# Emotion, Trauma and Memory

Nearly every event of forensic interest is emotional for those who experience it, and for many witnesses and victims it is traumatic. Emotion is among the factors most often assumed — by witnesses and jurors alike — to make memory more reliable. This paper explains how emotion shapes memory: what it strengthens, what it weakens, and why an emotionally charged recollection that feels searingly clear is not, for that reason, accurate. It then turns to the special case of trauma, where the stakes are highest and the intuitions strongest, and where the science cautions that powerful, distressing memories are subject to the same processes of error and reconstruction as ordinary ones — neither uniquely trustworthy nor uniquely unreliable. The purpose is to define the terms a court is likely to encounter and to summarize the research in plain language, without favoring any party. Closely related subjects — the weapon-focus effect, acute stress, recovered memory, and aging — are developed in their own papers and noted here where they bear on the general principles.

## Vivid Is Not the Same as Accurate

Emotional events tend to be remembered vividly. Across many studies the strength of the emotion felt at the time predicts how vivid the later memory feels, largely independent of the kind of emotion — sadness, anger, or fear (Reisberg, Heuer, McLean, & O'Shaughnessy, 1988). The forensically critical point is that vividness, detail, and confidence are properties of how a memory feels, not measures of whether it is correct. A memory can be intensely vivid and still be wrong.

The clearest demonstrations come from memories of shocking public events. After a cargo plane crashed into an Amsterdam apartment block in 1992, most Dutch participants later reported having seen television footage of the moment of impact, and answered detailed questions about what they had seen — yet no such footage ever existed (Crombag, Wagenaar, & van Koppen, 1996). Similarly, people gave confident, vivid accounts of how they learned of the Challenger explosion that were substantially wrong when checked against what they had written the morning after (Neisser & Harsch, 1992). These recollections were emotional, confident, and detailed, and they were mistaken. The accuracy of an emotional memory cannot be assumed from its vividness; it has to be assessed against independent evidence.

## What Emotion Helps and What It Harms

Emotion does not act uniformly on a memory; it helps some parts and hurts others. The well-documented pattern is that emotion improves memory for the central, meaningful core of an event — its gist — while impairing memory for peripheral detail. The central material is often remembered more completely and forgotten more slowly than the comparable core of a neutral event, even as the surrounding details fade (Christianson, 1992; Reisberg & Heuer, 2004, 2007). At the level of the brain, this enhancement is tied to the amygdala's modulation of memory formation for emotionally arousing material, which helps consolidate memory for the emotional core.

The standard explanation is attentional narrowing, sometimes called the Easterbrook hypothesis: as emotion rises, the range of attention contracts onto whatever is most salient or threatening, so that central information is encoded well and peripheral information is barely encoded at all (Easterbrook, 1959). Two cautions follow for legal use. First, what counts as "central" is partly subjective and depends on what seized the particular witness's attention, so the same scene may have a different center for different witnesses. Second, and more important, a detail that is psychologically peripheral may be forensically decisive: a fleeting glimpse of the perpetrator's face may be exactly what attention narrowed away from, even as the witness retains a precise memory of the central threat.

The most studied forensic instance of this pattern is the weapon-focus effect — the tendency of a witness to fix attention on a gun or knife at the expense of the perpetrator's face, producing good memory for the weapon and poorer identification of the person holding it (Loftus, Loftus, & Messo, 1987; Steblay, 1992). Because it is addressed in its own paper, it is mentioned here only as the leading illustration of how emotion can simultaneously sharpen memory for one element and degrade it for another.

## Emotion, Stress, and the Limits of the Enhancement

The enhancement of central memory has an important boundary: it appears to hold for emotional arousal that orients a witness toward an event, but to reverse under the intense stress and personal threat that provoke a defensive reaction. A meta-analysis found that high stress at encoding impairs both the accuracy of witnesses' recall and their ability to identify a perpetrator (Deffenbacher, Bornstein, Penrod, & McGorty, 2004). In a much-cited field study, military personnel subjected to a highly stressful mock interrogation were markedly worse at later identifying their interrogator than personnel who underwent a low-stress version, despite prolonged face-to-face exposure (Morgan et al., 2004). At the same time, real-world cases show that witnesses to genuine crimes can retain accurate memories over months (Yuille & Cutshall, 1986), and laboratory and field findings do not always align. The defensible summary is that moderate emotion tends to aid memory for an event's core, while extreme stress tends to impair it — and that the effects of stress, developed in its own paper, are more complex than any single rule captures.

