# MODERATORS OF RECALL: FLASHBULB AND EVENT MEMORY OF THE 9/11 EVENT

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Flashbulb memory (FBM) has been embraced and refuted by researchers. The lack of firm methodological standards has left flashbulb memory questions unanswered. Methodology important for evaluating whether flashbulb memories are special is discussed. Recommendations are made for required canonical categories and the use of control memories in order to measure the fallibility/superiority of FBM. Flashbulb memory and event memory for the 9/11 terrorist attacks was assessed for 360 participants after a 17 month delay by questionnaire. Participants were from the four major regions of the United States (Arkansas, South; Kansas, Midwest; New York City, East; and California, West), Britain, and The Netherlands and were grouped by age on 9/11 (e.g., those 23 years of age and below and those 25-64 years of age). Groups' recall was compared by age and location. Location, age, and media effects were found. Older participants and participants from affected areas performed better on recall and elaboration tasks. Among all groups, event memory was high after a long delay without repeated elicitation. FBM had better retention than event memory over time across samples.

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Addendum – October 2016

This research, including questionnaire construction and data collection, was the result of a joint effort of the author with Dr. Lauren Shapiro, under whom Erynne Hart Haugen worked as a graduate research assistant on the research questions forming the basis for this work. The dataset's other roots are in a project originating with Dr. Shapiro in collaboration with Tia Hansen at Aalsborg University, James Ost at University of Portsmouth, Gezinus Wolters at Leiden University, Ashley Cook at New York University, and Danielle Pollage at Pepperdine University. This thesis arose as a proposal by the author under the mentorship of Dr. Shapiro. It is a significant oversight that the thesis does not make clear that the methodology, instrumentation, or data described therein is the intellectual property of Dr. Haugen-Shatto, Dr. Shapiro, and their collaborators.

In June 2004 after successful thesis proposal but before its defense, Dr. Shapiro rescinded her permission to use this data in the thesis. Dr. Shapiro allegedly communicated this to the department chair at the time, Dr. Ken Weaver. The event occurred too long ago for any involved in the matter at ESU to recollect the sequence of events that followed. However, Ms. Haugen proceeded with thesis completion and it was ultimately accepted by the thesis committee, department chair, or graduate dean on behalf of Emporia State University.

It was an unintentional oversight that Dr. Shapiro's assistance and mentorship was not acknowledged in this thesis, and for that Dr. Shapiro is offered the sincerest of apologies by the author. On behalf of the Department of Psychology and The Teachers College at Emporia State University, we offer our apologies for the oversights which allowed this thesis to proceed without acknowledgement within the thesis that the data, instrumentation and methodology are the intellectual property of Dr. Haugen-Shatto, Dr. Shapiro, and their collaborators.

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# CHAPTER 1

## INTRODUCTION

On the morning of September 11, 2001, the unthinkable happened. Al Queda terrorists under the leadership of Osama Bin Laden, hijacked four passenger jets from Boston and Washington, D.C. en route to California. The terrorists used the airliners as bombs by flying a plane into each of the World Trade Center twin towers (WTC) in Manhattan, New York and a third plane into the Pentagon in Washington, D.C. The fourth plane crashed in a field in Skanksville, Pennsylvania near Pittsburgh. Rescue workers, including firefighters, police officers, and medics, were killed attempting to save victims in the WTC when it collapsed unexpectedly. The death toll from all three locations reached 2986 people. The 9/11 events are not forgotten by America's citizens. More than four years later, it affects life in New York, the rest of the U.S., and is a frequent media topic.

Are the 9/11 tragedies and personal circumstances when learning of these shocking and emotional events (i.e., reception context) indelibly burned in peoples' minds? Flashbulb memory (FBM) is a term coined by Brown and Kulik (1977) to describe memory for the reception context of emotional and personally meaningful events. Unlike autobiographical memory for non-traumatic personal experiences, FBM is believed to be more resistant to deterioration over time due to its emotional component (i.e., emotional memory). Thus, people who have FBM for a public tragedy are often able to recall their reception context when learning of the event years after its occurrence.

Research on FBM begins with an informal questioning by Colegrove (1899) in which 70% of his sample of Americans recalled their reception context for learning about

Lincoln's assassination. The next major investigation of FBM was conducted by Brown and Kulik (1977) who examined Americans' ability to recall their reception contexts for a variety of shocking public events, including the assassinations of Martin Luther King, Jr. and JFK. Since 1988, FBM has been sporadically studied (e.g., Challenger Shuttle disaster by Neisser & Harsch, 2000; deaths of political figures by Christianson, 1989; Curci, Luminet, Finkenauer, & Gisle, 2001; Hornstein, Brown, & Mulligan, 2003; Nachson & Zelig, 2003; Yarmey & Bull, 1978). FBM's history corresponds with the low frequency of shocking and unexpected public events which are worthy of investigation due to their emotional relevance and salience, particularly to the people in the region the event occurred (e.g., Linton, 1975). September 11, 2001 has been identified as a shocking event which is relevant to people throughout the world because it occurred in one of the most powerful nations in the world and because vast media coverage allowed viewers world-wide to become eyewitnesses to the atrocious crime. The media's provision of highly emotional scenes from the carnage is proposed to have resulted in event memory with episodic properties and high recall confidence, characteristic of autobiographical memory (Brewer, 1986; Nachson & Zelig, 2003).

Most psychologists recognize that public tragedies that may invoke FBM provide excellent analogs to personal, traumatic experiences that cause serious mental health problems, such as post-traumatic stress disorder (PTSD). This parallel makes FBM a necessary research topic. It is in need of standardized study, which will require researchers to agree on basic FBM concepts.

## Review of the Literature

Embraced to illustrate memory's ability to capture a specific moment in time, psychologists Roger Brown and James Kulik first coined the term "FBM" in 1977 when studying the American population's recollection of shocking public events such as the assassinations of President Kennedy and Martin Luther King, Jr. There is an abundance of research to support the presence of FBM, though it remains a controversial subject in memory research. FBM characteristics and functions, event memory, methodological problems of FBM, and moderators on memory are reviewed here.

### *FBM Characteristics and Functions*

*FBM characteristics.* FBM is autobiographical, personal, and emotional. Brewer (1986) defined autobiographical memory as "memory for information related to the self" (p. 26), which includes personal memories episodic in nature. Because FBM is an episodic, personal memory account of an emotionally salient reception event, it is obvious how FBM is classified as a subtype of both autobiographical memory and emotional memory (Pillemer, 2000). The potency of these memories is heightened by the emotional component found in FBM, which is a catalyst to their formation (Strongman & Russell, 1986). LeDoux (1992) proposed this is true because emotional memory is processed through the brain's emotional epicenter, the amygdala, making FBM possible.

FBM is autobiographical and emotional in nature, but what qualifies a memory for FBM status? Brown and Kulik (1977) proposed the phenomenon's two basic postulates. According to the researchers, the hallmark characteristics of FBM are the recall of the following six features (i.e., canonical categories; see Conway, 1995): location (where the rememberer was when learning of the event, activity (what the

rememberer was doing when learning of the event), source information (how the event was first learned), affect in self (emotional reaction to learning of the news), affect in others (emotional reaction of others when learning of the news), and aftermath (the action the rememberer took upon learning of the event). These features are unique to FBM because they are quickly forgotten for routine experiences (Brewer, 1988). Out of the six components they established, Brown and Kulik stated that recall of one of the canonical categories was needed to qualify as FBM.

*Functions of FBM.* FBM is multi-functioning (Conway, 1995) because it serves as an organization function for autobiographical memory and serves social purposes. Shum (1998) and Neisser (2000) believe that FBM provides a temporal organization system for autobiographical memory that rememberers use to gauge the timing of other past events. FBM serves as a particularly strong landmark because it links public, personal, and autobiographical memories together (Brown, Shevell, & Rips, 1986). Following psychosocial development across the lifespan (Erikson, 1980), young adults use FBM to establish and maintain intimacy by social sharing of emotional memory (intimacy versus isolation), middle-aged adults use FBM to teach or inform (generativity versus stagnation), and older adults' social sharing leads to the sharing or eliciting of empathy and reassurance from another (integrity versus despair) (Alea & Bluck, 2003; Bluck & Habermas, 2001). Thus, while the event rather than the reception context is more salient, FBM rather than event memory is chosen more often for social sharing. Individuals share the unknown (i.e., FBM) portion of their memories because it is the unique, portion of their story in which the rememberer is the central character (Hyman & Faries, 1992). If retained over many decades, FBMs provide a source of social identification of

generational belonging (Conway, 1995). Also, the detailed accounts typical of FBM imply more credibility (Bruce, 1989) and thus social functions are served better by sharing FBM accounts because they are more likely to be believed (Alea & Bluck, 2003) and because the personal meaning behind these retellings conveys an intimacy between the rememberer and the listener (Tannen, 1990). This is probably due to the way that the provision of emotion and detail in stories allows the listener to relate to the story and narrator (Schank & Abelson, 1995). Thus, the social function of giving or receiving empathy or intimacy is better served when vivid memories, like FBM, are used.

*Methodological Problems of FBM*

While it has been established that FBM is an important subtype of autobiographical memory, researchers disagree on whether FBM is a special case of episodic autobiographical memory. If FBM is a special case, there should be hallmark facets in FBM and it should have a different recall and decay function than other memories. However, there is little agreement among researchers on canonical categories, what memories should be used for adequate comparison by which to judge FBM (Christianson, 1989), and the distinction Brown and Kulik made between FBM and flashbulb accounts (e.g., event memory) appears to be lost (Wright & Gaskell, 1995).

*Canonical categories.* There is not a standard for what aspects of memory are hallmarks of FBM (i.e., canonical categories) and what level of recall is necessary for memory's qualification as special (Shapiro & Haugen, 2003b). While Brown and Kulik's requirement of one canonical category to qualify for FBM is too lenient, other researchers have reacted to this by making FBM requirements too strict. Some researchers have included event memory features (Christianson, 1989) as canonical categories or added

minutiae questions (Wright & Gaskell, 1995), such as asking rememberers what they were wearing during the reception event (Bohannon, 1988). This is problematic because FBM is already special because of the presence of canonical categories Brown and Kulik set forth as compared to other reception events (e.g., Larsen, 1992). Brown and Kulik pinpointed these canonical categories by examining the commonalities in participants' reception memory for national tragedies. Therefore, naturally occurring elements were identified rather than created to fit a pre-determined idea of what constitutes FBM. Canonical category research should ultimately determine standardized criteria in number and specific categories for what operationally defines FBM. According to Shapiro and Haugen (2003b), the three most important canonical categories are location, activity, and source information. These three categories are the most heavily supported as being fundamental by the literature and are naturally the most occurring in FBM (Christianson & Engleberg, 1989; Curci et al., 2001; Wright & Gaskell, 1998). Also, not all canonical categories are available to all rememberers. Affect in others and aftermath are not canonical categories that are equally available to all rememberers because some learn of the FBM-inspiring event while alone or feel unable to react to the news immediately due to their role, such as that of an elementary school teacher. Affect in self can be difficult to determine because emotions can be difficult to self-judge immediately and seem less salient over time, as the neurological processes of arousal are only present during recall for personally traumatic events (Schacter, 1996), therefore biasing metamemory. However, with recall that remains vivid over time, participants often over report emotional salience in recall at follow-up when compared to first assessment (Christianson & Engelberg, 1989).

