

F

Flashbulb Memory



Jennifer M. Talarico
Lafayette College, Easton, PA, USA

Abstract

Flashbulb memories are long-lasting, vivid, confidently held memories of the reception context for learning about surprising, important, public events that were not directly experienced. Initially thought to be distinguished by their remarkable accuracy, evidence of omission and commission errors are as common in these memories as in ordinary autobiographical memories. Rather, it is the durability, vividness, and confidence with which flashbulb memories are held that seem to differentiate them from everyday memories. The substance of flashbulb memories are mundane experiences, made remarkable only due to their association with remote, public events. When a consequential public event occurs, that event captures attention due to its novelty and disruption of ongoing experience. The event is also likely to evoke a strong emotional response, frequently as a result of its resonance with aspects of identity. Subsequently, rehearsal processes, as supported via social networks, reinforce the interpretation that the public event was important and noteworthy. These linkages between particular event features and resulting memory characteristics

provide fertile ground for investigators interested in social, emotional, and cognitive interactions in mnemonic function. Further, the apparent paradox of why a personal memory of hearing surprising news should seem so unforgettable suggests that the flashbulb memory phenomenon will continue to resonate with the general population.

Definition

Flashbulb memories are long-lasting, vivid, confidently held memories of the reception context for learning about surprising, important, public events that were not directly experienced.

Personal Memories of Public Events

The term flashbulb memory was coined by Brown and Kulik (1977) to describe the seemingly perfect recall of an otherwise mundane event when an individual first learned the news of a consequential public event. The metaphor was meant to emphasize the indiscriminate and permanent capture of ongoing experience as differentiated from typically selective and fallible encoding processes. This claim of extraordinary accuracy was strongly associated with the flashbulb memory phenomenon in the early years of its research and remains a key component of lay understanding of the concept.

Is a Special Mechanism Required to Explain Enhanced Flashbulb Memory Accuracy?

Perhaps surprisingly, there was relatively early evidence of inconsistencies and omissions in flashbulb memory recall, undermining the indiscriminancy claim. Among the most well-known examples of erroneous recall is Neisser's (1982) recollection of listening to a baseball game when the radio broadcast was interrupted to announce the Japanese attack on the US port at Pearl Harbor; this memory is necessarily false because the Pearl Harbor attack occurred on December 7, 1941, and the baseball season ended on October 6 that year.

A plausible reinterpretation of this memory was provided by Thompson and Cowan (1986) where they suggested that a football broadcast was likely to have been substituted by a baseball game. Neisser (1986) himself agreed that this was likely the corrected source of his false memory, yet he maintained that the nature of the error was significant because it altered the meaningfulness of the memory. The transformation of the sport being interrupted made the memory more congruent with his self-image as a baseball fan – a characteristic that was a significant component of his identity both at the time of the event and throughout his life. Further, the change aligned his personal actions with the collective implications of the event; in other words, he was doing the “quintessentially American thing” (p. 286) of listening to “The National Pastime” (and not just any ordinary sporting event) when the USA was attacked. More generally, this reconstructive error underscores the similarity between flashbulb memories and other autobiographical memories where false memories frequently result from conflating details from one event with those of another or from the merging of many similar or related events.

Neisser's (1986) assertion that mistakes in memory are systematically influenced by social identity factors has been supported by subsequent research. For example, Berntsen and Thomsen (2005) demonstrated that elder Danes' memories for the invasion and liberation of Denmark by the

Germans in World War II were systematically biased in the direction that was consistent with their emotional interpretation of those events. In other words, participants recalled the weather as colder and rainier than it actually was on the day of the invasion in contrast to recalling the weather as sunnier and warmer than it actually was on the day of liberation.

Because event details can only rarely be compared to objective evidence as a means to assess their accuracy, alternative techniques were developed to test what has been called the “special-mechanism hypothesis” (McCloskey et al. 1988, p. 171). That is, the original Brown and Kulik (1977) claim that flashbulb memories are differentiated from ordinary memories by some distinct processes that enhance encoding effectiveness. Typically, this is done by eliciting flashbulb memory reports from two time points – one close in time to the event itself and one later – and then evaluating consistency between those reports. Notably, it is possible that the event described in the initial memory report is itself an inaccurate representation of what actually occurred and therefore consistent recall does not guarantee accurate recall; however, it is certainly the case that inconsistencies between memory reports indicate that at least one of the reports must be inaccurate. Given the effects of delay on forgetting, investigators presume that the report obtained closer in time to the event occurrence is more likely to be accurate and attribute inconsistencies to errors in subsequent reports.

