INTRODUCTION

How research on Flashbulb memories has developed in the last ten years

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Definition, origins, and evolution of the interest for the construct

Flashbulb memories (FBMs) are memories for the circumstances in which individuals have heard about particular news. Research has mostly studied public news but FBMs also occur for private events (Pillemer, 2009). We all have these types of memories, and the notion of FBMs is now very popular in the media, which is often replete with anniversary dates in which the reader is often asked about some canonical variables assessing FBMs, with "Where were you?" and "What were you doing when you heard about the 9/11 attacks?" being prototypical questions. The news about a particular event does not need to involve as many people and countries as the 9/11 attacks did. It can apply to any community, whatever its size, as long as the event holds an emotional tone and is distinctive and consequential for most members of the community (e.g. Talarico & Rubin, Chapter 4; Rice, Hamamouche, & Bohannon, Chapter 5, this volume).

Although systematic research on FBMs only started at the end of the 1970s, it has already been reported in some preliminary work. The roots of this domain can be related to news of the assassination of President Lincoln in 1865. Almost 35 years later, F. W. Colegrove (1899) published an article in the *American Journal of Psychology* in which he examined the memories of US citizens upon learning of the news of the assassination. Despite the very long time gap, out of 179 participants, 127 (71%) were able to give many details of the circumstances in which they heard about the news. Although the accounts were not always extremely long or detailed, all of them provided at least some elements regarding the time and the location where people were when they heard the news. Colegrove concluded his paper by insisting on the abiding character of vivid experiences.

The next publication on FBMs occurred almost 80 years later and was also related to the very long term memories citizens of the US had about another famous president's assassination, the one of Kennedy in 1963 (Brown & Kulik, 1977). Rapidly after its publication, a wave of studies was published on the topic of FBMs from the 1980s to the 1990s. During that period, 22 papers were published (Scopus database). Many of these papers focused on fierce debates about FBMs being potentially a special case of memory. While Brown and Kulik (1977) advocated that FBMs were almost immune to changes, later studies emphasized that the reconstructive aspects of these memories were highly active, thus making FBMs similar to ordinary memories (e.g. Neisser & Harsch, 1992; Wright & Gaskell, 1995). If FBMs are similar to any other ordinary memory process, it is not surprising that interest in them vanished soon afterwards.

After some quiet years, the time between 2003 until 2009 can be considered as 'the golden age' of FBM research, with 60 papers published in only seven years. The first reason for this revival was the 9/11 attacks in the US, which occurred in 2001. This event had all the characteristics that are supposed to create strong and long-lasting FBMs: high distinctiveness and unexpectedness, strong consequences and emotional reactions, and extended covert and overt rehearsal. For the first time in the history of research into FBMs, long follow-up studies were conducted regarding a particular target event. They showed that for long retention intervals, the consistency rate was far above normal memory processes (e.g. Hirst *et al.*, 2015). The second reason for the sudden popularity of FBM research was related to a stronger interest for more phenomenological aspects of FBMs, such as vividness and confidence. When considering these two aspects, there is a strong consensus that FBMs are exceptional (e.g. Talarico & Rubin, Chapter 4, this volume). A third reason was related to the more systematic use of statistical analyses (e.g. taxometric models, structural equation modeling) that allowed models for the formation and assessment of FBMs to be tested (see Curci, Chapter 1; Luminet, Chapter 3, this volume).

Why a new edition of the book?

The publication of the first edition of this book in 2009 corresponded to that golden age. In the introduction of that edition, we justified the publication using five rationales. We will present them here below and consider whether new advancements have occurred since then. First, in 2009, models explaining the formation of FBMs were proposed and tested (Finkenauer *et al.*, 1998; Er, 2003). These models examined the consistency and vividness dimensions of FBMs. Since 2009, new models have been suggested, including one that examines the predictors of confidence in FBMs (Day & Ross, 2014).

Second, much progress in statistical methods has been made (e.g. Curci, 2005). Structural equation models have become very popular tools in the field of FBM investigation, allowing researchers to test specific hypotheses concerning the formation and maintenance of FBMs. On the other hand, studies focusing on the measurement of

the FBM construct with respect to similar constructs in the field of autobiographical memory. These psychometric studies have contributed to the theoretical debate on the nature and specific characteristics of FBMs (see Lanciano & Curci, 2012).

