

## The Study of False Memories: Historical Reflection

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### Abstract

This work consists of a theoretical review with the aim of historically framing the way false memories have been studied. Although most of the studies on false memories have been developed since the last decade of the 20<sup>th</sup> century, the earliest is dated from the late 19<sup>th</sup> century. With the aim of pointing out the great historical milestones in the research of false memories, the pioneering studies carried out in the 19<sup>th</sup> century, as well as the researches on the effect of the questions on the reports of children and adults, are presented. Subsequently, we present the first researches carried out with the specific objective of studying the effect of suggestive questions on the production of false memories, followed by those who used a naturalistic approach and become decisive for the understanding of this phenomenon. In the second half of the 20<sup>th</sup> century, a more cognitive approach takes place, and the paradigms of misinformation and DRM arise, which will also be discussed. Throughout the manuscript, it is also reflected on the mechanisms that were considered to be the basis of the production of the false memories, as well as on the scientific and social implications of this phenomenon.

**Keywords:** Memory, false memories, memory errors, distortion.

## O Estudo das Falsas Memórias: Reflexão Histórica

### Resumo

Este trabalho consiste numa revisão teórica com o objetivo de enquadrar historicamente o modo como as falsas memórias têm sido estudadas. Embora a maior parte dos estudos sobre falsas memórias tenha sido realizada a partir da última década do século XX, os primeiros datam do final do século XIX.

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Financial support: This study was conducted at Psychology Research Centre (UID/PSI/01662/2013), University of Minho, and supported by the Portuguese Foundation for Science and Technology and the Portuguese Ministry of Science, Technology and Higher Education through national funds and co-financed by FEDER through COMPETE2020 under the PT2020 Partnership Agreement (POCI-01-0145-FEDER-007653).

Assim, e com o objetivo de assinalar os grandes marcos históricos na investigação das falsas memórias, começam por apresentar-se os estudos pioneiros realizados ainda no século XIX, bem como as pesquisas realizadas sobre o efeito das perguntas nos relatos de crianças e adultos. Posteriormente, apresentam-se as primeiras pesquisas realizadas com o objetivo específico de estudar o efeito de perguntas sugestivas no aparecimento de falsas memórias, seguidas dos estudos que recorreram a uma abordagem naturalista tendo-se tornado decisivos para a compreensão deste fenômeno. Já na segunda metade do século XX, ganha peso uma abordagem mais cognitivista no estudo deste fenômeno, e surgem os paradigmas da desinformação e DRM, que serão também discutidos. Ao longo do texto, reflete-se também sobre os mecanismos que foram considerados como estando na base do aparecimento das falsas memórias, bem como sobre as implicações científicas e sociais deste fenômeno.

**Palavras-chave:** Memória, falsas memórias, erros de memória, distorção.

## El Estudio de Memorias Falsas: Reflexión Histórica

### Resumen

Este trabajo consiste en una revisión teórica con el objetivo de encuadrar históricamente la forma en que las falsas memorias han sido estudiadas. Aunque la mayoría de los estudios sobre falsas memorias se han realizado a partir de la última década del siglo XX, los primeros datan del final del siglo XIX. Con el objetivo de señalar los grandes hitos históricos en la investigación de las falsas memorias, comienzan por presentarse los estudios pioneros realizados aún en el siglo XIX, así como las investigaciones realizadas sobre el efecto de las preguntas en los informes de niños y adultos. Posteriormente, se presentan las investigaciones realizadas con el objetivo específico de estudiar el efecto de preguntas sugestivas en las falsas memorias, seguidas de los estudios que recurrieron a un abordaje naturalista y se tornaron decisivos para la comprensión de este fenómeno. En la segunda mitad del siglo XX, gana peso un enfoque más cognitivista en el estudio de este fenómeno y surgen los paradigmas de la desinformación y DRM. Durante el texto, se refleja también sobre los mecanismos que se consideraron como la base de la aparición de las falsas memorias, así como sobre las implicaciones científicas y sociales de este fenómeno.

