Vol. 6. No. 4. 2019.

Contents available at:

www.crdeepjournal.org

International Journal of Social Sciences Arts & Humanities (ISSN: 2321-4147) (CIF: 3.625)
A Peer Reviewed, UGC Approved Journal

Review Paper

Unraveling the Fabricated Past: A Neuropsychological Review of False Memories

Ragini Bahadur[1*] and Prof. Namita Pande[2]

[1-]*Research Scholar, Department of Psychology, University of Allahabad, Prayagraj, Uttar Pradesh, India.*
[2-]*Professor, Department of Psychology, University of Allahabad, Prayagraj, Uttar Pradesh, India.*

ARTICLE INFORMATION

Corresponding Author:
Ragini Bahadur

Article history:
Received: 21-02-2019
Revised: 28-02-2019
Accepted: 12-03-2019
Published: 15-03-2019

Key words:
False memory, frontal lobe damage, memory impairment, memory distortion

ABSTRACT

Individuals with frontal lobe damage experience diverse false memory phenomena, including fantastical confabulations, misattributed sources and temporal contexts, and impaired metamemory. Understanding these distortions hinges on unraveling the enigmatic "pathological false recognition" (PFR). Two main theories contend: 1) a verification deficit within the "Supervisory Activating System" (SAS) framework, and 2) a poorly focused retrieval system with a liberal response criterion. While both offer insights, neither fully explains PFR's nuances. Existing theories like Deese paradigm, IAR, and fuzzy trace theory fail to capture its unique characteristics. The poorly focused retrieval theory, however, extends beyond PFR, elegantly explaining source monitoring errors and metamemory impairments. Yet, caution is necessary: confabulation may involve delusional elements beyond memory impairment, and prompting during recall can influence memory retrieval. Continued research is crucial to illuminate the precise mechanisms of confabulation, disentangle prompting's influence, and refine our understanding of lateralized brain function and specific memory deficits. By delving deeper into these complexities, we inch closer to unlocking the secrets of false memories in frontal lobe damage.

Understanding False Memories

Memory is both fallible and remarkably reliable. We forget things and misremember them, yet they still guide us through life surprisingly well. Forgetting itself is just a natural quirk of our cognitive system. *"False memory"* may be a recent buzzword, but the human mind's susceptibility to distorted and invented memories has fascinated psychologists for well over a century. Pioneers like Ebbinghaus and Munsterberg laid the groundwork, paving the way for Roediger and McDermott's landmark article that cemented *"false memory"* as the umbrella term for these enigmatic memory flaws.

The lines between truth and illusion in our memories might be blurrier than we think. While we often categorize memories as either accurate or inaccurate, a curious phenomenon emerges: both seemingly true and demonstrably false recollections seem to harbor fragments of genuine experience. Even the most vivid and emotionally charged memories, like those we associate with significant life events (flashbulb memories), can be laced with elements of distortion. As Hornstein et al. (2003) observed, these flashbulb memories, despite their perceived accuracy, can contain inaccuracies in details surrounding the core event. Deciphering our past can be a treacherous journey, where the paths of true and false memories often intertwine with deceptive ease. The very factors that make remembering challenging add another layer of complexity: we readily embrace illusory memories, often with a conviction that mirrors our most cherished recollections (Marche et al., 2010; Toglia et al., 1999; Shaw, 2020). This unsettling truth throws into question the very foundation of our personal narratives, blurring the lines between what truly happened and what our minds have creatively woven.

While factual inaccuracies can stem from various sources, two stand out for their distinct nuances: lies, crafted with intent, and false memories, often unintentional distortions of the past. Though distinct, their paths can become surprisingly intertwined. Lies, in their many forms - from playful fibs to calculated whoppers - are deliberate acts of deception. Liars, like skilled weavers, blend threads of truth into their fabricated narratives, aiming to bolster believability. These *"half-truths,"* if accepted, can create fertile ground for false memories to sprout, serving as anchors for fabricated stories (Otgaar and Baker, 2018). False memories, in contrast, emerge from a different landscape. They are not born of deceit, but rather misinterpretations or misinformation (Ceci et al., 1987; Loftus, 2005). They can morph from unintentional external influences, like misleading information, or internal misremembering, influenced by existing knowledge structures stored in our minds. These illusory recollections, woven with threads of real

and distorted elements, become surprisingly persistent residents of our long-term memory, as research with long-lasting false memories in controlled settings demonstrates (Toglia et al., 1999; Seamon et al., 2002; Brainerd and Reyna, 2005).

