippocampal based memory. Magnetic resonance imaging (MRI) studies showed reduction in volume of the hippocampus in both combat veterans and victims of childhood abuse (Bremner, 1999). Bremner et al. (1995) reported deficits in explicit memory in veterans with PTSD. Memory deficits were correlated with a hippocampal volume reduction. Glucocorticoids can modulate memory functions. Prolonged exposure to stressful events is associated with a marked increase in the release of the stress hormone cortisol from the adrenal glands. Elevated cortisol levels may lead to impaired declarative memory. According to Elzinga, Bakker, and Bremner (2005) stress induced cortisol specifically affects long-term consolidation of declarative memory. Although on a neurobiological level, prolonged traumatic stress has proved to have negative long-term effects on memory, so far no research has been published that links memory consistency with biological aspects.

Methodological considerations

Findings from the different studies should also be regarded in the light of certain strengths and limitations. A number of strengths and methodological comments and limitations have already been mentioned in the previous chapters and will be reiterated and expanded here.

Strengths

The research reported in this thesis has some important strengths, concerning both the populations and the designs used. Firstly, we were able to study consistency of memory for a personally experienced traumatic event and follow-up on post-trauma complaints. Except for chapter 6, we used non-treatment seeking populations, where most studies focus primarily on clinical samples. The samples included in the current thesis contribute to the generalizability of our findings. Also, the majority of our subjects had experienced a real life traumatic event. Most studies on traumatic events like assault or abuse consist mainly of a female population (Gershuny & Thayer, 1999) indicating that those trauma reactions only concern women. The victims of assault interviewed for the purpose of this thesis included an almost equal distribution of both men and women, extending the external validity of the findings.

Another important strength of the field study is that, according to Candel and Merkelbach (2004), the ideal study on peritraumatic reactions should interview trauma victims shortly after the

traumatic event, to rule out the problem of rapid forgetting. Also, questions about peritraumatic dissociation should precede questions about other complaints or symptoms. In our prospective field study, we interviewed victims as shortly after the event as possible. Furthermore, peritraumatic dissociation was assessed before other symptom questionnaires were presented.

A common problem with memory consistency concerns the fact that this concept is often not defined and measured in a standard way. If possible, a standardized interview measure was used, specified in commissions and omissions to assess consistency of memory, making the results more valid.

The present thesis included both field and laboratory studies, ensuring that the results can be generalized. An advantage of laboratory research is that it allows verification of the accuracy of memory. Therefore, it is possible to determine the relationship of consistency with accuracy. An important advantage of the field studies is the personal involvement of the participants. The convergence of results from the field and laboratory studies contributes to the generalizability of the findings from this thesis.

Limitations

Findings from the different studies should also be regarded in the light of certain limitations. A number of methodological comments and limitations have been mentioned in the previous chapters and will be reiterated here.

A first point of concern is the representativeness of the population studied (chapter 3, 4 and 6). Although we spared no means to inform victims about the study, the response rate was relatively low. Participation was entirely voluntary, possibly resulting in a selection bias which may have influenced the study findings. Therefore, participants may not be representative of all victims of assault. People who were motivated to participate in this research project may have been more motivated to seek help and tell their stories. Participants in this study also received no direct benefit of their participation, although it can be stated that interviewing trauma victims and listening to their stories has a therapeutic effect in itself. To come to the attention of the researchers, the victim must have reported the crime to the police, or contact the researchers themselves. People who do not report their crime, or choose not to participate, may have different patterns of symptoms and recovery. However, the above mentioned limitation does not critically apply to differential drop-out during the field study or systematic differences between participants from the field study and participants from the field study volunteering for the experimental study.

With regard to the laboratory findings (chapter 5), a general limitation of studies on the effects of emotional events is the ecological validity of experimental analogues of emotional events. Clearly, it is difficult, and often unethical, to induce profound emotions in an experimental setting. The emotional stimuli used in our laboratory study were not rated as very distressing. A more distressing stimulus like a distressing film could have been used (Kindt & Van den Hout, 2003; Smeets et al., 2004). However, also when watching a film, participants are not personally involved. The degree of involvement in and the severity of emotionally arousing events have found to be associated with memory consistency

(Foa, Molnar, & Cashman, 1995; Krinsley, Gallagher, Weathers, Kutter, & Kaloupek, 2003; Neisser et al. 1996).

The quality of memories for a traumatic event depends on the time span between the index event and assessment. While performing our field study, we tried to keep this interval as short as possible in order to diminish the time effect of rapid forgetting by only including victims of recent assault less than two months ago. A restriction concerns the differences in length of follow-up period between the index event and repeated assessments in the field and experimental studies. Therefore, it is difficult to make a direct comparison between the results of field and laboratory studies.

Another point of concern is the validity of the measurements used in the different studies. Most data were retrospectively collected. Retrospective techniques, especially when measuring peritraumatic dissociation, are often seen as a limitation (Tichenor, Marmar, & Weiss, 1996; Candel & Merckelbach, 2004). Also the studies reported in this thesis made use of self-report measures, while it is generally believed that interview measures are more reliable than self-report questionnaires (Dohrenwend, 1973; Southwick et al., 1997). Unfortunately it is not always possible to include interview measures. Besides the use of retrospective self-report measures, the psychometric properties of some of our instruments, like the Memory of Assault Interview in the field study and the structured trauma interview in the clinical study, are not yet available; therefore the results must be interpreted with caution. In this context it should also be mentioned that questions of the MAI related to emotions experienced during the assault may be easier to answer (e.g. "Did you feel you had any control over the situation?") than questions related to situational aspects (e.g. What was the location of the assault). Moreover, some authors even argue that memory for emotions and memory for facts operate through different processes (See Christianson & Safer, 1995). These differences preclude a direct comparison of the recall of emotional and the recall of situational items. Furthermore, no measures were included to rate subjective memory disorganization. Therefore it was not possible to detect the influence of distress or avoidance experienced during the trauma interview on this aspect of memory reports. Finally, because of their retrospective nature, instruments used in the field study to assess memory for past emotional events were sensitive to bias. Since recall could have been influenced e.g. by symptom level or mood at the time of the assessment, it cannot be excluded that instead of memory confabulation was assessed. Because no objective reports of the emotional event were available, it is not possible to confirm whether reports referred to actual memories or confabulations. Consequently, in measuring the completeness of memory of the assault in the absence of objective reports of the assault, the scores on the MAI also contain aspects of meta-memory.