**Palabras clave:** Memoria, memoria falsa, errores de memoria, distorsión.

When we utter phrases such as “I remember perfectly”, “it seems like I can still see it” or “I remember it as if it were today”, there is a high probability of being betrayed by our memory. Although there is a widespread belief that through our memory we can accurately and easily access the record of facts and events experienced in the past, this belief is, at least, exaggerated. While it is true that memory allows us, in most situations, to functionally access information about the past, it is also true that these records are rarely a faithful copy of the reality we previously experienced. So when we speak of memory we must assume that it is by its nature reconstructive, not a camera-like system that allows events to be recorded and then reviewed just as they occurred.

Interestingly, the idea that memory is fallible is accepted and disseminated spontaneously and frequently by the majority of people. Expressions like “I completely forgot”, “I never again remembered it” or “I cannot remember this”, are used by all of us in various situations. That is, while on one hand, in some cases, we assume that memory is a fallible system, on the other, we act as if we could blindly trust it. While remaining paradoxical, the truth is that these two presuppositions well reflect the history of the study of memory in general, and of false memories in particular.

False memories refer to the fact that we remember events or information that did not happen, that we did not experience or did not occur

as we report them. Although the study of false memories has been neglected for several years, there is currently a great deal of research in this area. Due to the great impact that the results of these studies have had on the academic environment and also on society, we are often confronted with a great diversity of definitions and paradigms for their study. In this sense, this article aims to historically frame the study of false memories. For this, the historical milestones of great relevance in the study of false memories will be discussed.

### The First Steps in the Study of False Memories - 19<sup>th</sup> Century

For more than a century, the main purpose of human memory research was the study of its potentialities (correct recall and recognition), with errors detected in the mnemonic process considered to be a result of problems/failures in the experimental procedure (Roediger, 1996). On the other hand, the study of memory errors was mainly centered on errors of omission (i.e., forgetfulness), and not so much on errors of commission (i.e., distorted recall of events or situations that never occurred; Brainerd & Reyna, 2005; Roediger & McDermott, 2000). Although these two types of errors are related, they are viewed differently perspectives, both by the population in general and by the scientific community. If the experience of forgetfulness is familiar to most people, the assumption that a particular memory may be false is a process that is viewed reluctantly and accepted only by irrefutable evidence (e.g., photographs). However, the earliest experimental studies, of both omission errors and commission errors, did not differ for more than a decade.

Thus, in 1885, in what is referred to by many authors as the first experimental study in memory (e.g., Roediger & Gallo, 2004; Roediger & McDermott, 2000; Ruacter-Vargas, 1991; Schacter 1995) 1964), Ebbinghaus (1885/1964) conducted a series of experiments that led him to formulate the *curve of forgetting*. Only nine years later, Kirkpatrick (1894) performed what is also considered to be the first laboratory study

of false memories (e.g., Gallo, 2006; Roediger, Watson, McDermott, & Gallo, 2001). In this study, Kirkpatrick (1894) made the first experimental demonstrations of false recall of words associated with previously presented items:

There were some incidental cases of false recall. About a week before . . . I had said ten words to the students. Many of these were evoked and placed on the lists as if they were part of it. Again, it seems that when words such as “roll”, “thimble” and “knife” were pronounced, many students thought of “thread”, “needle” and “fork”, which are so often associated with them. The result was that many of these words were evoked as belonging to the list. This is an excellent illustration of how things suggested to a person during an experience can be honestly reported by that person as part of that experience. (pp. 608-609)

Despite this temporal proximity, the directions that the research into these two types of errors (i.e., omission and commission) took were quite different. For many decades, the so-called “Ebbinghaus tradition” increased, with the majority of studies performed aiming to comprehend the mechanisms underlying correct recall and recognition, as well as avoid errors (of omission) associated with these tasks (Bruce & Winograd, 1998; Gallo, 2006).