Understanding the intricate interplay between lies, beliefs, and false memories, across diverse research fields like psychology, forensics, and neuroscience, is crucial. Their pervasiveness in everyday life underscores the importance of untangling this web of truth and illusion. Lies, with their deliberate intent, stand on one side, while false memories, born from error or external manipulation, occupy the other. Yet, their paths can intertwine, with half-truths serving as bridges, and existing beliefs shaping the fertile ground for illusory recollections to take root. By recognizing the distinct origins and consequences of these two forms of factual inaccuracy, we can approach them with greater nuance and understanding. For lies, unraveling the intent and the web of deceit becomes paramount. For false memories, acknowledging their unintentional nature and the complex psychological processes that lead to their formation is key. In this way, we can navigate the labyrinth of the human mind, where truth and illusion coexist, with greater clarity and awareness.

Neurocognitive Correlates of False Memory Formation

Despite being clinically recognized for years, the intricate interplay between brain damage and the fabrication of false memories has surprisingly attracted limited attention from the field of experimental neuropsychology. This form of memory impairment, distinct from the more commonly understood phenomenon of memory loss, warrants deeper investigation due to its potential to significantly impact legal proceedings, interpersonal relationships, and individual well-being. This article aims to present a comprehensive review of recent findings concerning false recollections in adult patients with frontal lobe damage, drawing insights from the neuropsychological literature. While the focus remains on adult data and theories, the potential implications may also be considered useful for understanding false memory formation in children. Evidence suggests an overlap between certain false memory phenomena observed in children and those associated with frontal lobe damage in adults (Lindsay, Johnson, & Kwon, 1991; Wellman, 1978). Additionally, significant functional changes within the frontal lobes occur between the ages of 5 and 10, with complete maturation not achieved until the teenage years (Case, 1992; Smith, Kates, & Vreizen, 1992). These parallels raise the intriguing possibility that insights gleaned from the neuropsychological literature on adult memory impairment may hold critical significance for understanding the heightened susceptibility of children's memories to distortion. Furthermore, these observations pave the way for the potential construction of a theoretical framework within the burgeoning field of developmental neuropsychology that can illuminate the mechanisms underlying children's memory vulnerabilities (cf. Schacter, Kagart, & Leichtman, 1995).

Neurocognitive Substrate of Confabulation: Delving into the cerebral underpinnings of memory fabrication

The term "confabulation" has unfortunately become imprecise and encompasses a spectrum of phenomena beyond its clinical and theoretical utility. This is particularly salient in individuals with organic memory impairments, who frequently generate fabricated responses. However, within this category, two qualitatively distinct subtypes emerge. The first type of fabrication appears plausible and internally consistent. Notably, individuals exhibiting this subtype often express uncertainty or doubt regarding the memory's accuracy. In contrast, the second form involves recollections of demonstrably implausible events, lacking grounding in the present context. These individuals typically hold fervent conviction in the veracity of their fabricated memories, prompting Moscovitch (1989) to aptly characterize this subtype as *"honest lying."* Kopelman (1987) proposes *"fantastical confabulation"* as a more fitting term for fabricated memories in individuals with organic memory impairments, implicitly criticizing the potential for less precise terms to trivialize the profound disconnect between these memories and reality. Fantastic confabulation, characterized by the generation of implausible and internally inconsistent false memories, appears to be a unique consequence of frontal cortical damage and adjacent structures (Parkin & Leng, 1993; Stuss et al., 1978). Notably, it is not observed in amnesic syndromes arising from lesions in either the midline diencephalic nuclei or the medial temporal lobes, despite these regions playing crucial roles in memory consolidation and retrieval. This differential pattern suggests that fantastic confabulation may occur independently of severe memory impairment, and its presence within a classic amnesic syndrome strongly implicates the involvement of the frontal system in the genesis of such fabricated memories.