*Control memories.* The second main problem with FBM methodology is the lack of a worthy comparison event with which to judge FBM. To gauge if FBM is special, comparison events are essential so that decay functions for FBM can be compared to other memories. Researchers have used control events or memories to judge FBM in the following ways: use of events that occur previous to the reception event under study, including other FBMs (Bernstein, Nourkova, & Loftus, 2003; Wright & Gaskell, 1998); use of ordinary news events (Linton, 1975); use of events that occur in the same time window as the reception event (Christianson, 1989); use of personal events (Christianson, 1989); and the use of event memory for the FBM-inspiring event (Bohannon, 1988; Nachson & Zelig, 2003; Shapiro & Haugen, 2003b; Wolters & Goudsmit, 2003). The problem with using previous events is that the two events, the control and the reception event, have different retention intervals, which confounds differences between the memories. Using ordinary news is problematic because of the inequality of emotional valence between the two to-be-remembered events (Larsen, 1992). Similarly, using a control from the same time window lacks congruence in occurrence type and emotionality. When a personal event is used as the comparison, many factors can keep the comparison from being controlled, such as type and level of emotionality, retention interval, and level of direct consequentiality. For these reasons, differences between the control and FBM are expected, leaving FBM's fallibility unchallenged.

For these reasons, Bohannon's (1988) use of event memory is an important precedent for FBM study. Since his questioning of participants' memory for facts concerning the Challenger, the use of event memory as a control memory has been further developed by other researchers. While many have used his elicitation method of

specific questions (Berg, 2000; Yuille & Cutshall, 1986), others have made the parallel between the two memories more equal by using general prompts for both FBM and event memory questions (Nachson & Zelig, 2003; Shapiro & Haugen, 2003b). The best control may be event memory for the FBM-inspiring event because both memories have the same retention interval. Second, both memories are equal in type and intensity of emotionality. Third, event memory and the reception event will have equal scores on a scale that measures an event's ease of being recalled (Linton, 1975). Fourth, the media provide many necessary methodological elements. The media allows participants' event memory to be judged for veracity, which has been problematic in other studies because facts for personal events cannot be verified (Christianson, 1989; Heuer & Reisberg, 1990). The media also provides a massive social sharing in which viewers become informed of how the event directly affects their lives (i.e., personal consequentiality; see Shapiro & Haugen, 2003a for a review). The media also synthesized direct eye-witnessing of events, thus creating episodic, emotional, and autobiographical memory (Nachson & Zelig, 2003), such that it is a worthy comparison of FBM.

*Event Memory*

Unfortunately, event memory has not received as much research attention as FBM. While research on children's autobiographical memory and event memory is extensive and systematic, mapping out expected retention intervals (Shrimpton, Oates, & Hayes, 1998), the work is not paralleled in adult memory. Little is known about the decay function of adult emotional event memory after long delays and the course of emotional event memory recall for adult developmental stages (Alea & Bluck, 2003; Shapiro & Haugen, 2003a). This is partially due to the uniqueness of FBM and its compelling force

to retell FBM as compared to event memory. Event memory is intuitively the important aspect of memory, yet FBM is consistently the chosen aspect for social sharing (Bohannon, 1988; Shapiro & Haugen, 2003b; Wolters & Goudsmit, 2003). The fact that decay for FBM is more gradual than that for event memory makes FBM an interesting topic of study (Brown & Kulik, 1977). Much research on event memory, therefore, is inadvertent, in which the focus was on FBM, eyewitness, or emotional memory research.

Some of what is known about event memory is through research which has focused on eyewitness simulations of crimes (Yuille & Cutshall, 1986) or synthesized traumatic events through the use of audiovisual equipment (Christianson, 1984; Clifford & Scott, 1978; Heuer & Reisberg, 1990). Other event memory research has used real traumatic events, such as Bohannon's (1988) investigation of the Challenger disaster. He found that event memory of the Challenger event was less accurate over time than the corresponding FBM. Wolters and Goudsmit's (2003) finding was similar; facts were not recalled as well as FBM. Shapiro and Haugen (2003b) found that event memory remained accurate but leveled over time. Searching for an explanation of why seemingly unimportant reception events would be recalled better than the tragedy itself, Christianson (1992) did a critical review of the literature and was able to summarize that while arousal (e.g., emotional component) reduced recall accuracy for simulated events, it increased recall accuracy for real events. Aside from poorer recall than that of the reception event, what is known about event memory? Past research has focused on the aspects of emotional memory that are remembered, while others have focused on rehearsal and/or decay function.

*Features recalled.* Unanimously, emotional memory research has shown that, with regard to features, it is the central rather than peripheral aspects of events that are remembered (Christianson & Loftus, 1991). While the logical conclusion, then, is that details would be destined for leveling quickly over time, the research has not reached agreement on the fate of details. Weapon focus or tunnel memory are the terms that have come to describe how specific details (e.g., recall for the color of a perpetrator's shirt) are positively moderated by arousal and retained longer than expected (Christianson, 1984; Heuer & Reisberg, 1990). More research, however, indicates that details are still fated for leveling over a short time due to arousal's negative effects on detailed information (Burke, Heuer, & Reisberg, 1992; Clifford & Hollin, 1981; Kebeck & Lohaus, 1986; Loftus & Burns, 1982). A review of Easterbrook's (1959) cue-utilization hypothesis clears some of the confusion. Easterbrook stated that specific details will be positively moderated by arousal if the detail is central to the source of the arousal (e.g., a perpetrator), while other details are lost due to the narrowing of attention elicited by the emotionally negative event.

If event memory is destined for decay, how long can event memory be expected to last and can rehearsal moderate the normal rate of decay? Burke et al. (1992) showed that arousal attenuated memory deterioration, but how long memory decays until it has leveled completely is unclear. Until recently, Kebeck and Lohaus (1986) provided the longest retest interval, two weeks, in which they concluded that arousal did not increase memory after two weeks. Conversely, emotionality was proposed to aid detail memory at an interval of two weeks for staged events (Heuer & Reisberg, 1990). Therefore, the difference in memory retention for emotional events may be due, again, to the differences

between synthesized and real events. Shapiro and Haugen (2003b) used a real event (9/11) to measure the longevity of event recall. With multiple comparison and control groups, event memory had leveled among all groups, regardless of amount of rehearsal, between a 6-week and 11-week follow-up. Recall was then maintained, even after 52 weeks, among all groups. Therefore, there is a discrepancy of when long term memory levels differ from two weeks (i.e., found for synthesized events) to between 6-11 weeks (i.e., found for real events).

Determining if event memory can have a slower decay function as a result of rehearsal is important. Recent FBM investigators have tested event memory in various ways, some with specific questions and others with general prompts. Shapiro and Haugen (2003b), using general prompts, found that event memory, though not as durable as participants' FBM, was more resistant to forgetting than expected under the Easterbrook hypothesis (see Easterbrook, 1959). It was further hypothesized that this was most likely due to the correlation found between elaborate event memory and number of media sources used (i.e., rehearsal) to learn of the 9/11 event (Shapiro & Haugen, 2003b). Similarly, Wolters and Goudsmit (2003) found a correlation between event memory and rehearsal when they performed their 9/11 FBM study. Thus, recent studies indicate rehearsal may lengthen retention of event memory, but more research is needed to investigate expected retention intervals and decay over longer time periods than 2, 6, and 11 weeks.

The recent research, therefore, showed that event memory for FBM-inspiring events is recalled well over time, most likely due to its emotional component, but not as strongly recalled as FBM because FBM is a special case of memory (Conway, 1995). In

fact, some event memory for FBM-inspiring events has been recalled so well that they produced PTSD symptoms (Kiser, Heston, Hickerson, Millsap, Nunn, & Pruitt, 1993; Nader, Pynoos, Fairbanks, Al-Ajeel, & Al-Asfour, 1993; Pfefferbaum, Seale, McDonald, Brandt, Rainwater, Maynard, et al., 2000; Shaw, Applegate, Tanner, Perez, Rothe, Campo-Bowen, et al., 1995; Terr, Bloch, Michel, Shi, Reinhardt, & Metayer, 1999). Brown and Kulik were the first to make the distinction between FBM and event memory, calling event memory "flashbulb memory accounts." Therefore, examination between FBM and event memory as comparative and distinct entities was inherent in the original FBM paradigm. The hallmark FBM study by Brown and Kulik, therefore, advocates for the comparison of FBM and event memory. Event memory is a good control mechanism through which to assess FBM, because the two are instigated by equal emotionality and qualifications for being worthy of lasting memory (Linton, 1975). According to Linton, events can be rated for probability of recall on seven measures: confusability—distinguish-ability, emotionality, importance, ease of dating the event at a later time, membership to a sequence (whether the event fits in a sequence of other events), length of the sequence in which the event fits, and probability of rehearsal. The 9/11 event can easily meet each of these criterion, especially the sequence items, since the 9/11 event was a series and was followed by two distinct wartime periods.

*Moderators of Memory*

*Age.* Studies have shown that, generally, young adults perform better on recall tasks than older adults (Frieske & Park, 1999). However, an anomaly appears to exist in the 31-40 age group, where vivid recall is lower than that of the 60-80 age group. Also, little research exists for those just past adolescence (i.e., over 19; Fitzgerald & Lawrence,

1984). These findings suggest that vivid memories, such as lasting event memory and FBM, decrease over time as a function of development and then slightly increase in latter years. Several researchers have thus studied age as a moderator of FBM. While Wolters and Goudsmit (2003) were unsuccessful in determining age's effects on FBM and event memory due to ceiling effects of FBM and event memory presence, Tekcan and Peynirciogcaronlu (2002) were more successful as a result of diverse recall performance in their groups and found that older adults were 27% less likely to have FBM than young adults. A considerable shift was also noted for FBM between participants 65-74 years of age and those 75 years of age or older assessed for recall of the Hillsborough disaster (Wright, 1993). Cohen, Conway, and Maylor (1994) also found similar results when comparing young and older adults for FBM of the resignation of Margaret Thatcher. While 90% of young adults (age range 18-55; $M = 22.4$ years of age) had FBM, only 42% of older adults (age range 64-84; $M = 71.6$ years of age) did. Compiled, it appears FBM formation appears very poor for older adults (those 65 and over) but most likely among adults below the age of 31. Obviously, the anomaly, then, exists in those rememberers in the "generativity versus stagnation" stage of development (i.e., those 31-64 years of age; Erikson, 1980) and currently, no information exists for persons in their 20s. Neurobiological and cognitive processes explain the disparity between the young and old, but not the middle-aged from the young or old (e.g., Fuster, 1995; Salthouse & Babcock, 1991). While developmental theories indicate that the changing of psychosocial goals across the lifespan would create a difference in functionality for FBM among age groups, it does not explain why there would be a disparity in epidemiology (Alea & Bluck, 2003; Bluck & Habermas, 2001).

*Consequentiality.* While many moderators have had limited study, consequentiality has been included directly or indirectly in a large portion of FBM studies. This is important because consequentiality is said to be one of the most important determinants of FBM formation (Conway, 1995). Others argue that consequentiality is assigned post-event, such that it can have no bearing on FBM formation (Neisser, 2000). The debate over where in the process of FBM formation and maintenance consequentiality fits and the myriad types of consequentiality that can moderate FBM only makes the study of consequentiality more important.

Although FBM formation was thought to require personal meaning (Brown & Kulik, 1977; Neisser, Winograd, Bergman, Screiber, Palmer, & Weldon, 1996; Pillemer, 1984; Weaver, 1993), many of the public, shocking events that are FBM-inspiring are often only personally consequential on a direct level for a very small population that is rarely assessed (exceptions are Bernstein et al., 2003; Er, 2003; Neisser et al., 1996). Neisser and Harsch's (2000) discovery of gross error and confabulation in FBM reports for the Challenger disaster continued this belief by attributing results to rememberers' lack of personal relevance. However, Black participants had a higher incidence of FBM for the assassination of Martin Luther King, Jr. than White participants. If these public shocking events are not personally consequential, then why are FBMs formed? Many have theorized that FBM formation, is a result of national consequentiality (Conway, 1995; Pillemer, 2003), however, this is rarely assessed (exceptions are Curci et al., 2001; Kvavilashvili, Schlagman, Kornbrot, & Mirani, 2003). Conway et al. (1994) found support for this theory when comparing UK and US samples for the presence of FBM for the resignation Margaret Thatcher. UK samples performed better on FBM measures (e.g.,

90% verses 60% accurate responses), and a correlation matrix revealed that national importance was third, behind surprise and interest, to contribute to FBM formation. Other than Conway et al. and Christianson and Engelberg (1999), few studies have examined the impact of national consequentiality. National consequentiality may explain the presence of FBM when little or no personal relevance exists (see Shapiro & Haugen, 2003b for an example of low personal relevance paired with high FBM incidence).