Nevertheless, some works on false memories can be found from the late nineteenth century, albeit with the aim of understanding the normative functioning of memory. In 1900 Binet, after presenting a set of objects to children, introduced misleading information in the form of questions in which he suggested, for example, the existence of objects that had not been presented. With the results of this procedure, Binet concluded that the suggestive questions caused the appearance of memory distortions (e.g., recall of objects suggested in the questions). From this and other studies on autosuggestion, Binet proposed the distinction between false memories derived from autosuggestion and false memories resulting from suggestion (external). His training in Law and the consequent contact with the legal world allowed Binet to observe the effect

of questions in the reports made by adults, and especially by children, as they were identified as being more susceptible to the effect of external suggestion, a fact that would come to be corroborated by studies conducted over a century later (e.g., Brainerd & Reyna, 2005). Binet (1900) also found that there was no relationship between a witness's conviction and the accuracy of the information recalled, a fact also evidenced by several more recent studies (e.g., Wells & Lindsay, 1985; Wells & Olson, 2003).

### **The Influence of Suggestion – First Decade of the 20<sup>th</sup> Century**

Using scenarios performed in the classroom context followed by suggestive questions, Stern (1910) showed the possibility of children confusing real events with imagined events. His studies aimed to understand how the suggestions made by adults could produce memory distortions in children (cf. Neufeld, Brust, & Stein, 2010; Roediger & McDermott, 2000; Schacter, 1995). For this, Stern staged an event in his classroom. The class was interrupted by a man entering the room and addressing Stern. While he was talking to the professor, the man would take a book off the table and leave the room. A week later, the students were invited to recall the event. Some participants recalled the event following the narrative method, while others were subjected to a set of questions.

The results revealed that the participants who were subjected to the narrative method remembered the information wrongly in 25% of the cases, whereas 50% of the participants subjected to the interrogative method made mistakes when recalling the event.

With these experiences, Stern (1910) concluded that it is possible to create memory errors with the use of suggestive questions. These conclusions highlighted the importance of the questioning performed, especially with children, when the intention is to recall information. This can be especially critical when trying to ascertain the real facts, as in the police and forensic contexts.

### **Bartlett and the Naturalist Approach – The 1930s Decade**

In 1932, Bartlett published *Remembering: A Study in Experimental Social Psychology*, in which he presented several experiments that demonstrated the existence of memory distortions. Aware of the work of Ebbinghaus, Bartlett also became his critic. While recognizing the advantages of his method, notably with respect to the ability to objectively evaluate the participants' answers, Bartlett considered that the materials used by Ebbinghaus (1885/1964) were far from reality and devoid of meaning, thus, not allowing the assessment of the effect of previous knowledge on the results of the memory tasks that the participants performed. In this way, maintaining the objectivity of the method, he proposed to study memory using complex materials rich in meaning, materials that could mirror the everyday situations of the participants (Brainerd & Reyna, 2005; Ruíz-Vargas, 1991).

In his best known experiment, Bartlett (1932/1997) presented to the participants a version of a North American Indian tale entitled *The War of the Ghosts*. As well as being a narrative and, as such, complex material rich in meaning, the story has other particularities that were decisive in Bartlett's choice: it came from a culture alien to the participants (Cambridge students); it contained unfamiliar, appealing characters, in particular, the supernatural entities; and had an open narrative structure. For Bartlett, these characteristics would be capable of enhancing the appearance of results that other kinds of material (such as the meaningless syllables used by Ebbinghaus) did not trigger, because they allowed the participants some freedom of interpretation of the story (Brainerd & Reyna, 2005). The participants were asked to read the story (which occurred twice). After fifteen minutes, the participants performed a written, free recall task. This remembrance task was repeated after a few hours, days, weeks, months, or even years, according to the convenience of the participants and the researcher, with no great concern on the part of

standardizing the retention intervals (Bartlett, 1932/1997).

This “experimental freedom” is also mirrored in the way the results of the experiments were exposed: Bartlett presented excerpts from certain response protocols in a descriptive manner and without any attempt at systematization or quantification. Bartlett noted that, in some cases, the participants omitted details while others added them and, in the latter case, the new information was information that was familiar to the participant (i.e., congruent with their mental schemata). As far as Bartlett’s distortions were concerned, they varied in magnitude, that is, simple language changes without modification of meaning, normalizations (e.g., to substitute an activity described in the story for a more familiar one), inferences (e.g., from the information presented), and cases of pure addition, that is, cases in which the participants reported entirely new facts, however, consistent with the original story. Bartlett also noted the existence of a high congruence between initial and subsequent recall in the sense that the version of the story recalled the first-time, with all errors of omission and commission, tended to persist over time (Bartlett, 1932/1997; Brainerd & Reyna, 2005).