The first such example of this procedure was by Neisser and Harsch (1992) who explored the consistency of flashbulb memories over time by asking undergraduate students to report how they learned the news of the *Challenger* NASA shuttle disaster within days of the event and then again more than 2 years later. Although these data included evidence of consistent memory reports from time one to time two, they also showed dramatic evidence of inconsistent recall. Another key findings from this work (and one that has been replicated by future studies conducted by independent investigators) were remarkable consistencies among the inconsistencies. For example, initial memory reports included a variety of

sources from whom participants initially learned the news, yet later memory reports were much more likely to indicate that the initial source of news was a television broadcast. The ubiquity of television coverage of the *Challenger* disaster, the likelihood that all participants (eventually) watched such footage, and the graphic visual images of the explosion presented via that medium all combined to enhance the probability that a given participant would recall the experience of watching the news on television and forget an earlier, but less salient, conversation in which another person shared the news with them.

Furthermore, the Neisser and Harsch (1992) data showed that participant confidence in the accuracy of their memory was unrelated to the objective consistency measures. These data, in conjunction with Neisser's own experience as described earlier, led them to conclude that flashbulb memories may be "appreciably less reliable than other cases of vivid and confident recall" (p. 30). However, both the assumption of greater accuracy posited by Brown and Kulik (1977) and the suggestion of decreased accuracy provided by Neisser and Harsch (1992) include an implicit comparison with memories of everyday experiences. Brown and Kulik (1977), in reference to memories of learning that US President John F. Kenney had been assassinated, asked rhetorically, "What else can one remember from 1963?" (p. 74) but it would be later investigators who addressed that question empirically.

In the wake of the terrorist attacks in the USA on September 11, 2001, Talarico and Rubin (2003) explicitly compared flashbulb and everyday autobiographical memories. Importantly, the memories assessed were from the same time frame (i.e., occurred within days of each other) and were cued with similar specificity (i.e., participants were asked to provide "a two- to three-word description [for the everyday event] that could serve as a cue for that unique event in the future" p. 456). Like previous investigators, Talarico and Rubin (2003) also found evidence of inconsistencies in the flashbulb memory reports of their undergraduate participants over time and the persistence of high confidence ratings for flashbulb memory reports independent of the

number or nature of the inconsistencies. They were also able to demonstrate that the flashbulb memory reports did not differ from ordinary autobiographical memories in the timing or frequency of either errors of omission (e.g., forgetting details that were initially included in the memory reports) or errors of commission (e.g., introducing details that contradicted information presented initially); the forgetting curves and contradiction curves were indistinguishable across memory types over time. However, this is not to imply that there were no differences between flashbulb memories and ordinary autobiographical memories. The phenomenological experience of heightened vividness was observed for flashbulb memories relative to ordinary memories as was the enhanced metacognitive evaluation of confidence in the accuracy of one's recollection. Therefore, although the "special-mechanism" hypothesis required to distinguish flashbulb memory accuracy from ordinary memory processes has largely been rejected, the dissociation retains utility to capture these reliable subjective differences between flashbulb and ordinary autobiographical memories. Current investigations of the topic are predominantly focused on the application of known mnemonic processes for enhancing subjective phenomenological experience and persistence of autobiographical memory recall. Elucidating which memory characteristics are predicted by which event features remains a productive area of inquiry.

How Are Flashbulb Memories Characterized?

In contrast to the initial formulation as exceptionally accurate memories, contemporary definitions of flashbulb memories identify them as long lasting, vivid, and confidently held. Examining each of these characteristics in turn can provide a fuller conception of the flashbulb memory phenomenon.

Long Lasting

There are many single-report studies of flashbulb memories at considerable delays subsequent to

the event, all of which confirm the lay intuition that such memories can last a lifetime. The earliest published example of memories for the personal circumstances of learning about a public event were those from Colegrove (1899) describing individuals' memories for US President Abraham Lincoln's assassination 33 years prior. Similarly, the Berntsen and Thomsen's (2005) study described above was conducted 63 years subsequent to the invasion of Denmark and 58 years after its liberation. Other studies have asked participants about multiple events at various delay intervals, finding variability in the rate of self-identified flashbulb memories as a function of the specific event but not as a function of event age (e.g., Brown and Kulik 1977; Pew Research Center 1999). Flashbulb memory recall rates do not appear to be logarithmically associated with time nor are events from an individual's youth selectively more likely to result in flashbulb memories, meaning they are differentiated from ordinary autobiographical memories (Rubin et al. 1986).