Perhaps the earliest documented instance of confabulation comes from Harlow's (1848) account of Phineas Gage, a man with significant frontal lobe damage. Harlow noted that Gage "was accustomed to entertain his little nephews and nieces with the most fabulous recitals of wonderful feats and hair-breadth escapes, without any foundation except in his fancy." This vivid description showcases the characteristically grandiose and fabricated nature of memories associated with "fantastic confabulation." In recent years, JB (Parkin, 1997; Parkin et al., 1996, 1988) has emerged as a well-studied case of confabulation. Following a ruptured aneurysm in the anterior communicating artery (ACoA), a frequent cause of fantastic confabulation (DeLuca & Diamond, 1995; Fischer et al., 1995), JB exhibited a remarkable tendency to generate elaborate and implausible memories. Over a two-year period, JB exhibited a pronounced form of "fantastic confabulation," characterized by the persistent elaboration of elaborate and demonstrably false memories. Notably, while his performance on standardized memory assessments remained relatively unimpaired, his confabulatory narratives displayed a distinctive tendency to blend elements of his stable, remote past onto his current experiences. This resulted in the generation of remarkably bizarre and internally inconsistent memories that significantly diverged from objective reality. (Parkin, 1997; Parkin et al., 1996, 1988). JB's case exemplifies the distinct characteristics of "fantastic confabulation," characterized by profound deficits in self-awareness and the inability to evaluate the plausibility of fabricated memories within the context of his current reality (Parkin, 1997; Parkin et al., 1996, 1988). A salient feature lies in the "blending" of elements from both his distant and recent past, resulting in a series of highly implausible and internally inconsistent fabrications. This specific pattern of memory impairment bears striking resemblance to less severe forms associated with frontal lobe

lesions, suggesting a shared underlying neural substrate, despite varying degrees of severity.

Episodic Memory under Scrutiny: Examining the Joint Influences of Source Monitoring and Temporal Order

Source monitoring, the cognitive process of discriminating between memories from different origins (Johnson et al., 1988), has emerged as a key investigative tool in understanding memory dysfunction. In standard source monitoring tasks, participants encounter information and are later tested on both the content and its source (e.g., who they heard it from). Notably, numerous studies have demonstrated dissociation between knowledge of factual information and the ability to accurately recall its source (Schacter et al., 1984). This disconnection is particularly prevalent in individuals with frontal lobe damage, who often exhibit false recollections for source information. Schacter et al. (1984) aptly illustrated this phenomenon by presenting amnesic patients with fabricated facts linked to specific individuals. While these patients typically retained the factual information, they often misplaced its source, attributing it to entirely different contexts. This dissociation between factual memory and source amnesia further points to the crucial role of the frontal lobes in source monitoring, as evidenced by a positive correlation between impaired source memory and poorer frontal lobe function in the studied patients. Building upon previous research, Shimamura et al. (1990) conducted a study further investigating the dissociation between factual and source memory in patients with frontal lobe damage. Participants, including both frontal patients and healthy controls, were tasked with learning a series of answers to obscure quiz questions. A week later, their memory for both the fact itself and its source (where they learned it) was assessed. Notably, while the frontal lobe patients demonstrated unimpaired recall of the factual information, they exhibited significant deficits in source memory, frequently misattributing the answers to unfamiliar contexts. This finding further reinforces the distinct cognitive processes underlying factual knowledge and source identification, implicating the frontal lobes in the latter.

Metamemory- Self-Awareness in Remembering

Normal memory functioning often includes a phenomenon called "feeling of knowing," a metacognitive awareness that you could recall information even if it's currently inaccessible. This ability relies on accurate self-monitoring and prediction of future recognition. However, research by Janowsky et al. (1989) revealed a striking dissociation in individuals with frontal lobe damage. In their study, participants were presented with sentences like *"At the museum we saw some ancient relics made of clay."* Later, they were shown the incomplete sentence "At the museum we saw some ancient relics made of?" and asked to recall the missing word. If unsuccessful, they were then asked to rate their confidence in recognizing the word if presented with options. While healthy controls displayed precise estimations of their future recognition, frontal patients exhibited significantly inaccurate predictions. This highlights a distinct and multifaceted impact of frontal lobe damage on memory function.

Further exploring the range of associated memory disorders, we encounter:

Fantastic confabulation: Characterized by the generation of elaborate and bizarre fabrications, often bearing no connection to reality, representing the most extreme manifestation of memory disturbance.

Source amnesia: Involves misattributing memories to incorrect sources, leading to confusion about the origin and context of experiences.

Impaired temporal context: Disrupts the ability to accurately place memories within the timeline of your life, resulting in temporal misplacement of events.

Metamemory deficits: As demonstrated by the Janowsky et al. study, this impairment specifically impacts self-monitoring and judgment about the content and reliability of one's own memories.