Based on these results, Bartlett (1932/1997) concluded that recall is a reconstructive process, guided by preexisting, general, organizing *schemata*. That is, Bartlett found that in his study, although the general script of the story was maintained, the participants tended to omit details that were not congruent with their preexisting schemata and to fill in the gaps created by forgetfulness with familiar information (i.e., preexisting in their mental schemata). When the presented material was not congruent with these mental schemata, the stimuli were reinterpreted according to them. This process resulted in a schematized and distorted version of the original version of the story that, once told, tended to be repeated (Roediger & McDermott, 2000; Ruiz-Vargas, 1991).

These experiments served to distinguish the concepts of *reproductive memory* and *reconstructive memory*. Reproductive memory has been defined as referring to situations in

which a precise and faithful reproduction of the information stored in the memory occurs, whereas reconstructive memory refers to those cases where, in the recall process, new information is integrated, giving rise to errors of various types (Bartlett, 1932/1997).

Later, other authors (e.g., Roediger & McDermott, 1995) argued that memory is reconstructive by nature. According to Roediger and McDermott (1995), any recall is a construction, and its greater or lesser precision can depend on the material to be remembered (e.g., its nature, its complexity, or the sensory modalities involved). However, this will always be a quantitative rather than a qualitative difference. According to Surprenant and Neath (2009), the principle of reconstruction is one of the seven principles of memory functioning. For these authors, the principle of reconstruction applies to the various memory systems and is independent of the type of mnemonic task, the time scale, the type of materials/stimuli and even the type of processing.

Despite the importance currently attributed to Bartlett’s studies, they did not have a major impact at the time they were published, because they did not fit the dominant paradigm, still strongly influenced by Ebbinghaus, both in relation to the method and to the subject under study. On one hand, the naturalist nature of his approach was not in line with the tradition of laboratory studies, and on the other, the researchers’ theoretical concerns focused on memory as a system capable of coding, storing and recovering large quantities of information and not on its possible failures or limitations (Schacter, 1995).

### **The Importance of the Association – 1950s and 1960s**

The works published by Deese in 1959 remained practically ignored until the 1990s. Deese (1959a, 1959b) developed a procedure analogous to that used by Ebbinghaus (1885/1964). The procedure consisted of presenting lists of words to which the participants were to pay as much attention as possible, since they would be asked to recall them later. However, unlike

Ebbinghaus, Deese not only investigated correct recall, but had the study of intrusions as the main aim, that is, the recall of words not presented in the lists. The results of the studies revealed that participants tended to evoke words that were not on the list presented. These words were often strongly associated with the words that constituted the list presented. Following his results, Deese (1959b) proposed the idea of *association*, as an alternative to the notion of schema previously advanced by Bartlett, as an explanation for the errors produced in recall tasks.

Five years after Deese's studies, and also using a procedure based on the presentation of word lists, Underwood (1965) replicated his results, however, this time in recognition tasks. Underwood's (1965) procedure consisted of presenting a list of 200 words and then asking participants to rate each word as new or old. That is, whenever the word had not yet been presented (during the presentation of this list of 200 words), the participant had to identify it as new. On the other hand, if the word had already been presented in the course of this procedure, the participant had to identify it as old. The author verified that, after presenting a certain number of words, the participants tended to recognize as old words that, being new, were related to the words already presented. Underwood then argued that false alarms arose from an *implicit associative response* that occurred during the study phase (presentation) of the associated words. That is, as certain words were presented, other related words were activated mentally and coded as if they were words that had already been presented. Thus, when these words were presented in the list, they were classified as old (Underwood, 1965).

At the end of the 1960s, Neisser (1967) published the book *Cognitive Psychology* and rekindled the interest in the notions of schema and reconstructive memory, advocated by Bartlett (1932/1997). According to Neisser, remembering would not be exclusively a process of retrieving a trace of stored memory, but rather a reconstructive process in which people use information and preexisting schemata to give meaning to memory fragments that remain from

the original memory. In parallel with the publication of this work, other authors began to study the occurrence of errors in information retention, using prose material (e.g., Bransford & Franks, 1971; Cofer, 1973), inspired by Bartlett's work.