For obvious logistical reasons, there are few longitudinal studies of flashbulb memory at delays approaching those described above. One counterexample would be the work of Hirst et al. (2015) who have assessed participants' memories for the September 11 terrorist attacks in the USA for a period of 10 years. Their data are consistent with the test-retest data at shorter intervals described previously showing the presence of inconsistencies over time and a dissociation of consistency and confidence in the accuracy of one's flashbulb memory. Interestingly, although there may have been little correspondence between a flashbulb memory narrative and the actual event as it occurred, individuals were likely to report the same inconsistencies repeatedly (Hirst et al. 2009). These data are readily compatible with the snapshot data described above in that self-reported retention of a flashbulb memory remains high even after a decade.

Vivid

What does it mean for a layperson to self-identify as having a flashbulb memory? The colloquial definition is to remember "exactly where you

were and what you were doing" when you learned important news. One component of this conception is the vividness with which the memory is recalled.

Vividness can be defined in at least two ways, both of which can be assessed as subjective evaluations provided by participant self-report ratings and as objective evaluations of participants' narrative memory reports. First, vividness can be understood as the degree of elaboration or the total quantity of details included in a memory. Second, vividness can be conceptualized as the quality of details recalled, in particular the clarity of the sensory imagery (typically, but not exclusively, visual imagery). By any definition or means of assessment, flashbulb memories are consistently found to be more vivid than are ordinary autobiographical memories of equal age. Enhanced vividness is a defining characteristic of flashbulb memories.

Confidently Held

The other component comprising the colloquial definition of flashbulb memories is that of confidence. Specifically, individuals are confident that what they are recalling is an accurate representation of the event as it occurred. Within ordinary autobiographical memory research, confidence in the accuracy of the recollection has been reliably dissociated from confidence that the event occurred (Scoboria et al. 2015). Within flashbulb memories, the term is more closely associated with the former than the latter.

Not only is there a positive connotation of remembering one's personal circumstances "exactly" as they occurred, there is also an inverse connotation of "never forgetting" the event. (This imperative is captured by the mnemonic language ubiquitously associated with events, for example "Remember the Alamo" or "Never Forget 9/11.") Talarico and Rubin (2003) demonstrated that both flashbulb memories and recent autobiographical memories are recalled with equal confidence, but over time, the flashbulb memories retain that inflated confidence whereas participant confidence in everyday autobiographical memory declines over time. Therefore, the authors argued that the enhanced confidence associated with

flashbulb memories was a hallmark of phenomenon. As described above, it is noteworthy that this subjective confidence that one's recollection accurately reflects the prior experience is independent of objective assessments of the consistency of the memory reports over time and of the presence of verifiably inaccurate details. Ironically, the reconceptualization of flashbulb memories to emphasize subjective confidence reintroduces much of the evidence originally cited in support of enhanced accuracy. Because those snapshot studies did not assess accuracy (as compared to an evidentiary record) nor consistency (by comparing memory reports over time), the compelling narratives provided by participants reflecting their own confidence in the recollection were successful in convincing investigators of their veracity – hence the adoption of the photographic analogy to begin with!

Personal

Again, the common cue for flashbulb memory generation (both in common parlance and in systematic investigation) is, “do you remember where you were and what you were doing when you heard the news.” Notably, the emphasis is on one's personal, ongoing experience that was interrupted by learning of the public event. The factual details of the public event can provide an interesting comparison of semantic memory with the episodic flashbulb memory, but those facts are not intrinsic to the flashbulb memory phenomenon. Rather, it is the personal details that comprise a flashbulb memory report.