A third rationale that was presented in the first edition of this book was that two public events that supposedly met the conditions needed for the creation of FBM (high novelty and surprise, high personal importance/consequentiality, intense feeling states, and extended rehearsal) were investigated in a rather systematic way by researchers. These events were the death of Princess Diana in 1997, and the September 11th attacks in the US in 2001. A parallel investigation of the 9/11 attacks by several research groups and sampling different national groups allowed for a better understanding of the key variables involved in the process of FBM formation (e.g. Luminet & Curci, 2009). One main advancement since the first edition of the book was that longer follow-ups were performed for 9/11, for instance three and ten years after 9/11 on a US sample (Hirst *et al.*, 2009, 2015). Other more recent public events have also been investigated (e.g. the death of Bin Laden or Michael Jackson) although the number of publications (two in each case) never reached the number of papers published on the subject of Princess Diana's death (five) or the September 11th attacks (25).

Fourth, we pointed out that the new literature on FBMs published after the death of Princess Diana and the September 11th attacks allowed researchers to examine from new directions the special vs. mundane character of FBMs. On this matter, we can point out strong advancements in the last years of research. This is largely due to a consideration of the more varied ways of assessing FBMs via self-report (focusing on consistency, level of detail, confidence, or vividness), and through the adoption of an experimental approach (Lanciano, Curci, & Sartori, Chapter 6, this volume). Future research still needs to be conducted to test the concurrent validity of these different approaches.

Fifth, we noticed that the topic of FBMs appears to be equally relevant for various fields of psychology (social, cognitive, cross-cultural, and clinical). This is even more the case now, and this new edition makes it obvious that the connections between social and cognitive psychology are becoming even stronger (e.g. Hirst & Meksin, Chapter 10; Stone & Jay, Chapter 8, this volume). We also expected in the former edition that the content would be of interest to other fields of social sciences such as sociology, political sciences, or history. On this matter, we would like to outline briefly the strong potential of considering FBMs in the field of history more systematically (for more detail, see Luminet & Spijkerman, in press).

Although we found that references to FBMs were quite scarce in history publications, some exceptions were noted. For instance, Clark (2012) gave the description of FBMs for the assassination of the archduke Franz Ferdinand and his wife in Sarajevo in June 1914. We also found many FBMs for the day of the Armistice for World War I in Belgium on November 11, 1918. Their occurrence seemed to be widespread as they were observed whatever the condition (soldier or civilian), the place of living (city or countryside), gender, or age.

We firmly believe that there are several advantages of considering also FBMs from

Indeed, a major shortcoming in the current studies is that they orient people's mind into the search for contextual memories, even when they did not consider them spontaneously. Another issue is to examine the hypothesis that events leading to FBMs will be particularly well retained by people and thus more likely to be part of the collective memory of a group or a nation. Studying the presence of FBMs shortly after public events could thus give insight into how an event obtains lasting historical significance. A third advantage is to extract highly relevant information from archives. We showed the possibility to corroborate people's accounts of FBMs in diaries or memoirs with controllable information happening at the time of the event, like the weather.

The current edition also includes some important modifications. Two new chapters have been included that represent important developments in the field. Chapter 6 examines the possibilities of conducting experimental lab-based studies in order to provide better control on the factors that determine the formation of FBMs. It also suggests a new implicit measure to assess autobiographical memory, providing new ways to avoid the biases involved in traditional explicit assessment (Lanciano, Curci, & Sartori). Chapter 9 explores the relevance of examining positive FBMs and investigates the functionality hypothesis for FBMs in general (Stone and Jay). It also means that two chapters are no longer present in the current edition. The authors (Pillemer and Fivush, Bohanek, Marin, & McDermott Sales) did not wish to write an update. The main reason for not including the chapter by Pillemer on comparing FBMs and recall of first-hand experiences was that no major changes have occurred in this topic in recent years. The other chapter dealt with emotional memory and memory for emotions. The chapter covered very important issues regarding one specific predictor of FBMs, the intensity of emotional feelings when hearing news. Fivush *et al.* considered that their chapter was not central in a book dealing with FBMs. This is only partly true, and we highly recommend new readers who are not familiar with the first edition to read these two extremely valuable chapters.

For the other chapters, we asked each author to make updates related to any important contribution that occurred in their field between 2009 and 2016. A very nice surprise when we received the new chapters was that many authors went far further than a simple update. They took the opportunity to consider very new and innovative ideas. Some of these chapters aim to be thought-provoking and deliver clear messages regarding the program of research for the years to come. It means that we are not only happy to present a complete update of the state-of-the-art research on FBMs. In addition, we can provide the FBMs research community with ideas and hypotheses that are ready to be tested, either in the lab, or when public news that is distinctive, consequential and emotional occurs. Finally, these ideas will improve the general research domain of autobiographical memory.