These various memory disturbances point towards a crucial role of the frontal cortex in the "executive function" of memory. This executive function encompasses the ability to regulate, monitor, and evaluate memories, ensuring their coherence and accuracy. Disruption of this function within the frontal lobes renders the memory system susceptible to inconsistencies and uncertainties, ultimately paving the way for the emergence of false memories. Understanding the underlying mechanisms of these deficits becomes crucial in our quest to illuminate how memory veracity is established and maintained. Furthermore, insights gleaned from studies like Janowsky et al.'s may extend beyond clinical populations, informing our understanding of false recollections even in healthy individuals.

Mechanisms of False Memory Formation: Insights from Experimental Studies

While false memory presents itself readily in clinical settings, relying solely on such observations presents limitations for building a robust theoretical framework. While controlled experiments offer a more rigorous approach, they tend to observe false recollection indirectly through measures like source monitoring errors. In these cases, the error could potentially stem from guessing rather than a genuine misattribution of the source.

To address these limitations and directly observe false memory, researchers have developed new paradigms, with the false recognition task emerging as a frontrunner. This task measures false recollection by presenting participants with a series of *"target*" stimuli (e.g., words, pictures) followed by a recognition test. During the test, participants must discern previously encountered targets from novel *"distractor"* items. The key metric here is the false alarm rate, which refers to incorrectly identifying a distractor as a target. An abnormally high false alarm rate suggests a propensity for false recollection.

Four individual case studies serve as compelling evidence for the link between frontal lobe damage and pathological false recognition (PFR), characterized by significantly elevated false alarm rates.

RW: Following frontal damage from an aneurysm, RW exhibited a striking pattern of numerous false alarms on a forced-choice recognition test. Notably, RW expressed unwavering confidence in his erroneous responses, even though his overall recall performance was within normal range. Interestingly, his recall was marked by a higher tendency to

include spurious elements ("intrusions") compared to control participants.

JB: With documented frontal lobe damage, JB consistently produced a notably high false alarm rate (approximately 40%, compared to the typical 80% hit rate). Similar to RW, JB displayed remarkable confidence in his incorrect responses. Additionally, his recall revealed a significant presence of intrusions.

BG: Another individual with frontal lobe damage, BG, demonstrated an excessive number of false alarms across different recognition memory tasks. However, like JB, his hit rate remained within normal range. Similar to the other cases, BG displayed unwavering confidence in both his correct and incorrect responses.

MR: Suffering from a progressive demyelinating illness affecting the frontal lobes, MR reported experiencing vivid illusory memories. One instance involved him believing he had painted the kitchen door, despite it remaining untouched. This anecdotal evidence mirrored his PFR observed in formal tests, where he exhibited high false alarm rates and firm confidence in his errors.

These case studies, in conjunction with the widespread use of the false recognition task, provide valuable insights into the intricate phenomenon of false recollection and its potential link to frontal lobe dysfunction. By directly studying false recollection in controlled settings, researchers can deepen their understanding of this complex cognitive process and explore its contributing factors in both clinical and healthy populations.

Theoretical Implications of False Recognition: Understanding Memory Fallacies

Dominant theories view the frontal lobes as an *"executive"* governing complex behavior through the Supervisory Activating System (SAS). Norman and Shallice (1986) propose the SAS orchestrates most mental activity: routine processing ("driving") requires no intervention, while uncertain situations demanding decision-making activate the SAS. For Shallice (1988), the SAS in memory has two roles: (1) constructing retrieval "descriptions" that access specific events, refining them through interaction with stored memories until the target is retrieved; and (2) verifying retrieved memories, distinguishing real events from imagined ones. Frontal lobe damage could therefore impair memory through deficient description setting/implementation or faulty verification.

Norman and Schacter (1996) reject Shallice's description/verification dichotomy, arguing that the information underlying both processes is identical. They propose that frontal damage leads to a poorly focused retrieval system relying on a context ("I saw words") that allows false alarms in recognition tasks. This explains false recognition, poor recall (lack of focused context for selecting memories), and source/temporal errors. This theory also elegantly incorporates metamemory impairments: "feeling of knowing" reflects partial retrieval context activation insufficient for recollection but guiding recognition. Poorly focused retrieval naturally leads to poor metamemory. Finally, confabulation is seen as the extreme of this deficient context, resulting in wildly inaccurate memories. The currently dominant "focused retrieval" theory posits PFR primarily at the retrieval stage, assuming normal encoding followed by a damaged retrieval system's failure to create a properly focused context. However, the theory acknowledges that PFR could also arise from encoding deficits providing deficient event memories for the retrieval system to work with.