Brown and Kulik (1977) described at length the similar elements of information provided by participants when cued to recall how they learned of nine different public events (of which the assassination of President Kennedy was merely one). These “canonical categories” as they called them were the participant's location when they heard the news (i.e., where they were), their ongoing activity and what they did immediately after learning (i.e., what they were doing and what they then did as a result), the source of the information (i.e., the informant), as well as the emotions they felt and that they observed in others. Kızıloz and Tekcan (2013) conducted a systematic review of

flashbulb memory studies and reported that the five most common categories requested of participants were location, ongoing activity, source, time, and who else was present. They then conducted a conceptual replication of Brown and Kulik's (1977) original method of identifying the details participants most commonly disclosed and found only location, ongoing activity, and source to be included by more than 50% of participants. (Notably, reporting one's own emotional reaction and the immediate aftermath were the only other categories that were within 10% of the threshold.) Therefore, although there does appear to be some consistency in the contents of flashbulb memory reports, the particular details may be less important to subjective experience of the memory than quantity and clarity of those details.

Contemporary investigators have often asked cued recall questions instead of (or in addition to) open-ended questions to generate flashbulb memory report in order to obtain the fullest report possible. Similarly, some investigators collapse responses into a summative score, such as the Weighted Attribute Score (Neisser and Harsch 1992) or other methods that differentiate substantive location, source, and activity components from the more idiosyncratic details that provide the impression of indiscriminate encoding and recall. It is these distinctive details that are also likely associated with enhanced vividness and, to a lesser or more indirect extent, confidence ratings.

Lastly, when discussing the autobiographical nature of flashbulb memories, it is also important to emphasize that these are memories of otherwise mundane experiences that become the reception context for news of public events; these are emphatically not memories of direct involvement in events which are of public interest. If a person were to experience, or even directly witness, the kinds of events that typically lead to flashbulb memories, these would most often be classified as traumatic memories (or, in some rare cases, exhilarating or peak experiences). Likewise, there are many personal events that would be expected to result long-lasting, vivid, confidently held autobiographical memories: transitional life events such as births of children or receiving a

medical diagnosis, major accomplishments such as awards or promotions, and profound failures such as conviction at trial or bankruptcy. Take, for example, a person who lives through an earthquake. That person's memory is likely to include vivid details of what they were doing when the earthquake struck, where they were, who they were with, their immediate emotions and subsequent actions as well as other idiosyncratic details. That this memory would be vividly and confidently retained for a lifetime would be readily predicted by models of episodic remembering. However, that the resulting memory of merely learning about an earthquake that occurred many miles from one's location shares similar properties (e.g., enhanced durability, vividness, and confidence) without the tremors being directly experienced is what makes the flashbulb memory phenomenon noteworthy.

The prototypical event that straddles the line between autobiographical and flashbulb memory is learning of a familial tragedy (e.g., death of a loved one or destruction of one's personal property from a safe distance). In this case, the analogy to flashbulb memory is clear: The direct experience was mundane, made emotional only by virtue of news delivery. Yet, the expectation would still be that members of that family would develop long-lasting, vivid, confidently held memories of learning that news. Arguably, though, the paradox of flashbulb memory remains: Why should mnemonic processes evident for personal experiences with obvious, direct impacts be similarly manifest for remote events with minimal immediate effect? The phenomenon of why some public events result in enhanced qualia for personal experiences remains insufficiently explained.

Which Events Give Rise to Flashbulb Memories?

When asking which event features predict flashbulb memory formation, it can be useful to differentiate those features of the public event that overlap with features of personal events which result in enhanced mnemonic phenomenology and those that are distinct.

Surprising

Although often associated with emotional reactivity, in the context of autobiographical events, surprise may be better understood as analogous to novelty. Events that lead to flashbulb memories are unusual and, thus, novel. Therefore, enhanced attention to and encoding of these events is predicted by well-established mechanisms of remembering (e.g., von Restorff 1933) as is retroactive memory enhancement for events including unexpected (but relevant) event details (Congleton and Berntsen 2020).

Surprise is also associated with interruption. Brown's (2016) transition theory of autobiographical memory posits that temporal landmarks in the organization of an individual's life story are those events that change one's material circumstances. Flashbulb memories do not typically cause such widespread or persistent disruptions to the people, places, or activities that a given individual engages in, therefore they do not typically emerge as markers when people discuss events from their lives in the way that collective events like war or political upheaval do. Yet, at the microlevel, events that result in flashbulb memories are conspicuous in that they tend to produce an immediate change in routine. Autobiographical events that are themselves rare, or which belong to categories of experience that are uncommon, are more likely to be recalled (Brewer 1988), potentially explaining the durability of flashbulb memories. Much like a breaking news alert, the original informant disrupts a person's ongoing activity (two of the three event elements most likely to be included in a flashbulb memory report, as described above). Frequently, an individual will seek additional information, hence the ubiquity of television imagery in flashbulb memories, especially those collected at longer delays. The availability of multiple sources of information over time results in potential confusion among which of those instances were first and present an opportunity to merge several similar events into a schematic representation of how one learned the news. Both these source confusion and merging mechanisms can result in inconsistencies in flashbulb memory reports over time in response to the canonical cue, "tell me the first time you learned

the news.” This “wrong time slice” (Brewer 1988, p. 53) pattern has been shown in studies of both autobiographical memories (Brewer 1988; Neisser 1981) and flashbulb memories (Neisser 1982; Neisser and Harsch 1992).