The above mentioned strength of interviewing trauma victims as soon as possible after the traumatic events also has a negative side effect. Because of the short interval between the traumatic event and the interview, it is often not possible to assess a diagnosis of PTSD, which can only be diagnosed when the duration of the symptoms is more than one month. Also, emotions are still present in those victims who were interviewed very shortly after the event. This may have affected their memories of the traumatic event and self-report of symptoms. These effects were repeatedly verified at the two follow-up assessments.

Finally, studying consistency of memory comes at a cost. To assess consistency, a necessary condition is that assessments using exactly the same instrument should be performed on at least two different occasions. The cost consists of the fact that the initial assessment can provide cues that can stimulate and aid recall at the second assessment. This will result in memory amplification based on more accurate memories becoming available at retest. Also, when at the second assessment a participant gives a specific answer (e.g. that the perpetrator wore a blue baseball cap), one can never be sure if this is what he remembers seeing at the time of the attack, or whether it is the answer he remembered having given at the first assessment. This pattern of answering will result in memory consistency in the possible absence of an accurate memory,

Practical implications

Findings from the studies reported in this thesis can be applied to clinical and juridical practice. This study adds to the literature on completeness, consistency and accuracy of recollections of personally experienced emotional events, broadening the existing knowledge in this field.

With regard to clinical practice, results indicate that reports of traumatic events in a patient's history are fairly stable, but therapists should still refrain from conclusions about the veracity of those memories. Since participants were more consistent in the central aspects, therapist should not focus too much on detailed information but on the broad outline of the reported traumatic events.

An important practical implication of this study concerns different aspects of eyewitness testimony. In a courtroom setting many of the memories of past events are emotionally intense to victims and eyewitnesses. Furthermore, eyewitnesses are often required to report on minute details of what happened. The results of the present study show that witnesses are overall quite consistent, but are probably more accurate and consistent in recalling information central to an event than in peripheral details. The remembered minutiae are possibly less reliable than information central to the event.

Finally, it is also worth noting that experts in both clinical and juridical practice should be careful in using the concepts completeness, consistency and accuracy, since they refer to different concepts and cannot simply be used as an a proxy for one another. One should be cautious in using consistency of memory to indicate whether a memory is true or false. Although consistently recalled memories are often also accurate, they still can be inaccurate or false.

Recommendations for future research

The results from this thesis warrant some directions and implications for further research on consistency of memory for emotional events. Further studies should be conducted to replicate important findings and clarify some of the issues that have been raised throughout this thesis. Also the studies presented in this thesis are not without limitations, and these limitations should be taken in consideration in future studies.

As it remains unclear to what extent the findings of this study can be generalized, in future studies larger and more representative groups of participants are needed. For example, when investigating consistency of memory for violent assault, victims of a broader range of violent crimes

should be included. In our field study only a few (n=7) participants were victims of sexual assault, so no comparison between consistency of memory for a physical assault compared to a sexual assault could be made.

In chapter 5 it was found that consistency and accuracy were highly correlated. Furthermore, when consistently recalled, central aspects of an emotional event were more often accurately recalled than the peripheral aspects. This remarkable finding is worthwhile investigating more thoroughly. The relation between completeness, consistency and accuracy also needs further exploration.

Because in field studies a reliable categorization of central and peripheral aspects is difficult, it is advisable to ask the respondents to rate their answers as central or peripheral to their experience (Herlihy et al., 2002).

Several questions with regard to consistency of memory have not been addressed in the present thesis, and remain to be explored in future studies. For instance, it was not an aim to compare consistency of memory for emotional events with consistency of neutral or pleasant memories. Future studies should address this theme. When investigating aspects of memory for a traumatic event, a control event is advisable. Without a control event it is hard to tell if consistency of memory for an emotional event actually differs from the consistency of memory of a "normal" event.

Further psychometric development and validation of adequate instruments and scoring tools with good psychometric properties to assess consistency of memory for traumatic events is needed when carrying out additional research in this field. Other measures, like objective measures of memory fragmentation and a subjective evaluation of memory performance, so called meta-memory, should be included (Kindt & Van den Hout, 2003). In future studies it may be worthwhile to further investigate the possible bias of primarily processing the emotional and bodily aspects of the event at the expense of more external situational aspects due to higher levels of peritraumatic dissociation. Therefore, objective assessments of data-driven processing are needed.

Finally, when no objective reports of an emotional event are available, one cannot confirm whether reports refer to actual memories. Therefore, it is recommended that the results of field and laboratory studies are compared to see whether there exists a convergence of findings across laboratory studies with their higher level of internal validity and field studies with their higher level of external validity.

Conclusion

In conclusion, the human memory is fairly stable over time. So when it comes to our memory, we are more similar to an elephant than expected. Still, the human memory is sometimes incomplete and prone to inaccuracies and inconsistencies. Maybe an elephant never forgets, but people occasionally do!