A second type of consequentiality is proximity to the affected areas. Researchers studying FBM for an earthquake hypothesized that groups would have varying rates of FBM based on nearness to affected sites (Neisser et al., 1996). The results supported their tenants; those who were directly affected had higher FBM epidemiology (99%) than those mildly affected (96%) and those who had no direct experience with the earthquake (55%). Similarly, Er (2003) found that accuracy over time remained high for an earthquake victim group but declined for the non-victim group. Because of these findings, the current study explores consequentiality via proximity to affected areas by assessing memory for New Yorkers, other nationals, and Europeans.

*Media.* Media's constant availability in several modalities over the last decade has affected how soon rememberers learn of public, shocking events and how much information can be gained in one sitting. The length, breadth, and time span covered by news provides rememberers with cues to encode, rehearse, and moderate event memory and, therefore, FBM (Luminet, Curci, Marsh, Wessel, Constatin, Gencoz, et al., 2004; see Shapiro & Haugen, 2003b for a discussion on rehearsal through repeated elicitation and media's effects on FBM and event memory). While the decay function of event memory is unknown, the media provides a ready rehearsal format for emotional event memory to

be extended and withstand long delays prior to recall. Rehearsal enhances recall of emotional memory (e.g., event memory, FBM; Conway, Anderson, Larsen, Donnelly, McDaniel, McClelland, et al., 1994; Cohen et al., 1994; Conway, 1995) and is required for FBM formation (Conway, 1995). However, not all FBM research examines the postulate that any form of rehearsal (e.g., overt, covert, manual) will serve to form and/or maintain FBM (Brown & Kulik, 1977). Most research has focused on examining participants' level of social sharing (i.e., overt rehearsal) or mental rumination (i.e., covert rehearsal) of the event (Philippot & Rimé, 1998; Rimé, Philippot, Boca, & Mesquita, 1992) while the investigation of media's effects on memory (i.e., overt rehearsal) is largely overlooked. The choice of September 11$^{th}$ as a stimulus event presents an excellent opportunity for examining media effects, as this tragedy received continuous coverage for weeks.

While many media sources can be used to rehearse event memory and FBM, most people cite television as the first and primary source for information because it provides almost immediate information (see Neisser & Harsch, 2000). Television news is also more convenient, provides a vehicle for multitasking while listening to the news, and is more conducive to a broad range of educational levels (Neuman, 1976). The reliance of rememberers on television can be problematic for memory, however. Mundorf, Drew, Zillman, and Weaver (1990) found that "the acquisition of information from the [television] news items following the emotionally charged, disturbing story was significantly poorer for a period of three minutes" (p. 601). Thus, FBM for news events are likely to lack details immediately following initial learning of the news due to lack of encoding (Mundorf et al., 1990), making the memory of canonical categories more

impressive. These problems are offset, however, by the special properties of televised news, such as high visual-verbal redundancy, which has shown to enhance viewer recall (Son, Resse, & Davie, 1987). Anderson and Schooler (1991) also found that frequency, recency, and prior exposure to an event by environmental sources like news media increase the likelihood of event memory, and thus FBM. This is because rehearsal of event information has been found to be linked with FBM formation (Conway et al., 1994; Finkenauer, Luminet, Gisle, El-Ahmadi, Van Der Linden, & Philippot, 1998; Hornstein, et al., 2003). Memory is also increased for televised news when pictures or photographs are used. The findings are intuitive: vivid images result in better recall (Collins, Taylor, Wood, & Thompson, 1988). Brosius (1993) reported that pictures increase recall of event memory and lead to more enduring memories. It can be posited, based on this information, that people who watch continuous news channels when shocking public events occur are more likely to retain FBM and event memory as a result of high visual-verbal redundancy and the vivid images they provide.

*Metacognition*

Over the past several decades, memory research has focused on the rememberer's recall perceptions. Despite accuracy being a commonly studied metacognitive factor in emotional memory, confidence has not been shown to equate with recall accuracy (Link, Soderberg, Fisher, Guenin, Reed, & Bohannon, 1998; Neisser & Harsch, 2000; Talarico & Rubin, 2003; Weaver, 1993). So few studies have produced contrary results that confidence cannot be trusted as a proxy for accuracy (one exception is Hornstein, et al., 2003). Are there metacognitive perceptions of memory that are trustworthy? Recent studies have focused on vividness of visceral images of the 9/11 event (Hansen, 2003;

Talarico & Rubin, 2003). However, the studies yielded conflicting results. In another study of the 9/11 event, vivid imaging correlated with elaborated event memory (Shapiro & Haugen, 2003b). Shapiro and Haugen also found that elaborated event memory was higher among participants who considered their 9/11 memory to be "resistant to forgetting" rather than "fading like other memories."

In conclusion, FBM is a special case of emotional memory characterized by a more gradual decay function due to moderators, such as rehearsal, consequentiality and age. These moderators on FBM and its control, event memory, are in need of study so that accurate predictions of FBM formation can be made. The ability to make conclusions about FBM, event memory, decay and prediction functions will require future researchers to agree on standardized paradigms for what qualifies recall for the FBM label.

*Hypotheses*

Several *a priori* factors moderate recall: age, nationality, proximity to the affected sites, and political relationships between the United States (US) and British (UK) and the US and Netherlands (NL). Specifically, the current study examined the following hypotheses.

Hypothesis 1: The US samples compared to the European samples and would have the following pattern of FBM rates: NY > AR, KS, CA> UK, NL.

Hypothesis 2: The younger sample compared to the older sample would have higher FBM rates.

Hypothesis 3: Relevance rankings would follow the following pattern and therefore correlate with FBM rates: NY participants > AR, KS, CA > UK, NL

Hypothesis 4: The younger group would have greater event memory recall compared to the older group.

Hypothesis 5: US samples would have greater event memory recall compared to European samples and would follow the following pattern: NY participants> AR, KS, CA > UK ≥ NL.

Hypothesis 6: Participants who label their memory as "vivid", "accurate", and "lasting longer than a few seconds" would have higher incidence of FBM and better event feature and detail recall.

Hypothesis 7: Participants who consulted more media sources would have greater event recall.

# CHAPTER 2

# METHOD

## *Participants*

Participants were 360 adults from four geographical locations in the United States. Emporia, Kansas (KS) represented the Midwestern region; New York City, New York (NY) represented the Eastern region; Malibu, California (CA) represented the Western region; and Searcy, Arkansas (AR) represented the Southern region ($N = 240$). Participants ($N = 120$) also came from United Kingdom (UK; Portsmouth, Britain) and the Netherlands (NL; Leden). At each location, the participants were divided by their age as of September 11, 2001 into a younger group (i.e., those 16-23 years of age) and an older group (i.e., those 25-64 years of age). The younger group included predominantly undergraduate students enrolled in general education classes ($M$ age = 19.6 years). The older group consisted of graduate students, faculty, staff, and their families ($M$ age = 35.5 years). A random selection of 60 completed surveys was taken from each location, 30 younger and 30 older. NY was an exception, however. NY participants were first identified as either *Manhattan* respondents (i.e., those who commuted daily to Manhattan, Manhattan residents, and those who were in Manhattan on 9/11/01) or *non-Manhattan* respondents (i.e., those who work, live, or attend college in one of the other boroughs or in a nearby New York or New Jersey suburban city). Then the author randomly selected 15 Manhattan and 15 non-Manhattan respondents from each age level.

## *Design*

The independent variables were location, age, media sources consulted to learn of the event, and participants' perceptions of their memories (i.e., metacognition). The

dependent variables were flashbulb memory (FBM), event memory feature recall, and event memory detail recall. Operational definitions for the purposes of this study are defined. Location and nationality were determined by the participant's residency. FBM and event memory feature and detail recall were defined by coding, described later.

*Materials*

A survey was constructed (see Appendix A) to elicit Brown and Kulik's (1977) six canonical categories (Section I ), a description of the event itself (Section II), and participants' conceptualization of memory and media exposure (Section III). The instructions in *Section I* requested that participants provide information concerning: a.) location, b.) activity interrupted, c.) source, d.) emotional reaction of self, and e.) emotional reaction of others. An additional item, personal relevance of September 11$^{th}$ on respondent's lives, used a Likert scale from 1 to 5, with "1" representing a general relevance (e.g., as a US or world citizen), "3" representing a specific relevance (e.g., family/friends reside in New York City or Washington, DC), and "5" representing a very specific relevance (e.g., loss of family/friend).

There were nine specific questions concerning the factual events of 9/11 in *Section II* to assess event memory. In *Section III*, three forced-choice questions were used to assess participants' conceptualization of their recall for 9/11. There were also questions corresponding to the number and type of media sources utilized to learn information about 9/11 at three time periods—initial, six-months, and one-year.

*Procedures*

All participants were treated according to APA guidelines for human participant research, and the study had prior approval of the university's Institutional Review Board

for research (see Appendix B). Participants were also required to give their informed consent in order to participate and be included in the study (see Appendix C). Participants were asked to complete the survey in one of three ways. Two of the methods used paper-and-pen versions of the survey. Specifically, college instructors distributed and collected consent forms and paper versions of the surveys in their classrooms, which were sealed in envelopes and mailed to the author. To ensure standardization, an instruction sheet was provided (see Appendix D). Additionally, surveys were mailed to faculty campus mailboxes. The third technique utilized an online version of the survey. College students, staff, faculty, and their family members were directed via flyer, instructors' announcement, or academic program bulletin board to a website where participants completed the survey online. The surveys were e-mailed anonymously to the author's electronic mailbox. The survey took approximately 15 to 25 minutes to complete. Participants from KS, AR, and UK completed pen and paper surveys while NY, CA, and NL participants completed the survey online.

*Coding*

*Canonical categories*. Although Brown and Kulik only required one of the canonical category questions be answered to classify a memory as FBM, this study used a more stringent requirement. Participants were considered to possess FBM if they provided substantive responses for location, activity and source. Each participant was given one point for each of these three categories which was then summed into a LAS (i.e., location, activity, source) score (range 0 to 3). Zero points were awarded for unanswered questions.

*Factual features*. A coding manual was developed for scoring accurate event memory responses (see Appendix E). Nine features were identified a priori and were grouped into three categories. The *main event* category includes the attack on the "WTC," the attack on the "Pentagon," and the plane crash in "Pennsylvania." The *major players and weapon* category includes the "targeted officials" (i.e., the President), the "mastermind" (Osama Bin Laden was the first and primary suspect), "terrorists," and "planes." The *aftermath* category includes "rescue efforts" at the tragedy sites and "death toll" (totaled from New York, D.C., and all four planes).

The amount of information provided in each survey is indicated by two summation scores, a feature score and an elaboration score. Each participant was given a total feature score based on how many features the participant was able to provide substantive responses for out of nine (i.e., a range of 0-9 points). Each feature was then scored based on the amount of elaborate information provided. The score for each feature variable was "0" points if no information was present, "1" point if less than critical/complete information was provided (i.e., partial information), "2" points if critical/complete information was given (i.e., provides the critical aspects of what occurred), and "3" points if the participant provided critical/complete and additional information for any given feature. A respondent was said to have "complete" information if the response included the critical aspect(s) of any given feature according to a 9/11 encyclopedia entry (see Wikipedia, 2006 and the coding manual in Appendix E). There were two coders, the author and an assistant, each coding half of each age and location sample with 92% inter-rater reliability. For each feature, out of nine, that a respondent

provided elaborate information (i.e., a 3-point response), the respondent earned one point toward a total elaboration score that was summed across features.