Summary of the chapters

In the first chapter of the book, Curci compares two measurement approaches for the assessment of FBMs: dimensional (Latent Trait Analysis) models and categorical (Latent Class Analysis). The former assumes that psychological constructs are latent

dimensions, so that the individual's characteristics might be quantified along these dimensions; the latter assumes that the individual's characteristics can be classified into some latent categories corresponding to a categorical latent psychological construct. The mathematical assumptions that underlie each of these approaches are presented and references to empirical evidence are discussed. Measurement models have carried significant assumptions – either explicit or implicit – about the nature and inclusion of FBMs in the general domain of autobiographical memory. Studies reviewed in the chapter demonstrate that dimensional measurement models fit well with ordinary autobiographical data, while FBMs are better modelled through a categorical approach. The application of a taxonomic model to a large dataset concerning the September 11th attacks (Lanciano & Curci, 2012) provides empirical support for the idea that FBMs represent a discontinuity in the field of autobiographical memory, and lead to important conclusions on their special nature.

In Chapter 2, Wright and Carlucci discuss the criteria for a memory to be considered as an FBM. The issue of memorability is presented in term of its conceptual and methodological implications for the assessment of the FBM construct and the research hypotheses that can be investigated. The authors propose that either associative or causal hypotheses can be tested in FBM research and different designs have been adopted to test each of these hypotheses. It follows that researchers have been interested in either comparing different groups of people on their memory for a specific event, or testing a relatively small number of people on a large number of events. These methodological choices have influenced the conclusions that have been drawn on the nature and characteristics of FBM. In the final part of the chapter, the authors discuss the strengths and limitations of the single-case approach (involving the assessment of the memory for one event), which is still the most popular strategy in FBM investigation, although it has been rarely employed in cognitive psychology. The reason that FBM scholars adopt a single-case approach is that it allows for accuracy and consistency to be more easily assessed, but new avenues are available for FBM research to overcome the limitations of this approach.

In Chapter 3, Luminet emphasizes the need to use statistical tools in order to test different models for the formation of FBMs. The vast majority of studies on FBMs examine public events through large surveys. In general, a set of variables thought to influence the formation of FBMs is assessed from a few days to a few weeks after the event has occurred, and then at least one follow-up is administered some months afterwards. This follow-up provides the possibility to compute a consistency score. Structural equation modeling (SEM) is presented in this chapter as a very fruitful approach that provides a statistical test of the hypothesized relationships among FBM variables. SEM provides a powerful tool for examining how the data can fit with a theoretical model of relationships between different constructs. It also provides a test for the path between each predictor represented by a set of dimensions (referred to as latent variables). And it allows for a distinction between direct antecedents of FBMs (like novelty and surprise) and indirect ones (like emotional reactions through the activation of rehearsal and event-memory). The chapter compares theoretical models developed by Conway *et al.* (1994), Finkenauer *et al.* (1998) and Er (2003). Since the last edition of the book, a new model has

been proposed by Day and Ross (2014) in which, together with FBM consistency, the phenomenological aspect of confidence is also considered. For each model, the author adopts a critical view by assessing its ability to provide a strong theoretical background, an empirical validation, and a test of the appropriateness of the events considered.

In Chapter 4, Talarico and Rubin provide a systematic screening of the available data regarding the old question of the potential uniqueness of FBM as a special memory mechanism. Indeed, they are the first authors since Brown and Kulik (1977) who have advocated for a special memory mechanism accounting for these memories, identified as exceptionally consistent, vivid, and held with high confidence, as conveyed by the photographic metaphor of "flashbulb-ness". Talarico and Rubin examine this question through three main criteria: memory properties, conditions necessary to produce these memories, and the way individuals process these memories. Regarding memory properties, they suggest an important difference between vividness and confidence on the one hand, and longevity, accuracy, and consistency on the other hand. For the second criterion of the necessary conditions for FBMs, consequentiality, distinctiveness, and emotional affect are considered. The authors examine which one of these variables would best predict FBMs. Regarding the third criterion of how FBMs are processed, significance, surprise, emotional intensity, and rehearsal are presented as each having an important role. The conclusions address different directions regarding the effect of these variables on the three main characteristics of FBMs: consistency, vividness, and confidence. The systematic review presented in Chapter 4 also points to a clear agenda for future research in order to answer some of the current critical issues in understanding the potential uniqueness of FBM.