Importantly, surprise can be restricted to the outcome of an otherwise predictable or anticipated event. In this way, high-profile sporting events and influential elections can provide opportunities for the systematic study of the degree of surprise on subsequent memory phenomenology. These particular events are often accompanied by expert assessments of probabilistic outcomes. All parties know when the event will occur and most know the predicted outcome, yet the actual outcome can still be surprising. Furthermore, events nor their outcomes do not need to be unexpected to result in flashbulb memories; highly anticipated events like the moon landing or royal weddings can still produce flashbulb memories that include the characteristics described above. Moreover, when directly comparing events which differ in self-rated surprise, no differences in flashbulb memory characteristics result (Coluccia et al. 2010). It may be that, like sporting events and political appointments, there remains a degree of uncertainty and/or novelty associated with the specific anticipatable events that lead to flashbulb memories. Event rarity and disruption to ongoing activity are clearly present in those cases.

Important

Importance is another event feature that can be interpreted in multiple ways. Importance can imply objective consequentiality in terms of the material changes that occur as a result of the event. Political violence as well as natural and human-made disasters, the types of events that are most commonly represented in flashbulb memory, all have obvious impacts in immediate loss of life, property damage, and policy implications. Moreover, the scale and scope of those consequences influence the population in which one would expect flashbulb memories to arise. In other words, events on an international scale may generate flashbulb memories in global populations; national events may result in flashbulb memories

for relatively fewer individuals; and, in the case of athletic or other niche events, flashbulb memories may result for an even more limited group of people. For example, Conway (1997) describes astronomers’ memories of the discovery of Supernova 1987a, an opportunity to study neutrinos for which investigators would later go on to win the Nobel Prize in Physics; this event is unlikely to result in flashbulb memories for anyone other than physicists.

This functional limitation of consequentiality to social group membership also explains why alternate definitions of importance, such as subjective assessments of personal significance, are a better predictor of flashbulb memory formation than are assessments of the objective scale or scope of concrete outcomes. For example, an objectively major political event may be unimportant to someone disinterested in politics or who is unlikely to be affected by the particular policy changes, whereas an objectively minor political event may be important to a partisan wonk or to a member of the group specifically implicated by the policy. Personal significance can also vary within a social group. Berntsen and Thomsen (2005) found that Danes who had ties to the resistance movement during World War II rated the invasion and liberation of Denmark as more important and accordingly had more vivid flashbulb memories than Danes who similarly lived through those events but who did not have ties to the resistance. Because individuals maintain positive impressions of themselves and their social groups, events that are congruent with these prior beliefs are more likely to result in flashbulb memories (Talarico et al. 2019).

A corollary effect of social group membership determining importance is that importance implies emotionality. As intensity is a more reliable predictor of autobiographical memory phenomenology than is valence (Talarico et al. 2004), defining flashbulb memories as resulting from “important” events rather than “emotional” events more effectively captures this nuance. Although there have been some differences in the phenomenology of flashbulb memories for the same event as a function of the valence induced by the outcome of that event (e.g., Bohn and Berntsen 2007;

Breslin and Safer 2011), the more substantial differences are among those who find the event itself to be important versus not and are therefore open to an emotional reaction (Stone et al. 2015; Tinti et al. 2009).

As outlined by Berntsen's (2009) model of flashbulb memory formation, emotional reactions to public events are due to either an individual's subjective appraisal of the event or to the social contagion effect of observing other people's reactions to the event. Individuals find solace or celebration (depending on the nature of the event) with close others. An individual's identification of the event as relevant to oneself and other members of one's social group is responsible for the cascade of processes that follow and which subsequently support the development and maintenance of flashbulb memories. The function of flashbulb memories to sustain social identity and group cohesion is captured by Bertsen's (2009) model in the feedback loop whereby the persistence of a flashbulb memory serves to reinforce one's membership in the social group to whom that event is relevant. This is consistent with the social function of autobiographical memory more generally to facilitate intimacy (Alea and Bluck 2003).