*Conceptualization and media sources*. There were four items in *Section 3* corresponding to how participants meta-cognitively classified the quality of their memory for 9/11. These questions involved discrete categorization and were converted to numbers (i.e., selection of first option = 1, selection of second option = 2, etc.). For example, the question, "My memory for this event is . . ." respondents were given two options, "vivid" received a score of 1 and "vague" received a code of 2.

The participants were asked to indicate the type of media sources they used to learn of the event. The survey provided eight options, such as radio, newspaper, television, and internet, to name a few. If a media source was indicated, that source variable was coded as "1." If the source was not indicated, the variable was coded "0." A nominal scale was used for media sources. If use of four or more media sources were said to have been consulted, media sources was said to be *high*, if less than four sources were indicated, media sources was said to be *low*.

# CHAPTER 3

# RESULTS

## *Hypotheses 1 and 2: FBM Would Be Higher in US and Younger Samples*

*Canonical categories.* Did the tragedies of September 11th produce flashbulb memory (FBM)? Participants who provided a substantive response to all three of the canonical categories of location, activity interrupted, and source were given credit for FBM. Did the ability to recall the canonical categories vary by the participant's proximity to the event or the participant's age? To answer these questions, a one-way ANOVA between location groups and LAS score (range was 0 - 3) and a *t* test between age and LAS score were planned. However, 98.3% of the participants earned credit for FBM according to the LAS definition (i.e., 3 points). Only six participants did not possess FBM. Due to lack of variance, no formal analysis was performed. Therefore, Hypotheses 1 and 2 were rejected.

## *Hypothesis 3: Relevance Rankings Would Vary by Location*

*Consequentiality.* Relevance for the 9/11 event was measured by Likert scale from 1 to 5 with "5" indicating highest relevance. A relevance of "1" was indicated by 40.8% of participants. Interestingly, FBM was still high despite the mode response for relevance being 1. There was no correlation between relevance and presence of FBM due to the high FBM rate. Next a one-way ANOVA was performed with location identified as a factor for relevance, $F(5, 354) = 31.95$, $p < .001$. Tukey's post-hoc analysis ($p < .05$) showed that relevance levels followed the predicted pattern: NY ($M = 3.36$, $SD = 1.04$) > CA ($M = 2.16$, $SD = 1.02$), AR ($M = 2.13$, $SD = .99$), KS ($M = 2.16$; $SD = 1.07$) > UK ($M = 1.40$; $SD = .78$), NL ($M = 1.46$; $SD = .85$). Therefore, Hypotheses 3 was partially

supported; relevance followed the predicted pattern by location but FBM rates did not correlate with reported relevance. As a supplemental analysis, younger and older age groups relevance rankings were compared using the *t* test. A trend was found for older participants (a more politically minded group, see Conway, 1995) to indicate a higher relevance for the 9/11 event than younger participants, $t(358) = -1.72$, $p = 0.08$, shows that political relevance seemed to play a larger role than other forms of relevance on recall.

*Hypotheses 4 and 5: Event Recall Would Be Greater among Younger and US Samples*

*Age.* Hypothesis 4 was rejected; older participants had better event recall than the younger cohorts. Two planned comparisons were performed using age as the independent variable and features and elaboration recall as the dependent variables. The results show a main effect for age. Older participants had superior recall for features, $t(358) = -4.10$, $p < .001$, and details, $t(358) = -2.90$, $p < .01$. Older participants were able to provide more features ($M = 7.98$, $SD = 1.20$) and more detail ($M = 2.09$, $SD = 1.83$) than younger participants (features, $M = 7.42$, $SD = 1.36$; details, $M = 1.57$, $SD = 1.53$). This group also cited higher relevance, most likely due to developmental stage, and is considered more politically savvy.

*Location and features.* Hypothesis 5 was partially supported; US samples did out-perform the European samples in event memory recall. However, the location samples did not follow the predicted pattern. Planned ANOVAs using total number of features and elaborations as the dependent variables revealed a main effect for location on event memory. There was a significant difference in the amount of features participants were able to recall among location groups, $F(5, 354) = 5.74$, $p < .001$. Tukey post-hoc analyses

($p < .05$) revealed CA ($M = 8.33$, $SD = 0.91$) and NY ($M = 7.80$, $SD = 1.32$), the two tragedy-linked areas recalled significantly more feature information than the other US samples, which did not differ. An anomaly was found in the NL data. NL participants ($M = 7.85$, $SD = 1.40$) out-performed all groups except the tragedy-lined areas in feature recall: (AR: $M = 7.63$, $SD = 1.28$; KS: $M = 7.33$, $SD = 1.39$; UK: $M = 7.25$, $SD = 1.24$). NL scores for feature recall, in fact, were equal to the NY ($M = 7.80$, $SD = 1.32$) and CA ($M = 8.33$, $SD = .91$) participants.

The feature recall for this study is interesting paired with Shapiro and Haugen's (2003b) results, which was configured with a slightly different scoring system, preventing a direct statistical comparison (current study, after 17 months: $M = 7.70$, $SD = 1.40$; previous study, after 11 weeks: $M = 5.51$, $SD = 1.23$). While there was no there was no statistical comparison, there was a lower mean for the previous study. The best explanation for this is the sample was comprised entirely of KS participants, which did not include participants directly affected by the events. The results of the two studies are important, however, and support that memory had leveled by 11 weeks and stabilized by 23 weeks (Shapiro & Haugen, 2003b) and was retained even after 17 months (current study).

*Location and elaboration.* There was also a significant difference in the amount of details that were reported by location, $F(5, 354) = 14.53$, $p < .001$. Again, Tukey post-hoc ($p < .05$) revealed the tragedy-linked locations (NY: $M = 2.60$, $SD = 1.89$; CA: $M = 2.78$, $SD = 2.00$) provided more details than the UK and other national samples (see figures below and in Table 1). NL participants ($M = 1.86$, $SD = 1.53$) performed

Table 1

*Means and Standard Deviations for Feature and Detail Recall by Location*

| | Feature | | Detail | |
|---|---|---|---|---|
| Location | *M* | *SD* | *M* | *SD* |
| United Kingdom | 7.25 | 1.24 | .93 | 1.07 |
| Netherlands | 7.85 | 1.40 | 1.86 | 1.53 |
| Kansas | 7.33 | 1.39 | 1.01 | 1.03 |
| Arkansas | 7.63 | 1.28 | 1.78 | 1.58 |
| California | 8.33 | .91 | 2.78 | 2.00 |
| New York | 7.80 | 1.32 | 2.60 | 1.89 |

better than all but the tragedy-linked groups on detail recall (AR: $M = 1.78$, $SD = 1.58$; KS: $M = 1.01$, $SD = 1.03$; UK: $M = .93$, $SD = 1.07$).

The NL group's recall ability compared to the other unaffected samples are interesting. Two factors were at work here. First, the news providing most information was unfolding during Dutch primetime, giving them an advantage at encoding. In part, then, media's influence trumped consequentiality as a moderator on memory. While UK participants differ the Dutch by only an hour, the political alliance between the US and UK made many participants reflect, not on the events themselves, but on the political and military repercussions that may follow for them when America was attacked.

*Supplemental analysis for event memory.* Regression ANOVAs showed that relevance was a predictor of feature, $F(1, 358) = 4.44$, $p < .05$, and detail $F(1,358) = 20.14$, $p < .001$ recall. Tukey post-hoc analyses ($p < .05$) showed participants with higher relevance scores had higher feature and elaboration scores than their cohorts. While the effects of relevance on FBM formation for this study cannot be determined due to the high FBM rate, relevance played a crucial role in event memory encoding and recall.

*Hypothesis 6: Vivid Rememberers Would Have Better Recall*

*Memory frozen in time.* First, 51% of the participants described their memory of 9/11 as "frozen in time" and resistant to forgetting, while the remaining participants described their 9/11 memory as "similar to other memories which fade over time." This self-reported metacognitive factor was used as a grouping variable to examine differences in total number of features and total number of details. Those who viewed their memory as "frozen in time" recalled significantly more features than those who viewed their memory as "fading like other memories." Those who labeled their memory as "frozen"

recalled $M = 8.00$ features ($SD = 1.06$), $t(351) = 4.76$, $p < .001$, and $M = 2.03$ details ($SD = 1.68$), $t(351) = 2.68$, $p < .01$. While those who viewed their memory as "like other memories" recalled $M = 7.44$ features ($SD = 1.44$) and $M = 1.68$ details ($SD = 1.64$).

*Vivid memory.* Second, participants were asked to define their 9/11 memory in one of two ways, as either "vivid with many details" or "vague". The majority of participants, 73.18%, described their memory as "vivid." These two metacognitive descriptions were used as grouping variables. A *t* test revealed that those who viewed their 9/11 memory as vivid recalled significantly more features, $t(356) = 4.40$, $p < .001$; $M = 7.92$, $SD = 1.15$, than those who viewed their 9/11 memory as vague. Vivid recallers also provided more details ($M = 2.07$, $SD = 1.78$), $t(356) = 5.45$, $p < .001$, than those who viewed their 9/11 memory as vague ($M = 1.19$, $SD = 1.30$).

*Memory accuracy.* One-way ANOVAs were performed to ascertain whether the level of accuracy (independent variable) participants interpreted their memory to be was linked to their event memory (dependent variable). No significance for self-reported accuracy and detail recall was found. However, there was a significant difference, $F(2, 353) = 4.82$, $p < .01$, in the amount of features participants were able to provide when divided into self-selected accuracy groups (i.e., accurate, fairly accurate, inaccurate). Tukey post-hoc analyses ($p < .01$) revealed that the "inaccurate" group's poorer recall ($M = 6.81$, $SD = 1.60$) remembered less than the "accurate" ($M = 8.03$, $SD = 0.98$) and "fairly accurate" groups ($M = 7.72$, $SD = 1.31$), which did not differ.

*Length of memory.* The last metacognitive question asked participants to describe their 9/11 memory as either "lasting a few seconds" or "longer than the first initial seconds of learning of events." The majority of participants ($N = 309$, 86.79%)

considered their 9/11 memory to last longer than the initial seconds of learning the events. Participants who considered their memory to last longer than a few seconds also performed significantly better on the feature, $t(354) = -2.65$, $p < .01$, and detail, $t(358) = -3.34$, $p < .001$, recall tasks. The "only seconds" group recalled an average of 7.13 total features ($SD = 1.45$) and an average of 1.23 total details ($SD = 1.09$) compared to the "longer than seconds" group, which recalled an average of 7.80 total features ($SD = 1.27$) and an average of 1.94 total elaborations ($SD = 1.77$).

Therefore, Hypothesis 6 was supported; participants' conceptualizations of their memories were congruent with their ability to recall event features and details. Most participants define their memory as lasting longer than a few seconds, most likely elongated by the amount of media coverage that the event was given over a longer period of time compared to past FBM events.

*Hypothesis 7: More Media Access Produced Greater Recall*

Analysis of the number of media sources participants consulted was used to examine media's effects on recall. Participants were grouped by number of media sources consulted and then their features and elaboration scores were subjected to *t* tests. The analyses showed a trend in the number of media sources used on features recalled, $t(357) = -1.84$, $p = .06$, with the "low media" group recalling less features ($M = 7.53$, $SD = 1.36$) than the "high media" group ($M = 7.79$, $SD = 1.27$). Participants in the "high media" group were also able to significantly recall more detail ($M = 1.99$, $SD = 1.72$) than the "low media" group ($M = 1.55$, $SD = 1.64$) with $t(357) = -2.37$, $p < .05$.