## Emotion and Retrieval

Emotion influences not only how an event is stored but how it is later retrieved. Strong emotion present at the time of recall can interfere with retrieval, so that memory tested immediately, while the witness is still upset, may be poorer than memory tested after the emotion has subsided. Emotion is also associated with an increased rate of false positives — a tendency to judge something familiar when it is not — possibly because a focus on one's own feelings impairs source monitoring, the ability to track where a remembered detail came from. In the identification context, a false positive means selecting an innocent person. These findings create a practical tension for investigators: allowing an upset witness to calm down may improve retrieval and source monitoring, but waiting also lengthens the interval during which ordinary forgetting and outside contamination operate. The balance must be struck case by case.

## Are All Emotions the Same?

Much of the research has treated emotion simply as "arousal," measured by how worked-up a person felt. But arousal is only one component of emotion, and lumping anger, fear, and sadness together as generic "negative emotion" may obscure real differences (Levine & Pizarro, 2004). On the appraisal-theory view, distinct emotions arise when particular goals are threatened or met, and each emotion then directs attention toward goal-relevant information — fear toward the source of threat and routes of escape, anger toward the person blamed. Because of this, the very definition of what is "central" may shift with the emotion the witness was feeling, and so may which details are well remembered. Positive and negative emotions appear to engage somewhat different styles of processing as well. The practical implication is one of caution: broad claims that "emotion improves memory" or "emotion impairs memory" are too coarse, and the effect in a given case depends on the specific emotion, its intensity, and what it drew the witness's attention toward.

## Trauma and Memory

Trauma is the limiting case of emotional memory, and it is surrounded by the strongest intuitions. A long-standing clinical belief holds that memories of horrific events are special — encoded differently, sometimes fragmentary or banished from awareness, and later recovered intact. The empirical picture is more measured. Traumatic memories are not, by virtue of being traumatic, accurate memories (Laney & Loftus, 2005). They can be vivid, confident, and sincerely held while still containing error,

and the evidence for a special encoding mechanism that preserves them perfectly is weak — a point developed in the companion paper on recovered and repressed memory.

What the research does support is consistent with the broader theme of this paper. The central gist of a genuinely life-threatening event can be remembered very well, sometimes even enhanced. In a rare natural study, passengers aboard a transatlantic flight that nearly ditched at sea showed robust, durable memory for the core details of the disaster years later, whether or not they developed post-traumatic stress disorder; PTSD was associated not with a special trauma memory but with altered control over autobiographical memory generally (McKinnon, Palombo, Nazarov, Kumar, Khuu, & Levine, 2015). The subjective sense that a trauma memory is fragmented or disorganized — a feature linked to PTSD (Halligan, Michael, Clark, & Ehlers, 2003; Jelinek et al., 2009) — reflects how the memory is experienced and organized, not a guarantee of its accuracy.

Critically, traumatic memories remain subject to the ordinary forces of distortion. Misleading post-event information can alter memory even for a vivid, violent event (Paz-Alonso & Goodman, 2008); efforts to suppress thoughts of a distressing experience can increase, rather than reduce, later memory errors (Oulton, Strange, & Takarangi, 2016); and suggestive questioning reaches trauma memories as it reaches others. Of particular note for the courtroom, one study found that cross-examination — long assumed to be the adversary system's corrective for unreliable testimony — did not reliably uncover or fix distorted trauma memories, and its suggestive form could itself induce witnesses to change accurate answers (Segovia, Strange, & Takarangi, 2017). The honest, balanced summary was offered by a researcher who has studied trauma memory in soldiers: "I believe what I remember, but it may not be true" (Morgan & Southwick, 2014). Trauma memory is neither uniquely reliable nor uniquely false; its central gist may be well preserved, while its accuracy in detail must still be assessed against independent evidence.