Strong ties within the social group also enhance the likelihood that future events of a similar type will result in flashbulb memories and that these subsequent events will serve to cue recollections of past flashbulb memories. Intergenerational transmission of autobiographical memories for historical events occurs within families (Svob and Brown 2012) and demonstrates how new members may be introduced to social group values. At the group level, selective recounting of events (or event details) at the exclusion of others can serve to reinforce social hierarchies and shape collective memories (Stone et al. 2017). Therefore, the importance of an event shapes the rehearsal of that event which in turn affects the flashbulb memories that result.

The deliberate information seeking that follows first learning about an event includes attention to media, social sharing via conversation, and internal thoughts. Larsen (1992) described the "rehearsal displacement" (p. 62) of media reports

focused on factual event details serving to cue the private recall of one's personal circumstances when they initially learned that news. In terms of conversational remembering, the mechanism for enhancing phenomenology is more obvious. Narrative conventions to incorporate unique details to a conversation instead of repeating shared knowledge further encourages the sharing of personal circumstances and emphasizes that those details are worthy of remembering. Thus, social sharing is likely to sustain vividness and durability of flashbulb memories. Importantly, although rehearsal is associated with recall accuracy, in the case of autobiographical event recall, rehearsal serves to enhance recall of inaccurate details as well as accurate information from complex narratives (Dudukovic et al. 2004) and can lead to retrieval-induced forgetting of other details (Coman et al. 2009). These processes can explain the introduction of inconsistencies into flashbulb memory reports as well as their persistence once included (Hirst et al. 2009).

Public

Brown and Kulik (1977) did not initially identify the dissonance between a remote public event and an enhanced personal memory as being foundational to the flashbulb memory construct, saying "events that involve nationally prominent persons simply constitute a class of events for which one may reasonably hope to uncover a good number of flashbulb memories." (p. 75). Rather, as described above, they believed they had identified a uniquely accurate subset of autobiographical memories. Consequently, some early investigators like Rubin and Kozin (1984; see also Conway and Bekerian 1988) sought to rename the phenomenon "vivid memories" in an effort to refute the claim of indiscriminately accurate recall and to instead emphasize the enhanced phenomenology they thought distinguished this subtype of autobiographical memories. These latter arguments emphasized that the phenomenological characteristics of vividness and subjective confidence of flashbulb memories resulted from the same mechanisms that are fundamental to ordinary autobiographical memories, yet what differentiated them was how those processes were instantiated. It was

the juxtaposition of enhanced memory for one's personal circumstances when learning of a remote public event that made the flashbulb memory phenomenon interesting.

As alluded to above, public events presume an audience who is interested in such an event. Yet, as Larsen (1992) demonstrated, the everyday experience of consuming news is rarely memorable to the same degree as the few events that lead to flashbulb memories. Similarly, Larsen showed that semantic memory for public events were recalled less well than everyday autobiographical events, though both event types showed similar forgetting rates over time. Belli et al. (1997) found that recall of public event details showed similar temporal biases (i.e., the reminiscence bump) and reconstructive errors as personal autobiographical memories. Neisser's (1982) suggestion that "we remember the details of a flashbulb occasion because those details are the links between our own histories and 'History'" (p. 48) provides a rationale for why some events lead to flashbulb memories, but no real accounting for why only some events benefit from this connection.

Cross-References

- ▶ [Autobiographical Memory](#)
- ▶ [Emotions](#)
- ▶ [Media Memory](#)
- ▶ [Memory and War](#)
- ▶ [Natural Disaster](#)
- ▶ [Terrorism](#)
- ▶ [Vital Memories](#)