# CHAPTER 4

# DISCUSSION

While many psychologists still refute that flashbulb memory (FBM) is a special case of memory, the results of the study clearly indicate that memory for the 9/11 event, whether FBM or event memory, is special. No other study to date has had such high retention of FBM and event memory for such a long retention interval for both those directly affected and those minimally affected. This suggests that a variety of co-occurring factors produced an unusual phenomenon. First, 9/11 is one of the most shocking events in history due to the intricate planning, number of terrorists and coordination required to deliver such a synchronized and devastating wound to a country that previously felt immune to attack. The number of ways it affected life in the US was unprecedented for any one event: a) the number of casualties and fatalities, b) the emotion level in news reporters, c) the destruction of an icon representing foreign nationalities, d) international financial and political consequences, e) the uncertainty of what other attacks might still occur on that day, f) fear of terrorism in other countries, g) land and cell phone lines were exhausted and many could not reach their loved ones to learn of their safety, and h) the amount of news provided to the masses. The US government then responded with necessary security actions that inadvertently caused chaos around the country. Airports were closed and planes were grounded, leaving many stranded and unable to get home. The stock market closed and the conditions required for a recession quickly emerged. All national landmarks and tourist attractions were closed. Many companies, airports, and tourist attractions also revamped their security system such that life in the US was drastically changed. Also, a new chapter in

journalism began, in which information was given immediately and continuously for months. Even in unaffected areas of the country, 9/11 stories appeared in town newspapers more than one year after the event (Shapiro & Haugen, 2003a). The nation then entered two wars after the attacks (i.e., one in Afghanistan to remove the Taliban and one in Iraq as a pre-emptive campaign against terrorism). Socially, hate crimes toward Muslims increased in the US and around the world. The aftermath, especially at Ground Zero, produced unprecedented medical and mental health problems (Eth, 2001). Many civilians were killed, leaving many families bereft or children without parents. A new fear gripped nationals – the fear of terrorism. Since the media coverage of the attacks, stories stemming from the event have captured frequent headlines: bio-terrorism concerns, anthrax-laden mail, the 9/11 Commission and Report, the capture of terrorists, airline security, the thwarted attack on Library tower in Los Angeles, etc. Movies and television shows have a new focus on terrorist plots and documentaries and other movies have been made on the individual events, such as *Flight 93*, which is based on the crash in Pennsylvania. Without question, September 11$^{th}$ is one of the most uniquely negative events in history (Pillemer, 2003).

*Hypotheses 1and 2: Contributions to and factors of Flashbulb Memory*

So unusual and altering was this event to US and world history, its ability to produce FBM (i.e., participants were able to provide their location, interrupted activity, and source for learning of the 9/11 event) in nationals is not shocking. However, the vast majority of 9/11 studies have shown that FBM for this event is world-wide. It was interesting that FBM occurred across cultures despite that the average consequentiality ratings provided by participants was low (i.e., a "1" out of 5). The data clearly indicate

that these memories are special because they are also immune to forgetting even after 17 months (see Shapiro & Haugen, 2003b for a longitudinal FBM study on 9/11).

The questions used to elicit FBM canonical categories were prompted, non-leading questions rather than an open-ended narrative format such as the one Brown and Kulik (1977) used. Non-leading questions were used for two reasons. First, negative emotional events are more difficult to retrieve with this method than when retrieval cues are given (Wagenaar, 1986). This question method also allowed verification between what information participants recalled versus what was forgotten, as non-reporting is the primary problem in the narrative, open-ended style. Because this question format does not require a long response, participants were able to show memory for each category without providing much information. For example, when participants were asked their location when learning of the 9/11 event, they could simply respond in a few words, such as, "in my room" and they would receive credit for the category. While some may argue that this produces a ceiling effect, the recall of this minutia (i.e., canonical categories), in whatever degree of detail, is the hallmark of FBM as compared to memory for other events (Brewer, 1988). Therefore, the recall of the canonical categories at the general or elaborated level constitutes FBM. Therefore, recall of elaborated canonical categories is FBM minutia, or in effect, minutia of minutia. In sum, FBM is already special and does not need to reach excessive standards to make it special or to disqualify memories from receiving FBM status.

Another point of interest is the relevance scale which was used to differentiate various levels of consequentiality among nationals. However, the scale failed to provide measurement for relevance factors beyond proximity, knowing people in the affected

areas, and loss of a loved one. While the scale did not take into account the presence or absence of active military personnel being in participants' households, however, none of the samples were taken from locations with military bases. CA, while not attacked and the farthest away from the devastation had better quality of memory. It is possible that the planes being bound for west coast locations and the presence of an alumnus on flight 93 both increased arousal for encoding and maintenance as compared to AR and KS samples. Therefore, the national samples had large variances in factors relating to the vividness with which memories were encoded (i.e., those directly affected, Manhattan; those inconvenienced, NY; those with connections to the planes, CA; and those removed geographically, AR and KS).

*Why study FBM?* Regardless of consequentiality levels and reasons for encoding, these memories endured long retention intervals. Unusually vivid and enduring memories such as these are important to study. Many FBM-inspiring events are so tragic and disturbing that even those geographically distant may experience psychological trauma as a result. Many participants that were geographically distant from the 9/11 affected sites reported crying or weeping with a loved one after learning of the attacks. In fact, PTSD symptoms were found in youth geographically distant from Oklahoma City two years after the bombing of the Murrah Federal Building in April of 1995 (Pfefferbaum et al., 2000). The PTSD symptomology found in the youths parallel other PTSD problems experienced in children and adolescents from FBM-inspiring events that were learned or viewed through the media, such as the Gulf War (Nader et al., 1993), an earthquake warning (Kiser et al., 1993), a hurricane (Shaw et al., 1995), and following the Challenger explosion (Terr et al., 1999). The studies listed here indicate that anyone with

perceptual exposure (e.g., on-site eye-witnessing or TV eye-witnessing and viewing of replays) of an emotionally negative, FBM-inspiring event is at risk for PTSD, especially youth. A deadly attack on one's country affects one's sense of security, beliefs about the world, and personhood (Pillemer, 2003), which requires all nationals to deal with the aftermath of trauma, death, and loss. One of the ways to achieve closure after such an event is to construct meaning through social sharing, such as verbally retelling memory to regain a perceived loss of control, search for meaning and justice, and reach adaptation (Harvey, 2000).

FBM is also an important phenomenon to study because it provides an analog for many other psychological topics. This study demonstrated, to a small degree, a pattern for coping with traumatic events. It was an effective comparison for eyewitnesses to a crime or victims of a traumatic event and how people cope by turning inward (e.g., recall of FBM) and focus on self when threatened rather than on the external (e.g., recall of event memory). Just as FBM is the more enduring memory of the 9/11 event compared to event memory, it is the reception context that is often the most enduring for traumatic episodes, which often results in serious mental health problems, such as PTSD. FBM is the closest analog to PTSD. PTSD memory is so enduring that the recall of the reception context becomes intrusive and unbidden as a result of inadequate processing of the trauma memory, which can impede recovery (Zoellner, Alvarez-Conrad, & Foa, 2002). What enables FBM to be processed like a normal memory, not producing intrusive recall, yet allows it to be as enduring as a personally traumatic episode? Perhaps it is the level of social sharing that is associated with FBM, which is uncommon for PTSD-catalyzing events, because sharing the reception context of a traumatic event with others helps to

validate or clarify one's own reactions and perceptions (Barbato, 2002). In this way, FBM is also an analog for what styles of coping are best for traumatic episodes, such as the structured writing or retelling. It is interesting that structured writing about a disaster, a parallel to FBM questions, is used to explore narratives of PTSD patients, decrease intrusive thoughts, which in turn reducing negative affect and physical symptoms of PTSD (Smyth, Hockemyer, Anderson, Strandberg, Koch, O'Neill, & McCammon, 2002). These factors, the enduring quality, level of memory processing, compelling force to retell the story, and the reaction of synthesized eye-witnessing as a result of the media, provide psychologists insight into the traumatic memories for those with personal traumas or who have been witness to crime.

*Age.* Event memories of live, unfolding events also provide analogs to eye-witnessing and personal trauma memories. These tragic public events allow study of memory and responses to trauma across cultures, levels of consequentiality and development. The data showed that older participants had more factors promoting encoding and maintenance. Developmentally they are more politically invested, are more connected to the larger societal group than college students (i.e., latter adolescence where focus is on self and self identity rather than the larger society), and are more likely to process the loss of human life at a personal level due to adolescents' and young adults' tendency to feel immune to death (Erikson, 1980). The data showed that older participants did recall more feature and detail information.

*Hypothesis 3: Relevance*

Older participants also reported high relevance scores. The data on relevance here extended previous research (e.g., Burke et al., 1992; Shapiro & Haugen, 2003b) by

examining how variations in age mediated eyewitnesses' ability to recall accurate features and details for an emotional, shocking event. Relevance's overall impact on encoding and retention could not be determined due to high rates of FBM.

*Hypotheses 4 and 5: Event memory*

As predicted, samples linked to the tragedies were able to encode and recall more information over time as a result of optimal arousal. These results tentatively support the trauma superiority camp (i.e., trauma enhances recall, Shobe & Kihlstrom, 1997) rather than the view that trauma hampers recall (Herman, 1992). However, future study with a larger sample of directly affected participants should be conducted to give the Easterbrook Hypothesis equal measure. Because participants were asked to recall the 9/11 event after 17 months and had high success (features reported, $M = 7.70$, $SD = 1.31$), the results are interesting compared to Walker's view (1967) that delayed testing increases recall for emotional events due to reverberating cortical activity for the event. This study, however, branched from earlier work. The previous study, in connection with the current results, shows the opposite; information about 9/11 leveled over time and stabilized, rather than increased after a long delay for the event. This study shows that event memory with emotional components, while not as potent as FBM, can be very enduring over time. It also supports Shapiro and Haugen's (2003b) work that memory, even after leveling, can endure beyond 23 weeks, and as seen here, beyond 17 months.

*Hypothesis 6: Metacognition*

Enduring memories such as these have been assumed in the past to be linked with accuracy. Using short delays as a proxy for accuracy, many researchers have paired alterations in repeated elicitations with participants' confidence in recall accuracy to

show that even vivid memories can be misjudged (Bower, 1993; Neisser & Harsch, 2000). While Shapiro and Haugen's (2003b) repeated elicitation study shows that 9/11 memory was retained consistently over time, questions remained concerning if there were metacognitive perceptions of memory that are trustworthy. The data here replicate an earlier finding that "vividness" and a "frozen" quality in memory proved to indicate superior recall over participants that reported their memories to be "fading" and "vague." However, accuracy was also indicated as a successful measure of better recall. The latter appears to blend with the previous conflicted findings of "confident inaccuracies." Participants chose among three accuracy levels. Results were based on the superior recall of the two "accurate" (i.e., moderate and high accuracy) groups compared to the "inaccurate" group's low recall of event information. Taken together, feelings of inaccuracy are more congruent with recall performance than feelings of accuracy or confidence.

*Hypothesis 7: Media's Role in Memory*

Would memory have stabilized more quickly without the media's influence? The media provided a vast amount of news coverage that had depth, breadth, and provided continuous updates for the tragedy for many months. The amount of media coverage over time, in effect, stretched the event to encompass a wider period of time, thus providing more chances for rehearsal to optimize recall. It is also clear from the results that the media played a direct role in the retention of event memory features and details. European samples, with the least consequentiality, still had high levels of recall that could have only resulted from the media. The 9/11 event impacted the entire world, even countries not politically linked to the US, such as the NL. The media also played a direct

role; participants who reported more media sources provided more features and details. In the case of NL, media trumped nationality in ability to moderate event memory, with NL participants' recall on features and details paralleling those for CA and NY participants.

While conclusions are tentative due to FBM ceiling effects, the media most likely buttressed FBM maintenance as well. For example, the amount of media exposure given to this event led to enhanced retention for personal circumstances in two ways. First, because of the continuous updates on the tragedy, the 9/11 event remained a topic of conversation for several weeks. This provided recallers the opportunity to learn, from the journalists, new ways in which the events were relevant to them (i.e., stocks, war, etc.), which affects the recall of FBM categories (Neisser & Harsch, 1992). Second, it also prompted viewers to rehearse their reception context with others as a way of connecting themselves with their society, to the current news (Neisser, 2000), and as a way to clarify their own feelings and perceptions (Barbato, 2003).