PFR can arise from lesions in both left and right frontal lobes, seemingly contradicting the established functional distinctions between these hemispheres. While the right frontal lobe is typically associated with retrieval (e.g., Fletcher et al., 1995), and the left with encoding (e.g., Tulving et al., 1994), PFR in individual cases appears to stem from different underlying mechanisms based on lesion location.

Case studies illustrate this point:

BG (right frontal lesion): His high false alarm rate significantly improved when targets and distractors differed in category on a recognition test. Schacter et al. (1996) suggest BG suffers from a retrieval deficit with a "liberal response criterion," meaning he accepts many items as targets. Modifying the retrieval environment (distinct categories) helps differentiate targets and distractors, explaining BG's improved performance with this manipulation.

JB (left frontal lesion): His false alarm rate remained unchanged by manipulations affecting retrieval cues (category change) and response criterion (incentive). However, his performance improved significantly when instructed to use semantic encoding during learning (pleasant-unpleasant judgments). This suggests JB's PFR stems from an encoding deficit, where poor encoding creates an insufficient basis for a focused retrieval context.

These observations are consistent with the proposed functional dichotomy and support K. Norman and Schacter's emphasis on retrieval deficits in PFR. Notably, the specific retrieval manipulation that benefitted BG (category distinction) did not affect JB, and vice versa, further highlighting the differential effects of PFR based on lesion location.

Implications and Concluding Insights

The landscape of false memory in patients with frontal lobe damage is multifaceted, showcasing a variety of distortions and inaccuracies. We encounter the extreme realm of fantastic confabulation, where elaborate fabricated memories weave themselves into the tapestry of the past. But the misadventures don't stop there. Frontal lesions can also lead to source and temporal misattributions, where memories get misplaced in the wrong timeframe or assigned to unintended sources. This blurring of lines extends to impaired metamemory, leaving individuals struggling to gauge the origins and truthfulness of their own recollections.

At the heart of understanding these perplexing phenomena lies pathological false recognition (PFR). Unraveling its mysteries has become a central quest in this domain. One intriguing explanation, rooted in the Supervisory Activating System (SAS) concept, proposes that PFR stems from a faulty verification process rather than flawed event descriptions. However, critics point out the inherent difficulty in disentangling verification from description, questioning the logic of this sharp division. Another compelling contender is the poorly focused retrieval theory. This view argues that PFR arises from a retrieval system plagued by a "liberal response

criterion". Like a leaky dam, it allows too many items to flood through, blurring the lines between genuine memories and false alarms. The beauty of this framework lies in its flexibility – it seamlessly extends to encompass encoding deficits as potential culprits behind PFR. Furthermore, it aligns neatly with functional neuroimaging data, suggesting a neat lateralization of memory functions. While left frontal damage might wreak havoc on encoding processes, the right flank appears to be the guardian of retrieval. Yet, the story takes a surprising turn when we confront existing theories of false memory. Deese paradigm, IAR, and fuzzy trace theory, while holding their own in certain scenarios, falter when faced with the specifics of PFR. They predict sensitivity to the emotional valence of distracting information, a characteristic not consistently observed in PFR cases. This observation underscores the need for theories that capture the unique nuances of PFR in frontal lobe damage.

Returning to the poorly focused retrieval theory, its explanatory power extends beyond PFR. It elegantly explains source monitoring errors, where memories get tangled with incorrect origins or contexts. It also sheds light on metamemory impairments, providing a plausible explanation for the struggle to discern genuine memories from their imposters.

However, a word of caution: The continuum between fantastic confabulation and other false memory phenomena demands careful consideration. Confabulation might involve additional layers of complexity, potentially intertwined with delusional elements that transcend pure memory impairment. Moreover, the influence of prompting on recall cannot be ignored. In patients with poor recall, suggestive cues during retrieval can inadvertently nudge them towards generating false memories, further complicating the already enigmatic picture.

As we navigate this intricate landscape, recognizing the limitations of existing theories is crucial. While the poorly focused retrieval theory offers a robust framework, further research is needed to illuminate the precise mechanisms of confabulation and disentangle the influence of prompting on recall. Additionally, refining our understanding of the intricate link between lateralized brain function and specific memory deficits remains a key challenge.