### **The Studies of Loftus and the Nature of the Term *False Memories***

In the 1970s, several studies developed by Elizabeth Loftus and colleagues constituted a landmark in the history of the study of false memories. In their experiments, Loftus and collaborators aimed to study eyewitness testimony. To do so, they developed the paradigm of misinformation or misleading information, according to which it is possible to distort the memory of information and events by introducing false information (Loftus & Palmer, 1974).

The experimental procedure of this paradigm consists of presenting images/videos of a road accident (coding phase). The researcher then poses a set of questions about the accident to the participants, some of which include misleading/false information. Finally, participants are asked to remember the maximum possible information initially presented, both through a recall task and a recognition task. The results revealed that participants tended to accept the false information that was introduced by the researcher in the questions as being true. These experiments revealed that it is possible, in the laboratory context, to distort the memories of situations witnessed and coded by the participants (e.g., Loftus, 1975; Loftus & Palmer, 1974; Loftus & Zanni, 1975). The term *false memory* was used by Loftus at the 1992 meeting of the American Psychology Society, under the theme "Remembering Repressed Abuse", with precisely that meaning. At this meeting, Loftus presented some studies, according to which it would be possible to implant memories for non-occurrences, and questioned the possibility that some of the memories of childhood sexual abuse could be implanted by suggestion and, as such, constitute the status of false memories (Pezdek & Lam, 2007). This topic had great relevance and visibility at the time. However, to explain

this interest in false memories, other aspects that go beyond the limits of scientific research must be taken into account. It was in 1992 that an organization was set up in the United States to support families who had been affected by “False Memories Syndrome” cases.

False Memories Syndrome is the term used to describe cases in which a patient “remembers” memories of sexual abuse that he or she allegedly suffered during childhood, which are then proven to be false. Many of these cases would have arisen in the United States following therapeutic processes developed using the model called “Recovered-Memory Therapy”. Proponents of this therapeutic model claimed to be able, through techniques such as hypnosis, regression or imagination, to recover memories, especially memories of sexual abuse that occurred during childhood. These memories, however repressed, would be responsible for many of the problems that had arisen during adulthood, such as depression or alcoholism (Kaplan & Manicavasagar, 2001; Pinto, Pureza, & Feijó, 2010).

This phenomenon had already been described by Freud, about a hundred years earlier. In his *infantile seduction theory*, Freud argued that the cause of the psychoneuroses of his adult patients lay in the occurrence of traumatic experiences of child seduction and sexual abuse, experiences that patients reported during psychoanalysis sessions. Later, Freud himself stated that many of the patients’ reports were false (for a historical analysis of the relevant theory and reference, see Macmillan, 1997).

The effect of some of the techniques used in the recovered-memory therapy was therefore not new, as Binet had described the power of suggestion in altering memories in children as early as 1900, however, these cases greatly increased interest in the subject, triggering a number of studies dedicated to understanding it (e.g., Conway, Collins, Gathercole, & Anderson, 1996; Goldstein, 1997; Heaps & Nash, 1999; Hyman & Billings, 1998; Hyman, Husband, & Billings, 1995; Hyman & Pentland, 1996; Larsen & Conway, 1997; Loftus, 1993, 1997; Paddock & Terranova, 2001; Pezdek, Finger, & Hodge, 1997; Pezdek & Hinz, 2002; Pezdek & Hodge,

1999; Poole, Lindsay, Memon, & Bull, 1995).

### **Deese-Roediger-McDermott and the Affirmation of False Memories as an Area of Study**

In 1995 the article “*Creating False Memories: Remembering Words Not Presented in Lists*” was published by Roediger and McDermott. In this paper, Roediger and McDermott (1995) presented the results of the replication of the study by Deese (1959b), however, this time, contrary to what happened with the original study, the impact on the scientific community was immense. Following the same procedure and reaching similar conclusions, this paradigm of false memories became known as DRM (Deese-Roediger-McDermott), in recognition of its authors.