Chapter 5, by Rice, Hamamouche, and Bohannon, contains entirely different content from the 2009 chapter in which the authors discussed the relationships between accuracy and consistency in FBMs. In this new chapter, after reviewing some general considerations on autobiographical memories, they go into detail about one of the three conditions presented by Talarico and Rubin in the previous chapter as being necessary to produce FBMs, namely consequentiality. Then, they present a taxonomy divided into three axes. The first distinction relates to the distance between the event and the respondent. Three levels can be distinguished here, the victim, the observer, and the distance learner. In the second axis, the nature of the threat involved by FBMs is considered in a dichotomous way. The distinction occurs between a threat that is either physical (involving injury to the self or others) or social (involving a change in social relationships or in social position). The last axis is defined according to the valence of the event, distinguishing between pleasant, appetitive events, from unpleasant, aversive events. The authors take the election of Barack Obama in 2008 as a case study to examine the impact of these axes and categories of consequentiality on FBM formation. The chapter provides innovative avenues that elaborate on the measurement of a key condition for the formation of FBMs.

In Chapter 6, Lanciano, Curci, and Sartori portray state-of-art methods of studying FBM in order to establish how the supposed 'special quality' of these memories can be captured. Research work on FBMs has been mainly conducted over the years

through naturalistic approaches (retrospective recollections, surveys, or longitudinal methods). As stated by Wright and Carlucci in Chapter 3, despite the advantages, this view has some limitations concerning the control procedures for FBM assessment. In the first part of the chapter, Lanciano *et al.* discuss the possibility of establishing an experimental approach and review studies adopting experimental settings in FBM investigation. In the second part of the chapter, the authors review recent research that uses a new procedure to assess autobiographical memory based upon implicit measures (the autobiographical Implicit Association test), along with explicit measures. An important implication of these studies is that they provide support for a consistency-based approach to FBM assessment. Finally, the evidence reviewed entails important consequences for evaluating the accuracy of eyewitness FBMs in forensic contexts.

Tat, Gold, and Budson, in Chapter 7, discuss how memory for traumatic national events relates to clinical disorders such as Alzheimer's disease (AD), mild cognitive impairment (MCI), Korsakoff syndrome, amnesia, temporal lobe epilepsy, or post-traumatic stress disorder (PTSD). The authors review studies concerning FBM and factual memory for relevant public events, such as the September 11th attacks. While MCI patients appear able to form FBMs, AD patients exhibit somewhat impaired personal and factual memory for traumatic national events. Among amnesic patients, Korsakoff syndrome was associated with memory inconsistency for personal details and a poor semantic memory for factual details; patients with medial temporal lobe/diencephalic lesions had global memory deficits for personal and factual memory for the September 11th attacks, while frontal lobe patients were selectively impaired in personal memory for a highly emotional event. Individuals with temporal lobe epilepsy still appear able to form an FBM, although they exhibit a greater memory degradation compared with controls. Finally, individuals affected by a previous PTSD tend to show distorted long-term memory for personal details over time. The authors conclude their review by proposing methodological improvements to FBM assessment in clinical populations.

Chapter 8 by Stone and Jay addresses the potential differences in FBMs for negative and positive events and the functions both fulfill. Regarding four criteria for assessing FBMs (confidence, consistency, vividness and degree of detail), systematic reviews suggest that some of these characteristics are stronger in FBMs experienced as pleasant or unpleasant. But the data can only be preliminary, as very important sources of variation occur across studies regarding the intensity of the events considered, the comparison point (negative vs. neutral), whether the exposure to the event is direct or indirect, and the delay of reporting the memory that is considered. In addition, too many studies have a small sample size, which raises the question of whether the results in the field of FBMs may be underpowered, and the risk of false negatives. The authors also suggest that the huge bias in favor of FBMs for unpleasant events stem from a higher distinctiveness attributed to negative events. They also insist that FBMs, even for intense negative events, cannot be considered equivalent to traumatic memories. The last part of the chapter examines the functions that can be fulfilled by FBMs by referring to the functional approach of autobiographical memory (e.g. Pillemer, 2003), which examines *why* people remember something over long periods of time (Bluck, Alea, & Demiray, 2010).