By delving deeper into these avenues, we can gradually unveil the secrets tucked away in the minds of those with frontal lobe damage, bringing us closer to unraveling the enigma of false memories and their diverse expressions.

References

Benson, D.F. & D.T. Stuss. (1990). “Frontal lobe influences on delusions: A clinical perspective.” Schizophrenia Bulletin, 16,403-411.

Brainerd, C.J., V.F. Reyna, & E. Brandse. (1996). “Are children’s false memories more persistent than their true memories ?” Psychological Science, 6, 359-364.

Case, R. (1992). “The role of the frontal lobes in the regulation of cognitive development.“ Brain and Cognifion, 20, 51-73.

Damasio, A. R. & H. Damasio. (1993). “Cortical systems for retrieval of concrete knowledge.” In Large scale neural theories of the brain, edited by C. Koch & J. L. Davis. Cambridge, MA: MIT Press.

Deese, J. (1959). “On the prediction of occurrence of particular verbal intrusions in immediate recall.” Journal of Experimental Psychology, 58, 17-22.

Delbecq-Derousne, J. M. F. Beauvois, & T. Shallice. (1990). “Preserved recall versus impaired recognition.“ Brain, 213,1045-1074.

Fischer, R. S., M. P. Alexander, M. D’Esposito, & 0. Randall. (1995). “Neuropsychological and neuroanatomical correlates of confabulation.” Journal of Clinical and Experimental Neuropsychology, 17,20-28.

Fletcher, P. C., C. D. Frith, P. M. Grasby, T. Shallice, R. S. J. Fracowiak, & R. J. Dolan. (1995). Brain systems for encoding and retrieval of auditor-verbal Brain, 118, 401416.

Fujii, D.E.M. & I. Ahmed. (1996). “Psychosis secondary to traumatic brain injury.” Nueropsychiafry, Neuropsychology, and Behavioral Neurology, 9, 133-138.

Gardiner, J.M. (1988). “Functional aspects of recollective experience.” Memory & Confabulation, 16,309-313.

Hanley, J. Ii., A. D. M. Davies, J. J. Downes, & A. R. Mayes. (1994). “Impaired recall of verbal material following rupture and repair of an anterior communicating artery aneurysm.” Cognitive Neuropsychology, 27,543--578.

Hanley, J. R. & A. M. D. Davies. (1997). “Impaired recall with normal recognition.” In Case studies in the neuropsychology of memory, edited by A. J. Parkin. Hove, UK: Psychology Press.

Incisa DellaRocchetta, A. & B. Milner. (1993). “Strategic search and retrieval inhibition: the role of the frontal lobes.” Neuropsychologia, 32(6), 503-524.

Janowsky, J. S., A. P. Shimamura, & L. R. Squire. (1989). “Memory and metamemory: Comparisons between patients with frontal lobe lesions and amnesic patients.” Psychobiology, 27,3-11.

Kapur, S., F. 1. M. Craik, E. Tulving, A. A. Wilson, S. Home, & G. M. Brown. (1994). “Neuroanatomical correlates of encoding in episodic memory: Levels of processing effect. Proc. N&l. Acnd. 5-i. USA, 92, 2088-2011.

Lindsay, D. S., M. K. Johnson, & I’. Kwon. (1991). “Developmental changes in memory source monitoring.” Journal of Experimental Child Psychology, 52, 297-318.

Norman, D. A. & T. Shallice. (1986). “Attention to action: Willed and automatic control of behaviour.” In Consciousness and Self- Regulation (Vol. 4), edited by R. J. Davidson, G. E.Schwartz, & D. E. Shapiro. New York: Plenum Press.

Roediger, H. L. & K. B. McDermott. (1995). “Creating false memories: remembering words not presented on lists.” Journal of Experimental Psychology: Learning, Memory and Cognition, 21, 803-814.

Schacter, D. L., , T. Curran & L. Galluccio. (1996). “False recognition and the right frontal lobe.” Neuropsychologia7, 34, 793-808.

Tulving, E., S. Kapur, F. I. M. Craik, M. Moscovitch, & S. Houle. (1994). “Hemispheric encoding/retrieval asymmetry in episodic memory: Positron emission tomography findings.“ Proc. National Academy of Science USA, 91, 2016-2020.