The disparity of reactions to similar results, with more than 30 years between them, may have had much more to do with the environment and the scientific interests that characterized each of the moments of the publication of the articles than with the characteristics of the works in question. In the late 1950s, memory errors were seen as mishaps that occurred during memory experiments, which researchers had to deal with. Thirty years later, these same errors had achieved their own status in the scientific research on memory, occupying a prominent place (Roediger, 1996). The fact is that, prior to the publication of the article by Roediger and McDermott (1995), studies had been performed in which the procedure originally developed by Deese (1959b) was used to study false memories.

This paradigm is distinguished from others (e.g., the paradigm of misinformation or misleading information), because false memories are produced internally, by association effect (Mazzoni, 2002) and not by phenomena external to the participant (e.g., introduction of suggestive information). That is, memory is organized in a semantic network and the processing of a piece of information leads to the activation of other pieces of information associated with it (Meade, Watson, Balota, & Roediger, 2007; Roediger, Balota, & Watson, 2001).

The popularity of this paradigm is due, not only to the simplicity of its application (presentation of lists of words), but also to the robustness of the effects found in various experimental conditions and especially to the knowledge that false memories can even occur in apparently very simple tasks, using low complexity materials, such as lists of words (Gallo, 2010).

### Conclusion

Although the main focus of memory research is the identification of its potentialities and capabilities, namely through the study and analysis of correct recall or recognition of information, the production of errors and distortions of memory has not been neglected. Although initially studies of memory errors or distortions focused on forgetting, attention later shifted to so-called commission errors (i.e., false memories). With the emergence of various studies in the context of false memories, several experimental paradigms emerged, such as the DRM paradigm or the disinformation paradigm. In this context, several paradigms have served as the basis for the study of false memories (cf. Oliveira & Albuquerque, 2015). In the same way that the studies of Deese (1959b) were precursors to the use of word lists in the production of false memories, the use of more complex material, such as the suggestive questions used by Binet (1900), or the stories used by Bartlett (1932/1997), was followed, giving rise to the creation and development of other paradigms of which the disinformation paradigm (Loftus & Palmer, 1974), or the false narrative paradigm (Loftus & Pickrell, 1995) are examples.

Currently, the concept of false memory is not consensual, as researchers who use different paradigms to study this phenomenon define it differently. Despite the controversy that the use of this term has generated (and continues to generate), its use became popular and it is currently used in a virtually indiscriminate way to designate effects that, for several decades, were termed errors, illusions or memory distortions.

At present, the term *false memories* is used to characterize either the recall of events that never occurred or the distorted recall of events, that is, in a different form from the information originally processed (DePrince, Allard, Oh, & Freyd, 2004; Pezdek & Lam, 2007; Roediger & McDermott, 1995).

The results and conclusions of the experimental studies on false memories have had repercussions in society in general, since it became evident that all individuals are subject to this type of error, which can have unpredictable negative consequences. Above all, it should be noted that the study of the production of false memories was important in the sense that the understanding of mnemonic errors allowed a better understanding of the functioning of memory. Through the research, advances and discoveries of these studies, the scientific community and society in general, have a wide knowledge about the processes of retention, codification and recovery (correct and false) of information.

Understanding the functioning of memory, in particular the study of false memories, is essential for the performance of the psychologist. This is because the production of a false memory can have negative implications, particularly in the clinical and forensic context. The reliability of the reports and testimonies of patients, suspects or victims of crime can be compromised by the production of false memories. Thus, it is possible for patients, suspects or victims of crime to report information/events in a different way from reality, unintentionally distorting facts, conditioning and compromising their veracity. Currently, the occurrence of false memories is a phenomenon widely investigated in forensic psychology since the majority of the judicial systems worldwide use eye-witness as a source for decision making. If, in most situations, the occurrence of a false memory may be innocuous, there are cases in which it may be of extreme importance.

In this sense, and for the reasons mentioned, it is very important that the phenomenon of the production of false memories be taken into account during the practice of the psychologist.



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Received: 06/03/2017

1<sup>st</sup> revision: 27/09/2017

Accepted: 02/10/2017