## Conclusion

Despite the small sample size from each location, the findings are robust and are probably due to the magnitude of the tragedies September 11$^{th}$ on United States citizens and the rest of the world. There is no doubt that the participants have FBM for the 9/11 event, though consequentiality for most was reported to be low.

It is important that future studies utilize similar criteria for determining whether FBM is present, specifically presence of location, activity, and source. Researchers should also explore the degree of consequentiality required to form FBMs as its role in FBM is still undetermined. Future proxies for consequentiality, such as the relevance

scale used here, should be designed to take a wider scope of consequentiality into account.

Importantly, the study showed that recall for FBM was better than recall for event memory, making it an effective control for judging the uniqueness of FBM, as both had equal time frames and emotional valence. Future studies should focus on a sample with geographic variety with an FBM-inspiring event that has a lesser magnitude, as media exposure would be lower and less available. By doing this, it can be determined if the high event recall found for this study is typical. It may also clarify lingering FBM and relevance questions that could be explored with higher FBM variance. Greater FBM variance would also allow more direct comparisons between FBM and event memory to be made. To learn more about the relationship of memory between PTSD and FBM, future studies should use a PTSD scale (there are many available that focus on different types of indices: symptomology, style of memory, emotional reactions and behaviors, change in self, etc.) and examine the complexities (i.e., sensory qualities, etc.) of the FBM narratives as an index of PTSD (Gray & Lombardo, 2001).

In conclusion, several questions about emotional memory are unanswered because of the uniqueness of the 9/11 event. The conclusions reached here may not parallel the fate for recall for other, less shocking events that provoke FBM. More research should be done to take all factors into account, such as the possibility of mental health issues as a result of synthesized eye-witnessing, the recall of features and details following trauma after short and long delays, and a method to compare memory quality by level of media consumption (i.e., time rather than number of sources).

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# APPENDICES

# Appendix A
# Flashbulb Memory Questionnaire

**Dear Participant,**

Your teacher is part of a collaborative team who is investigating flashbulb memory, a special type of memory for unusual events. Please start with this page and complete the demographic section below. **Then fill out the questions in the next three sections in order. Please do not skip questions or read ahead.** Because of the nature of flashbulb memory, it is essential that you fill out this form by yourself and rely only on your own recollection of the September 11th events. It is not important how much or how little you remember, only that you rely on your own recollections when filling out this questionnaire. Please do not discuss the topic while filling out the questionnaire. If you do not have enough room to complete your answers, please use blank, lined paper and clearly label the answer with the section number and question number. **Please remember to write clearly so your answers can be read.** Thank you for your assistance.

If you have any questions, please email Erynne Haugen at haugener@emporia.edu or call the lab at 620-341-5810.

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**DEMOGRAPHIC SECTION**

Do not put your name on the questionnaire. However, please fill out the following information:

Sex: male __ female __

Birth date _____ Date Survey Completed _____ Age: _____

Ethnicity: European/European-American__ African-American __ Asian/Asian-American __Hispanic/Hispanic-American __ Mixed (explain _____)

Location: City _____ State _____ School _____

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**Section I : Please answer the following questions as fully as possible.**

1. Where were you when you learned of the events of September 11, 2001?
2. What were you doing when you learned of the events of September 11, 2001?
3. How did you learn of the events of September 11, 2001?
4. Use the scale below to indicate the relevance that the events of September 11, 2001 had on your life.___

GENERAL 1 2 3 4 5 SPECIFIC
(as a world citizen) (know people in areas) (family/friend died)

5a. What was your immediate emotional reaction to the events of 9/11?

5b. What were the immediate emotional reactions of those around you?

**Section II**

**Please write below what you remember concerning the events of September 11, 2001. Provide as much information as possible** (as though you are informing someone who has no knowledge of the events that happened on 9/11) **or if you do not remember, please indicate "I do not remember."** Also, **organize the information** such that information you knew on 9/11 should be put under "Old" and information you learned after 9/11 should be put under "New." Finally, **rate the importance of each aspect of the event** for understanding the 9/11 tragedy on a scale from 1 "very important" to 5 "not very important."

**Write old information under "old" and new information under "new." And rate the importance of the event.**

1a. What happened to the World Trade Center towers?

Old New

1b. How important was the attack on the World Trade Center?

VERY___1 ____2 ___3 ___4___5 NOT VERY

2a. What happened at the Pentagon?

Old New

2b. How important was the attack on the Pentagon?

VERY___1 ____2 ___3 ___4___5 NOT VERY

3a. What happened in Pennsylvania?

Old New

3b. How important was the event in Pennsylvania?

VERY___1 ____2 ___3 ___4___5 NOT VERY

**Write old information under "old" and new information under "new." And rate the importance of the event.**

4a. What official(s) were considered to be terrorist targets?

Old New

4b. How important was the fact that certain public official(s)

VERY___1 ____2 ___3 ___4___5 NOT VERY

5a. Who was the prime suspect (mastermind) behind the terrorist attacks?

Old New

5b.How important was knowing who the mastermind was to understanding the event?

VERY___1 ____2 ___3 ___4___5 NOT VERY

6a. What was the death toll for the attacks at all locations?

Old New

6b. How important was the death toll to the event?
VERY___1 ____2 ___3 ___4___5 NOT VERY

7a. What rescue efforts were made for the three locations and how long did they last?
Old New

7b. How important were the rescue efforts to the event?
VERY___1 ____2 ___3 ___4___5 NOT VERY

8a. What was the number of planes used to achieve the event?
Old New

8b. How important was the number of planes to the events?
VERY___1 ____2 ___3 ___4___5 NOT VERY

9a. How many terrorists were on the planes?
Old New

9b How important was the number of terrorists on the planes to the events?
VERY___1 ____2 ___3 ___4___5 NOT VERY

**Section III**

1. How would you conceptualize your memory for 9-11? Read through the following choices and mark with an "X" the choice that best describes your memory.
(a) **My memory for this event is**: ____vivid with lots of detail ____vague with little detail
(b) **My recall of this event**:
____ includes only the seconds surrounding when I first heard the news of the attacks
____ includes a longer period of time encompassing the news of the attacks and related information
(c) **I would describe my memory**
____as frozen in time (i.e., like a recording, resistant to forgetting)
____as similar to other memories (i.e., fading over time)
(d) **I consider my memory for this event to be**:
__ accurate, practically perfect __fairly accurate, some aspects may be wrong __inaccurate

2a. Which media sources did you use to learn about the 9/11 events? Be sure to indicate all sources used.
___radio __newspaper __tv news __tv special __magazine __tabloid __book __ internet

2b. To the best of your recollection, please indicate the amount of media coverage in hours that you were exposed to immediately following your learning of the 9-11 tragedy. ____ hours (total number). * If more than 24 hours, please indicate how many days _____ and the number of hours per day ____

3a. Did you read or watch 6 month memorial special reports for 9/11? _____ yes (how many? ___) _____ no
Did you read or watch 1 year memorial special reports for 9/11? _____ yes (how many? ___) _____ no
3b. If yes, specify what, if any, information did it help you to recall that you may have forgotten? Do not report what new information was learned during these special reports, only what old information was remembered again.

4. Did the amount of media exposure for this event increase your memory for it compared to other tragedies (Oklahoma City bombing, Columbine school shooting, Gulf War, death of Princess Diana )? If so, how or if not, why not?

5. a. First, select one of the four tragedies listed in question #4 and indicate:
1. Which event is it? _____
2. Where were you when you learned of the event?
3. What were you doing when you learned of the event?
4. How did you learn of the event?
5. Use the scale below to indicate the relevance that the event had on your life.___

| GENERAL 1 | 2 | 3 | 4 | 5 SPECIFIC |
|---|---|---|---|---|
| (as a world citizen) | | (know people in areas) | | (family/friend died) |

6. What was your immediate emotional reaction to the event?
7. What were the immediate emotional reactions of those around you?
8. What do you remember about what happened in the event?

b. **Next, for EACH of the following tragedies, provide the following information**:

***OKLAHOMA CITY BOMBING**

**Check here if you do not remember this event at all. _____ Then skip this question and go on to the next one. Otherwise answer all of the questions about this event.**

A1. From which media source(s) did you get your information? Mark all that apply.
___radio __newspaper __tv news __tv special __magazine __tabloid __book __ internet
A2. How much media exposure did you have for this event?
_____ days (write in number) _____ hours per day (write in number)
A3. How would you conceptualize your memory for this event? Read the following choices and mark with an "X" a choice that best describes your memory.
(a) My memory for this event is: ____vivid with lots of detail ____vague with little detail

(b) My recall of this event:
____ includes only the seconds surrounding when I first heard the news of the event
____ includes a longer period of time encompassing the news of the event and related information
(c) I would describe my memory
____frozen in time (i.e., like a recording, resistant to forgetting)
____ similar to other memories (i.e., fading over time)
(d) I consider my memory for this event to be:
__ accurate, practically perfect __fairly accurate, some aspects may be wrong __inaccurate

***COLUMBINE SCHOOL SHOOTING**

**Check here if you do not remember this event at all. _____ Then skip this question and go on to the next one. Otherwise answer all of the questions about this event.**

B1. From which media source(s) did you get your information? Mark all that apply.
___radio __newspaper __tv news __tv special __magazine __tabloid __book __ internet
B2. How much media exposure did you have for this event?
_____ days (write in number) _____ hours per day (write in number)
B3. How would you conceptualize your memory for this event? Read the following choices and mark with an "X" a choice that best describes your memory.
(a) My memory for this event is: ____vivid with lots of detail ____vague with little detail
(b) My recall of this event:
____ includes only the seconds surrounding when I first heard the news of the event
____ includes a longer period of time encompassing the news of the attacks and related information
(c) I would describe my memory
____frozen in time (i.e., like a recording, resistant to forgetting)
____ similar to other memories (i.e., fading over time)
(d) I consider my memory for this event to be:
__ accurate, practically perfect __fairly accurate, some aspects may be wrong __inaccurate

***GULF WAR**

**Check here if you do not remember this event at all. _____ Then skip this question and go on to the next one. Otherwise answer all of the questions about this event.**

C1. From which media source(s) did you get your information? Mark all that apply.
___radio __newspaper __tv news __tv special __magazine __tabloid __book __ internet
C2. How much media exposure did you have for this event?
_____ days (write in number) _____ hours per day (write in number)
C3. How would you conceptualize your memory for this event? Read the following choices and mark with an "X" a choice that best describes your memory.
(a) My memory for this event is: ____vivid with lots of detail ____vague with little detail
(b) My recall of this event:
____ includes only the seconds surrounding when I first heard the news of the event
____ includes a longer period of time encompassing the news of the event and related information
(c) I would describe my memory
____frozen in time (i.e., like a recording, resistant to forgetting)
____ similar to other memories (i.e., fading over time)
(d) I consider my memory for this event to be:
__ accurate, practically perfect __fairly accurate, some aspects may be wrong __inaccurate

***DEATH OF PRINCESS DIANA**

**Check here if you do not remember this event at all. _____ Then skip this question. Otherwise answer all of the questions about this event.**

D1. From which media source(s) did you get your information? Mark all that apply.
___radio __newspaper __tv news __tv special __magazine __tabloid __book __ internet
D2. How much media exposure did you have for this event?
_____ days (write in number) _____ hours per day (write in number)
D3.How would you conceptualize your memory for this event? Read the following choices and mark with an "X" a choice that best describes your memory.
(a) My memory for this event is: ____vivid with lots of detail ____vague with little detail
(b) My recall of this event:
____ includes only the seconds surrounding when I first heard the news of the event
____ includes a longer period of time encompassing the news of the event and related information
(c) I would describe my memory
____frozen in time (i.e., like a recording, resistant to forgetting)
____ similar to other memories (i.e., fading over time)
(d) I consider my memory for this event to be:
__ accurate, practically perfect __fairly accurate, some aspects may be wrong __inaccurate

The end. **Thank you for your help and participation.**

# Appendix B
## Institutional Review Board Permissions

| For R&G Use Only | Date approved _____ | | |
|---|---|---|---|
| File No. _____ | Full Review _____ | Expedited Review _____ | Exempted Review _____ |

This application should be submitted, along with the Informed Consent Document and supplemental material, to the Institutional Review Board for Treatment of Human Subjects, Research and Grants center, Plumb Hall 313F, Campus Box 4003.