Future Directions

The flashbulb memory phenomenon continues to resonate with the general public and retains its utility to researchers because it presents an unexpected linkage between particular event features and resulting memory characteristics. If social group membership is determinative of which public events are likely to lead to flashbulb memories and in which individuals, then a better conception of social identity is paramount to understanding

this phenomenon. Prior studies have relied on cross-group comparisons based on objective identifiers (e.g., race [Brown and Kulik 1977], gender [Morse et al. 1993], language [Stone et al. 2013], religion [e.g., Tinti et al. 2009], nationality [Talarico et al. 2019], or political affiliation [Bohn and Berntsen 2007]) but these are indirect assessments of social group identity. A stronger test of the social identity hypothesis would use subjective measures of group identification collected a priori to an event of group relevance and samples with variable scores on that measure to predict memory characteristics. Similarly, because social group membership facilitates rehearsal, manipulations of the frequency, duration, modality, and audience for such rehearsals could refine our understanding of this mechanism. Lastly, clarifying the role of surprise should also be possible via more systematic examination of this construct. There are anticipatable, recurring events which consistently lead to flashbulb memories (e.g., sporting events). These events also vary along separable dimensions of the size and direction of the expected outcome among experts, the size and direction of the expected outcome among partisans, and whether the outcome is consistent with either of those expectations. Therefore, there is an opportunity to assess these attributes prior to the event, immediately after the event, at various intervals after that, and to compare various instances of the event to each other. Although the flashbulb memory phenomenon is well defined, the cognitive and social factors that produce these memories are only now becoming a clearer part of the picture.

References

- Alea N, Bluck S (2003) Why are you telling me that? A conceptual model of the social function of autobiographical memory. *Memory* 11(2):165–178
- Belli RF, Schuman H, Jackson B (1997) Autobiographical misremembering: John Dean is not alone. *Appl Cogn Psychol* 11(3):187–209
- Berntsen D (2009) Flashbulb memories and social identity. In: Luminet O, Curci A (eds) *Flashbulb memories: new issues and new perspectives*. Psychology Press, New York, pp 187–205