## Emotion, Trauma, and the Law

The ordinary effects of emotion and trauma go to the weight of testimony, not to whether a witness may testify; under Federal Rule of Evidence 601 every person is presumed competent. The science is most useful in correcting a common intuition that works against accurate fact-finding: that a witness who recounts an event with vivid detail, evident emotion, and confidence must therefore be accurate. The research shows that this intuition is unreliable — emotional and traumatic memories can be richly detailed and sincerely held yet substantially wrong — and that emotion tends to preserve the gist of an event while eroding precisely the peripheral details, including identifying details, that a case may turn on. It also cautions against the opposite error: inconsistency or disorganization in a trauma survivor's account is a known feature of distressing memory and should not be reflexively equated with fabrication, a point of particular importance in settings such as asylum adjudication where credibility turns on the consistency of trauma narratives.

Where the testimony is an eyewitness identification affected by emotion or stress, the reliability of that identification is for the jury to weigh through cross-examination and argument unless it was produced by unnecessarily suggestive police procedures (Perry v. New Hampshire, 2012), and courts have increasingly recognized that confident, emotionally charged identifications can still be mistaken (State v. Henderson, 2011). Whether an expert may explain this research is governed by the rules on scientific evidence and expert testimony — Daubert v. Merrell Dow Pharmaceuticals (1993), Kumho Tire Co. v. Carmichael (1999), and Federal Rule of Evidence 702 in federal court and the states that follow them, and the general-acceptance test of Frye v. United States (1923) elsewhere. Under any standard, such testimony is offered to inform the trier of fact about how emotion and trauma affect memory — not to opine on whether a particular witness is accurate, a judgment the law reserves to the fact-finder.

## Special Issues in Legal Practice

The principles described above apply with equal force to every party in a legal proceeding. Memory operates the same way regardless of who is asking the questions, and the science summarized here

favors no side. What differs between the parties is not the science but the vantage point — the particular places where memory issues tend to surface, and the particular errors each party is best positioned to guard against. The two summaries below identify those recurring issues. They are offered for orientation, not as litigation strategy; in every case the controlling question is what the evidence in that case will, and will not, support, and the expert's role is to inform the trier of fact rather than to advocate for either side.

### Special Issues for Prosecutors

For the State, the science of emotion and memory supports crediting the core of an emotional or traumatic account while remaining careful about its edges. Emotion tends to strengthen a witness's memory for the central, meaningful features of an event, so a victim's account of the gist of a frightening crime may be comparatively durable, and ordinary gaps in peripheral detail — or the disorganization and inconsistency common to trauma memory — should not be mistaken, by the State or by the jury, for fabrication or for a failure to have witnessed the event. The errors the prosecution is best positioned to guard against arise from over-reading the same emotion: treating a witness's vividness, distress, or confidence as proof of accuracy, relying on peripheral details (including some identifications) encoded under high stress or weapon focus, and delaying or conducting interviews in ways that let strong emotion at retrieval distort the account. The constructive course is to anchor the case in the well-remembered core and in independent corroboration rather than in the emotional intensity of the telling.

### Special Issues for Defense

For the defense, the recurring task is to show where the emotion or trauma of the event undermined the reliability of what the witness reports — recognizing that a witness can be sincere, distraught, and certain, and still be mistaken. Attentional narrowing means that peripheral but case-critical details, including the appearance of a perpetrator, may have been poorly encoded, especially where a weapon was present or the witness was under intense stress, conditions the research links to impaired recall and identification. Vividness and confidence, which jurors tend to equate with accuracy, are poor guides to it, as the documented errors in highly emotional public-event and trauma memories show, and post-event suggestion and suggestive questioning reach traumatic memories as they reach others. The error best guarded against is overclaiming in the other direction — treating trauma as proof that an account is false — when the central gist of a traumatic event can be well preserved. The law contemplates that these matters be placed before the trier of fact through cross-examination, through challenge to the conditions of observation and questioning, and, where the governing standard is met, through expert testimony (Daubert v. Merrell Dow Pharmaceuticals, 1993; Frye v. United States, 1923).

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