1. Name of Principle Investigator(s) (Individual(s) administering the procedures): Erynne Haugen

2. Department Affiliation: Psychology and Special Education

3. Person to whom notification should be sent: Erynne Haugen
   Address: Campus Box 4031 Telephone: 343-9767

4. Title of Project: Flashbulb Memory: The Impact of the Media and other Influences

5. Funding Agency (if applicable): N/A

6. This is a dissertation _____ thesis X class project _____ other _____

7. Project Purpose(s):
   This project is a modification of a project already accepted by the Institutional Review Board, entitled, "Is There a Case for Flashbulb Memory?: Memories of East Kansas College Students" by Erynne Haugen and Lauren Shapiro. The original set of questions and procedures will be used in the current study except as noted below. The purpose of this study is to determine whether participants have flashbulb memories of the 9/11 events and what facilitated those memories, such as the media, age, and location. Many questions that will be asked in this study deal with the participant's ability to recall the 9/11 events. These questions are necessary to determine if flashbulb memories are present in the participant sample and if so, what factors facilitated creation and retention of those memories.

8. Describe the proposed subjects: (age, sex, race, or other specific characteristics, such as students in a specific class, etc.)
   The participants in this study will be willing participant college students (general education students) and faculty/staff of universities at: Emporia State University; a New York University; Harding University in Searcy, Arkansas; Pepperdine University in California; a University in Denmark; and the University of Portsmouth in the United Kingdom.

9. Describe how the subjects are to be selected:
   General education psychology classes will be used at each university in order to collect the study's sample. Faculty will be contacted by mail or email. Participants will fill out the questionnaire on paper or will be directed to the questionnaire's website.

10. Describe the proposed procedure in the project. Any proposed experimental activities that are included in evaluation, research, development, demonstration, instruction, study, treatments, debriefing, questionnaires, and similar projects must be described here. **Copies of questionnaire survey instruments, or tests should be attached.** *(Use additional page if necessary).*

Participants will be informed as to the purpose of the study, expectations of the participants, and assurance of anonymity. Those individuals who agree to take part in the study will be asked to sign a consent form or read a briefing statement that will proxy for informed consent should the participant take the questionnaire by internet before beginning the study (see attached). Each participant will be assigned a number that will be used to identify him or her from that point in the study onward. Participants will never be asked for

his/her name. Participants will fill out a questionnaire that will ask for their recall of the 9/11 events. When the participants have completed the questionnaire, the participants are finished participating in the study.

11. Will questionnaires, tests, or related research instruments not explained in question #10 be used?
Yes _____ No X *(If yes, attach a copy to this application.)*

12. Will electrical or mechanical devices be used? _____ Yes X No *(If yes, attach a detailed description of the device(s) used and precautions and safeguards that will be taken.)*

13. Do the benefits of the research outweigh the risks to human subjects?
X Yes _____ No *(If no, this information should be outlined here.)*

14. Are there any possible emergencies that might arise in utilization of human subjects in this project?
____ Yes X No *(If yes, details of these emergencies should be provided here.)*

15. What provisions will you take for keeping the research data private? *(Be specific.)*
The participants will be given a number with the informed consent that will automatically identify the participant from that point forward. The informed consent documents will then be placed in a locked filing cabinet. Those questionnaires that do not apply to this format (participants who take the same questionnaire on the internet) will be sent directly to an email account in which the participant name is never given.

16. **Attach a copy of the informed consent document, as it will be used for your subjects.**

EMPORIA STATE UNIVERSITY

1200 Commercial
Emporia, Kansas
66801-5087

620-341-5351
620-341-5909 fax
www.emporia.edu

GRADUATE STUDIES AND RESEARCH
RESEARCH AND GRANTS CENTER
Campus Box 4003

March 31, 2003

Erynne Haugen
Psychology and Special Ed.
Campus Box 31

Dear Ms. Haugen:

Your application for approval to use human subjects, entitled "Flashbulb Memory: The Impact of the Media on Recall," has been reviewed. I am pleased to inform you that your application was approved and you may begin your research as outlined in your application materials.

On behalf of the Institutional Review Board, I wish you success with your research project. If I can help you in any way, do not hesitate to contact me.

Sincerely,

Bill Stinson, Chair
Institutional Review Board for Treatment
of Human Subjects

pf

cc: Lauren Shapiro

Appendix C
Adult Informed Consent

Emporia State University supports the practice of protection for human participants in research and related activities. The following information is provided so that you can decide whether you wish to participate in the present study. You should be aware that even if you do agree to participate, you are free to withdraw at any time, and that if you do withdraw from the study, you will not be subject to reprimand.

You are invited to participate in a study investigating flashbulb memories. If you wish to participate in this study, you will be asked to answer questions concerning your memories for the 9/11 events and other memory questions. Your participation in this study is completely voluntary. Your name will not be associated with the research findings and will in no way affect your class status.

If you have any questions about this study, feel free to ask. I can be reached at 341-5803.

Thank you,

Erynne Haugen

---

I, _____, have read the above information and have decided to participate. I understand that my participation is voluntary and that I may withdraw at any time.

_____ _____

Signature of participant Date

# Appendix D

## Proctor's Instruction Sheet

Thank you for agreeing to be part of the collaboration exploring flashbulb memories for 9-11. This project can be used as the basis for lesson plans dealing with a variety of topics, including but not limited to how students process emotional events, deal with tragedies, apply statistical or math concepts to real life situations, and other psychological concepts. Our interest focuses on the first example. We want to know whether the media effects recall for emotionally salient events. If you are also interested in this topic, we would be glad to provide you with an overview of the literature in this field and to show you ways that you and the students can use the data to learn more about this issue. Your participants (students or faculty/staff) may complete the questionnaire in one of two ways. Participants can either fill-out a paper questionnaire, following the guidelines below, or participants may fill-out an electronic version of the questionnaire at the following website address: www.emporia.edu/psyspe/FBMSurvey.htm.

The completion of the questionnaire should take between 20 to 30 minutes (depending on the reading level of the students).

**General Instructions:**

1. While in class, ask students to complete the questionnaires. Explain the purpose of the questionnaire for your lesson plan (but do not define flashbulb memory beyond what is stated in the questionnaire until after the questionnaires have been completed).

2. DO NOT HAVE STUDENTS USE THEIR NAMES ON THE QUESTIONNAIRES. If students have placed their names on the questionnaires, be sure to cross it off. The electronic version will not provide a place for participants to include their names.

3. As students turn in the questionnaire, be sure that the students have completed all six pages. The electronic version will not accept a submitted questionnaire unless AT LEAST the demographic section has been included.

4. Please send us the completed questionnaires in the self addressed, stamped envelope if your participants are taking the questionnaire on paper and not through the internet.

Feel free to make copies for your own use. However, we will provide tables of summaries for your class. Also, internet participants may print out their forms if the teacher is going to use them for course credit. Students using the internet version should press the submit button after they are done completing the questionnaire.

If you have questions, please email the researcher at haugener@emporia.edu or call her at 620-341-5810 (office/lab) or 620-341-5803 (office).

Sincerely,

Lauren Shapiro, Ph.D.
Associate Professor/Research Supervisor

Erynne Eyrich Haugen
Graduate Teaching/Research Assistant

Appendix E

# Coding Manual

*Abridged for the purposes of this study*

**NOTES**

When coding answers that are given in numerical form, follow these guidelines:

Participant gave a range of responses, (ex: 3 – 5)

Always score the average response (3 + 4 + 5 = 12/3 = 4, score 4)

Participant gave two responses, (ex: 2 or 3)

Score the average response

---

**Demographic Section:**

**Subject Number:**

1000s = younger Kansas
2000s = older Kansas
3000s = young Arkansas
4000s = older Arkansas
5000s = young California
6000s = older California
7000s = young Netherlands
8000s = older Netherlands
9000s = young United Kingdom
10000s = older United Kingdom
13000s = young New York City
14000s= older New York City

**Sex:** 1 = male 2 = female

**Birthdate:**

Month, Date, and year for US participants – code as reported (ex: 10/10/79 = 10/10/79)
European participants = reverse the month and date (ex: 2/3/83 = 3/2/83)

**Date survey completed:**

US participants = code as reported
European participants = reverse the month and date as described above

**Age on 9/11:** Subtract birth date from 9/11

Ex: October 10, 1979 (date of birth)
September 11, 2001 (date of attacks)

| | 09 | 11 |
|---|---|---|
| 1979 | 10 | 10 |

---

11- 10 = 1 day

9 months – 10 months = borrowing one year by replacing 2001 with 2000 and adding 12 months to 9 = 17-10=7 months

2000 – 1979 = 21

Age of person on 9/11 = 21 years, 7 months, 1 day = ****21 years, 7 months

**Ethnicity:**

1 = European/European-American

2 = African/African-American
3 = Asian/Asian-American
4 = Hispanic/Hispanic-American
5 = Mixed or Other
If they do not indicate an ethnicity, score 99 (missing value)

**Location:**
City = write in the Excel column as reported
State = write in the Excel column as reported
School = write in the Excel column as reported

**Basic location categories reported in numbers:**

| | | |
|---|---|---|
| 1 | = | Kansas |
| 2 | = | Arkansas |
| 3 | = | California |
| 4 | = | Netherlands |
| 5 | = | United Kingdom |
| 6 | = | New York City area |
| 7 | = | Manhattan, New York |

---

**Section 1**
If any of Section 1 is left blank, score 0 for "do not remember/not reported"

**1. Where were you? - location**
1 = public place (dorm lobby, city bus, work, etc.)
2 = private place (dorm room, friend's house, private vehicle, etc.)

**2. What were you doing? – activity interrupted**
1 = getting ready for the day/morning activities (sleeping, making breakfast, getting dressed, showering/bathing, etc.)
2= in transit (walking to class, in car, driving, on bus, on plane, etc.)
3 = working/school (in class, preparing for class, finishing at work, etc.)
4 = other

**3. How did you learn of the event(s)? – source information**
1 = TV
2 = radio
3 = another person (roommate, instant messenger, chatting online, mother called me, overheard people talking, spouse, etc.)
4 = other (internet, newspaper, etc.)

**4. Relevance – personal meaning/consequentiality**
Record the number they have indicated, if they have indicated more than one number with no obvious choice, leave blank, do not code

1 = as US citizen
2 = in between US citizenship and knowing people in affected areas
3 = know people in areas
4 = in between knowing people in areas and having a family member or friend die as a result of the event(s)
5 = family/friend died as result of event(s)

**5a. Self emotional reaction: There is a variable for each of the following emotions/conditions:**
Mark 0 if the emotion for that variable was NOT reported by the participant
Mark 1 if the emotion for that variable IS reported by the participant

Variables:
1. Scared (worried, afraid, fearful, etc.)