- Berntsen D, Thomsen DK (2005) Personal memories for remote historical events: accuracy and clarity of flashbulb memories related to world war II. *J Exp Psychol Gen* 134(2):242–257
- Bohn A, Berntsen D (2007) Pleasantness bias in flashbulb memories: positive and negative flashbulb memories of the fall of the Berlin Wall among East and West Germans. *Mem Cogn* 35(3):565–577
- Breslin CW, Safer MA (2011) Effects of event valence on long-term memory for two baseball championship games. *Psychol Sci* 22:1408–1412
- Brewer WF (1988) Memory for randomly sampled autobiographical events. In: Neisser U, Winograd E (eds) *Remembering reconsidered: ecological and traditional approaches to the study of memory*. Cambridge University Press, New York, pp 21–90
- Brown NR (2016) Transition theory: a minimalist perspective on the organization of autobiographical memory. *J Appl Res Mem Cogn* 5(2):128–134
- Brown R, Kulik J (1977) Flashbulb memories. *Cognition* 5:73–99
- Colegrove FW (1899) Individual memories. *Am J Psychol* 10(2):228–255
- Coluccia E, Bianco C, Brandimonte MA (2010) Autobiographical and event memories for surprising and unsurprising events. *Appl Cogn Psychol* 24:177–199
- Coman A, Manier D, Hirst W (2009) Forgetting the unforgettable through conversation: socially shared retrieval-induced forgetting of September 11 memories. *Psychol Sci* 20(5):627–633
- Congleton AR, Berntsen D (2020) It took me by surprise: examining the retroactive enhancement effect for memory of naturally unfolding events. *J Appl Res Mem Cogn* 9:300–309
- Conway MA (1997) The inventory of experience: memory and identity. In: Pennebaker JW, Paez D, Rimé B (eds) *Collective memory of political events: social psychological perspectives*. Lawrence Erlbaum, Mahwah, pp 21–45
- Conway MA, Bekerian DA (1988) Characteristics of vivid memories. In: Gruneberg MM, Morris PE, Sykes RN (eds) *Practical aspects of memory: current research and issues, Vol. 1. Memory in everyday life*. Wiley, Chichester, pp 519–524
- Dudukovic NM, Marsh EJ, Tversky B (2004) Telling a story or telling it straight: the effects of entertaining versus accurate retellings on memory. *Appl Cogn Psychol* 18(2):125–143
- Hirst W, Phelps EA, Buckner RL, Budson AE, Cuc A, Gabrieli JDE, Johnson MK, Lustig C, Lyle KB, Mather M, Meksin R, Mitchell KJ, Ochsner KN, Schacter DL, Simons JS, Vaidya CJ (2009) Long-term memory for the terrorist attack of September 11: flashbulb memories, event memories, and the factors that influence their retention. *J Exp Psychol Gen* 138(2):161–176
- Hirst W, Phelps EA, Meksin R, Vaidya CJ, Johnson MK, Mitchell KJ, Buckner RL, Budson AE, Gabrieli JDE, Lustig C, Mather M, Ochsner KN, Schacter D, Simons JS, Lyle KB, Cuc AF, Olsson A (2015) A ten-year follow-up of a study of memory for the attack of September 11, 2001: flashbulb memories and memories for flashbulb events. *J Exp Psychol Gen* 144(3):604–623
- Kızılöz BK, Tekcan AI (2013) Canonical categories in flashbulb memories. *Appl Cogn Psychol* 27(3):352–359
- Larsen SF (1992) Potential flashbulbs: memories of ordinary news as the baseline. In: Winograd E, Neisser U (eds) *Affect and accuracy in recall: studies of “flashbulb” memories*. Cambridge University Press, Cambridge, pp 32–64
- McCloskey M, Wible CG, Cohen NJ (1988) Is there a special flashbulb-memory mechanism? *J Exp Psychol Gen* 117(2):171–181
- Morse CK, Woodward EM, Zweigenhaft RL (1993) Gender differences in flashbulb memories elicited by the Clarence Thomas hearings. *J Soc Psychol* 133(4):453–458
- Neisser U (1981) John Dean’s memory: a case study. *Cognition* 9:1–22
- Neisser U (1982) Snapshots or benchmarks? In: *Memory observed: remembering in natural contexts*. W. H. Freeman, San Francisco, pp 43–48
- Neisser U (1986) Remembering Pearl Harbor: reply to Thompson and Cowan. *Cognition* 23:285–286
- Neisser U, Harsch N (1992) Phantom flashbulbs: false recollections of hearing the news about challenger. In: Winograd E, Neisser U (eds) *Affect and accuracy in recall: studies of “flashbulb” memories*. Cambridge University Press, Cambridge, pp 9–31
- Pew Research Center (1999) Technology triumphs, morality falters. 1999 millennium survey. <https://www.pewresearch.org/politics/1999/07/03/technology-triumphs-morality-falters/>
- Rubin DC, Kozin M (1984) Vivid memories. *Cognition* 16(1):81–95
- Rubin DC, Wetzler SE, Nebes RD (1986) Autobiographical memory across the lifespan. In: Rubin DC (ed) *Autobiographical memory*. Cambridge University Press, Cambridge, pp 202–221
- Scoboria A, Talarico JM, Pascal L (2015) Metamemory appraisals in autobiographical event recall. *Cognition* 136:337–349
- Stone CB, Mercy A, Licata L, Klein O, Luminet O (2013) Mnemonic differences and similarities across opposing social groups: the linguistic conflict at the University of Leuven as a case study. *J Appl Res Mem Cogn* 2(3):166–172
- Stone CB, Luminet O, Takahashi M (2015) Remembering public, political events: a cross-cultural and -sectional examination of Australian and Japanese public memories: remembering public, political events in Australia and Japan. *Appl Cogn Psychol* 29(2):280–290
- Stone CB, Gkinopoulos T, Hirst W (2017) Forgetting history: the mnemonic consequences of listening to selective recountings of history. *Mem Stud* 10(3):286–296

- Svob C, Brown NR (2012) Intergenerational transmission of the reminiscence bump and biographical conflict knowledge. *Psychol Sci* 23(11):1404–1409
- Talarico JM, Rubin DC (2003) Confidence, not consistency, characterizes flashbulb memories. *Psychol Sci* 14(5):455–461
- Talarico JM, LaBar KS, Rubin DC (2004) Emotional intensity predicts autobiographical memory experience. *Mem Cogn* 32(7):1118–1132
- Talarico JM, Bohn A, Wessel I (2019) The role of event relevance and congruence to social groups in flashbulb memory formation. *Memory* 27(7):985–997
- Thompson CP, Cowan T (1986) Flashbulb memories: a nicer interpretation of a Neisser recollection. *Cognition* 22:199–200
- Tinti C, Schmidt S, Sotgiu I, Testa S, Curci A (2009) The role of importance/consequentiality appraisal in flashbulb memory formation: the case of the death of Pope John Paul II. *Appl Cogn Psychol* 23(2):236–253
- von Restorff H (1933) Über die Wirkung von Bereichsbildungen im Spurenfeld. *Psychol Forsch* 18:299–342