In Chapter 9, Berntsen presents an overview of FBM modeling starting from the pioneering work of Brown and Kulik (1977) to the more recent study of Finkenauer *et al.* (1998), to show that empirical investigation focusing on the cognitive and emotional predictors of FBM at the individual level has led to inconsistent results. The author proposes a new categorization of FBMs, which emphasizes the crucial role of the social relevance of the eliciting event. Based on the standard version of social identity theory (Tajfel & Turner, 1979; Tajfel, 1982), Berntsen maintains that events that are appraised as highly relevant for a person's social identity will be highly memorable. The durability of these memories over time will depend on whether the original events support or challenge positive values of the group to which the individual belongs. As a result of this process, FBMs display an exceptional vividness and confidence although they are not necessarily complete. Evidence is reviewed concerning the role of group membership in promoting the formation of vivid memories for public events, such as World War II. In the process of FBM formation, it is the activation of social identity that supports the immediate and delayed effects of emotional and rehearsal factors at the individual level and explains the long-term persistence of FBMs in social groups via social practices and exposure to mass media.

FBMs are sometimes also remarkable because they are unique moments during which the course of history and the course of our lives are aligned. As observed by Neisser (1982), people will later report they were alive when a particular event happened and that they were there. In Chapter 10, Hirst and Meksin go one step further from this observation by showing that although the formation of an FBM is first an individual act, it can only be fully understood when considering that it happens within a community. "I was there" then becomes "I was there together with other members of my community who are equally affected". In addition, the precipitating event is interpreted and mnemonically represented through the community's lens. By fully considering the collective nature of most FBMs, Hirst and Meksin can connect them with a collective identity. They draw special attention in this demonstration to the way media shapes the collective memory dimensions included in a flashbulb event and, because of the presence of this FBM, the way the media enhances the influence of collective memory on collective identity.

In Chapter 11, Páez *et al.* examine the overlaps and differences in the determinants of FBMs and event-memory considered at a collective level, which they equate with collective memories (CMs). They first examine similarities and differences between the content of FBMs and CMs. They observe that in both cases, political and collective events related to violence or catastrophes are often reported. But clear differences occur for events like war or political change. In the selection of events, systematic biases such as socio-centrism often occur. Secondly, they investigate similarities in processes, like the relevance of the critical period of identity formation ("reminiscence bump") for the creation of both types of memories. Next, they review similarities and differences in various categories of predictors (appraisals of novelty, importance, consequentiality, surprise, other emotional reactions, rehearsal). Aside from a systematic comparison of these predictors, they also pay attention to some biases such as the higher recall of negative events over

positive ones, or the attenuation of the unpleasantness of an event with time, biases that occur for both collective memories and FBMs. A next step which they propose is to examine the role of collective predictors such as collective identity, collective self-esteem, and congruence with cultural values. They also consider the nature of both types of memories, with FBMs being largely autobiographical and individual, while CMs are by nature collective and have mainly a semantic dimension.

Wang and Aydin, in Chapter 12, focus on FBMs and event memories of public events to define the cultural factors that shape both forms of memories. The authors outline a culturally embedded model of FBM and discuss various cultural factors that shape the formation and consequences of FBMs in macro and micro contexts. These factors influence how and what types of public event news individuals receive and subsequently remember. They also moderate the effects of individual factors that have been commonly assumed to be universal (i.e. appraisal of importance, emotional state and surprise, rehearsal and social sharing), and further affect the lifespan distributions of FBM and public event-memory. In line with Berntsen (Chapter 9, this volume), Wang and Aydin emphasize the self-defining function of FBMs in shaping the social identity with respect to the group to which the individual belongs. Additionally, the cultural constraints and beliefs of individualistic vs. collectivistic countries are supposed to either promote or diminish memory for idiosyncratic details of the reception context. Finally, the authors discuss recent findings on the influence of social media on remembering.

Finally, we are particularly happy that Justice, Akhtar and Conway accepted to read all the chapters of the book for a concluding chapter (Chapter 13) that emphasizes the main contributions from each author, and that they suggest an agenda for future research on FBMs. Martin A. Conway in particular has been involved in the field of research on FBMs for more than 20 years. His contribution, together with that of his colleagues, is thus invaluable.

This new edition provides a nice combination of different generations of scholars active in the field of FBMs. Some of them were already involved when the book *Affect and accuracy in recall: Studies of "flashbulb" memories* was published by Winograd and Neisser in 1992. Others ran their first studies at the end of the 1990s to early 2000s, while others started only recently. They represent the new generation showing that the field is still very active with new, exciting, and intriguing questions and challenges to deal with. We hope that the reader will share the same interest and enthusiasm for the different topics addressed in this book.

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