2. Angry (hostile, mad, infuriated, etc.)
3. Sad (sorrowful, mournful, crying, weeping, etc)
4. Shocked (disbelief, surprise, etc.)
5. Numb (detached, etc.)
6. Helpless (powerless, etc.)
7. Other (provides an answer that is not an emotion, ex: upset)

**Summation of self emotions:**
Provide the number of variables they provided substantial answers for (ex: if one writes, "I was sad, helpless, and angry all at the same time," his/her summation score is 3)

**5b. Other emotional reaction: There is a variable for each of the following emotions/conditions:**
Mark 0 if the emotion for that variable was NOT reported by the participant
Mark 1 if the emotion for that variable IS reported by the participant

Variables: (same 7 as above)
Scared (worried, afraid, fearful, etc.)
Angry (hostile, mad, infuriated, etc.)
Sad (sorrowful, mournful, crying, weeping, etc)
Shocked (disbelief, surprise, etc.)
Numb (detached, etc.)
Helpless (powerless, etc.)
Other (provides an answer that is not an emotion, ex: upset)

**Summation of other emotions:**
Provide the number of variables they provided substantial answers for (ex: if one writes, "My mother was sad, helpless, and angry all at the same time," the summation score is 3)

**LAS score:**
Score 2 points for each of the location, activity, source canonical categories that were answered with code-able responses.

---

Section II
**Part a** of every item requires participants to provide information from memory about the 9/11 events

**Part b** of every item requires participants to rate the importance of each feature of the 9/11 event on the entirety/understanding of the tragedy (how important was each feature to understanding the entirety of the 9/11 events?)

---

PART A: Event Memory Narrative
Notes:

A. The location is provided on the questionnaire on features: WTC, Pentagon, Pennsylvania; therefore everyone gets credit for location unless they respond, "I don't know; I don't remember;" etc; or leave the question blank.
B. There are details listed for each feature below for convenience. It is not an exhaustive list of information for which participants may earn credit.
C. Participants are given credit for any information they provide as long as it:
    a. Is not spoiled later (ex: reporting 2000 died in one portion of the narrative and then later reporting that millions died in another portion of the narrative)
    b. Was information that was available for them to encode (ex: there were theories released by the media that the Pentagon plane and the Pennsylvania plane might have been missile targets by our own government or shot down, while this has not been verified by the government, it was available to the participants for encoding, therefore, they get credit for recalling it)
    c. Can be verified as available information or accurate information
D. Each feature's section below gives the standard for "complete" information.

a. Score "0" if there is no substantive correct response;
b. score "1" for any verifiable/accurate substantive response
c. Score "2" if complete information is provided
d. Score "3" for any verifiable/accurate information beyond complete information

E. Participants must provide complete information to earn a score of "2" or "3"; a participant cannot give a bunch of details and get a "2" or "3" response unless they also include the critical/complete information as well.

0- no information
1- partial information
2- complete information
3- elaborate information (complete information plus additional information)

D. Code all injury information reported within the feature (ex: "A woman was covered in debris and had lung injuries from inhalation at ground zero" would be coded under WTC)

E. Code TREATMENT OF INJURY(IES) to the feature "RESCUE."

F. Code death information given within a feature to the "Death" feature (a.k.a., "death toll)

---

**1a. Feature 1: WTC**
Complete information:
The World Trade Center was attacked by aircraft, it was destroyed (must indicate building was destroyed b/c this is what resulted in the most loss of life; ex: collapsed, fell, crumbled, etc.)

Amongst other ways, participants may earn 1 point for indicating that WTC was attacked, bombed [planes were used as bombs/missiles], destroyed by a terrorist, etc.

Detail examples:
110-stories on each tower
North Tower attacked first (8:48am NY; 9:48am KS)
Near 95th Floor
10:23 - 10:33am NY/11:33am KS collapsed
18 minutes later – south tower attacked
South Tower attacked second (9:03am NY; 10:03am KS)
Near 90th floor
9:50am (NY, 10:50am) collapsed
Collapsed appr. 47 minutes after attack
5:20pm (NY, 6:20pm KS) Seven WTC (47-ft bldg) collapses from damage)
The buildings caught on fire as a result of the explosions from the aircraft
Closes several blocks in NYC (West, Vesey, Park Row, Wall, Washington, Rector Streets show rubble/destruction)
People had to walk home to the bridge
Shoes littered the NYC blocks
Pitch black with smoke in NYC
Stock market closes
George Bush makes speech

---

**2a. Feature 2: PENTAGON** Arlington, VA/Washington DC – Headquarters of the Department of Defense
Complete information:
The Pentagon was attacked by aircraft which damaged the building (ex: plane flew into the building/Pentagon)

Amongst other ways, participants may earn 1 point for indicating that it was attacked, bombed, damaged by a terrorist, etc.

Detail examples:
9:48am (NY, 10:48am KS) attack on Pentagon
West side of Pentagon struck
Believed to be originally destined for White House
Evacuated
Was on fire for several hours, fires extinguished

---

**3a. Feature 3: PENNSYLVANIA**
Complete information:
A plane crashed, must indicate that it allowed further tragedy to be averted (they can indicate this in several ways; ex: … in an open field, passengers intervened, it missed its target, it was headed for Camp David, etc.)

Detail examples:
If participant provides more than one reason that disaster was averted, give extra credit (ex: plane crashed in an open field because the passengers intervened)
Passengers intervened when learned of other terrorist acts via cell phones, Scott Beemer was one of them, he coined the phrase, "Let's roll"
Near Shanksville, Pennsylvania (close to Pittsburg, not that close to Pennsylvania)
Just north of Camp David (Presidential Retreat in Maryland)
Plane landing in Pennsylvania was speculated to be headed for the White House or Camp David, however, the passengers attempted to regain control of the plane resulting in it's crash in an open field
It crashed near an elementary school

---

**4a. Feature 4: TARGETED OFFICIALS**
Complete information:
The President

Participants may earn 1 point for general information such as:
Pentagon planed headed for White House
Pennsylvania plane headed for Camp David
[High ranking] government officials

Detail examples:
The resulting strategy to keep the President safe or the President's activities can qualify the response for "elaborate" or a "3" point response: (ex: keeping his location safe, moving him around)
GW Bush was at a school in Florida reading to children
Flown from Florida to Louisiana to Nebraska to DC

---

**5a. Feature 5: MASTERMIND**
Complete information:
Osama/Usama Bin Laden (may provide any of the names, Osama, Usama, Bin Laden, Laden, or any combination thereof)

Participants may earn 1 point for general information, ex: "Taliban", "Al Queda", Saddam was a suspect

Detail examples:
Osama Bin Laden suspected around 4pm and confirmed that night before midnight
Osama is a Saudi national
Osama is the leader of Al Queda
He has planned previous attacks against the US

---

**6a. Feature 6: DEATH TOLL**
Complete information:
Gave an answer within the range of 2500-3500

****If respondent indicates more, give a "1" if it is within reason of the news (see below); if respondent gives exact number (+/- 100), give a "3"; if respondent gets credit for complete information plus gives details, score a "3"*

Participants may earn 1 point by providing any number between 3501 – 100,000
Participants may earn extra credit by providing accurate death toll for more than 1 location rather than just overall death toll

Detail examples:
Mixed numbers released were released at first: suspected 10,000 from WTC, then 5000
50,000 people worked in each tower
800 suspected from Pentagon
Total killed at WTC: 2,823
Pentagon: 125 not including passengers
Passengers of all the planes: 266
*See detail examples under "planes" feature for number of deaths from each of the four planes

---

**7a. Feature 7: RESCUE EFFORTS**
Participants can qualify for giving complete information in 4 ways:

a. Provide information from one time frame and by indicating either a specific form of aid or a specific helping action
b. Provide information about 2 time frames
c. Provide 2 forms of aid information by indicating 2 forms of aid or 2 actions or a combination (cannot get credit for indicating obvious – ex: medical teams were helping injured)
d. Provide a time frame for more than 1 location

****Participants must provide at least one time frame before they can qualify for a "3" response

Time frames:
(1) immediate rescue – before collapse/evacuations
(2) after collapse/search for survivors
(3) clean up/recovery searches

Complete information:
Rescue efforts lasted for days and clean up lasted many months. Firefighters, police, and medical teams were the most dominant force in the process

Detail examples:
Rescue starts immediately
Rescue workers died in collapse of South Tower
Firefighters, Nurses, Police, Doctors, Rescue Teams & local hospital rush to scene
Last fires extinguished – Dec 20, 2001
Recovery work – 3,100,000 man hours
Firefighter deaths – 343
Port Authority Officer Deaths – 37
Police Deaths – 23
At WTC: Never found – 1,721; Recovered – 1,102

---

**8a. Feature 8: PLANES**
Complete information:
4 aircraft (less than 4, score a "1"; if mention possibility of other planes or a 5th plane, score a 3)

Must have a minimum of "2" planes indicated to get 1 point

Detail examples:
4 passenger jet airliners:

([Boeing] American Airlines flight 11 plane from Boston to Los Angeles[1-WTC] 92 on board; [Boeing] United Airlines flight 175 [2-WTC] leaving Logan International Airport in Boston for Los Angeles carrying 65 people; American Airlines flight 77 from Washington Dulles Airport to Los Angeles [Pentagon] 64 people on board; United flight 93 to San Francisco from Newark Aiport in NJ [Shanksville, PN] 45 people on board)
Each carrying tanks full of fuel
And large numbers of passengers enroute to destinations in western US

---

**9a. Feature 9: TERRORISTS ON PLANES**
Complete information:
Provided an answer within the correct range: 20 (+/- 5)

Participants may earn 1 point for providing terrorist information WITHOUT the correct number OR by indicating 8-14 terrorists

Detail examples:
Various numbers came out at first: Logically, at least 2 per plane
4-7 per plane; roughly 20, most sources believe 19
Most were Saudi nationals
Participants may earn 3 points if they indicate the exact number (19)
There was another terrorist who missed his flight, details associated with that
Florida flight training school
Box cutters were used to gain control of the planes

---

**MISC**
Gas rush (day of)
Sports halted (day of)
Airports halted and planes rerouted to Canada (day of)
Military alert (day of)
FL hotel raided (day of )
FL flight school for the terrorists (after 9/11)
War (after 9/11)
Anthrax (after 9/11)

---

**Total Features Score:**
For each of the nine features that the participant provided substantive responses for (a score of 1,2, or 3), score a "1". Then add all of them up to total the number of features that were provided by the participant.

EX: If a participant provided substantive responses for: wtc, pentagon, Pennsylvania, and death doll features, the total feature score = 4 out of a possible 9.

**Elaboration Score:**
For each participant, provide two scores:
1. Score the presence or absence of elaboration for each feature (ex: wtcelab, pentelab, pennelab, offelab, oblelab, deathelab, rescelab, planelab, terrorelab)

If the participant scored a "3" for the feature, score 1 for that feature's elaboration variable. (ex: score of 3 in Pentagon feature = 1 under the variable "pentelab")

If the participant scored a "2" or below for the feature, score 0 for that feature's elaboration variable. (ex: score of 1 in the death toll feature = 0 under the variable "deathelab")

2. Score the total number of features that were elaborated on for each participant under the variable "totalelab"

If a participant scored "3s" on 7 features, the totalelab score = 7 out of a possible 9.

---

**Section 11, Part B: Importance of Features**

Code as follows:

Code the number the participant marked. If more than one answer is marked with no clear choice, do not code, leave blank.

If a 1 is indicated, code it as a "1"

0 or 99 as unanswered/missing value

1 = very important
2 = important
3 = moderately important
4 = minimum of importance
5 = not very important

Section III

Unaswered questions, score as "99"

1. Conceptualizing memory - Metacognition
    a. memory
    1 = vivid
    2 = vague

    b. recall
    1 = seconds
    2 = longer

    c. describe
    1 = frozen
    2 = fading

    d. consider
    1 = accurate, practically perfect
    2 = fairly accurate
    3 = inaccurate

2a. Media sources: Each option is its own variable in the spread sheet
    score a 1 if the source is indicated by the participant
    score a 0 if the source is not indicated by the participant

Variables:
Radio
TV news
TV special
Newspaper
Magazine
Book
Internet
Tabloid

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Erynne H. Haugen
Signature of Author

4/27/06
Date

Moderators of recall: Flashbulb and event memory of the 9/11 event
Title of Thesis

Cary Cooper
Signature of Graduate Office Staff Member

5-2-06
Date Received