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Regaining Consensus on the Reliability of Memory

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Abstract

In the last twenty years the consensus about memory being essentially reliable has been neglected in favor of an emphasis on the malleability and unreliability of memory, and on the public's supposed unawareness of this. Three claims in particular have underpinned this popular perspective: That the confidence people have in their memory is weakly related to its accuracy, that false memories of fictitious childhood events can be easily implanted, and that the public wrongly sees memory as like a video camera. New research has clarified that all three claims rest on shaky foundations, suggesting there is no reason to abandon the old consensus about memory being malleable, but essentially reliable.

Keywords: False memory; memory accuracy; confidence; lay beliefs

Until recently human memory, although limited in capacity and therefore prone to error once these limitations are exceeded, was seen as broadly reliable. Errors in memory were not regarded as compromising the integrity of the system as a whole and its ability to guide our behavior. However, there has been an increasing emphasis on the "dark side" of memory (Koriat, Goldsmith, & Pansky, 2000) and the public's supposed failure to understand its true nature. Prominently underpinning this view are claims that the confidence we have in our memory has little relation to its accuracy, that it is easy to implant false memories of events that never happened, and that the public erroneously perceives memory as "like a video camera". We argue that these claims are exaggerated and do not challenge the traditional consensus concerning memory accuracy.

Memory has been seen as partially reproductive, retaining some details unique to an event, and partially reconstructive, influenced by knowledge ('schemas') derived from prior learning (Brewer, 1986). When events are complex or ambiguous, existing schemas can shape what is recalled, leading to vivid memories for unexpected objects or events but also to false memories for schema-consistent material (Lampinen, Copeland, & Neuschatz, 2001). People also make judgements about their confidence in the accuracy and source of their recollective experience (Johnson, 2006). To say that memory is reliable is to say that a memory held with high confidence is likely to be accurate whereas one held with low confidence is unlikely to be accurate (Mickes, 2015). The traditional view on the functioning of memory was expressed in comments such as (Schacter, 1996): "On balance…our memory systems do a remarkably good job of preserving the general contours of our pasts and of recording correctly many of the important things that have happened to us. We could not have evolved as a species otherwise" (p. 308).

The perspective that emphasizes the fallibility and unreliability of memory (Loftus, 2005) is exemplified by three sorts of comments. One involves claiming that memory is entirely

reconstructive and therefore unsafe (Howe, 2011): "…memories, regardless of whether they are formed and remembered in childhood or adulthood, are fundamentally reconstructive and, hence, error-prone" (p. 198). Memories are of course 'reconstructive' in the sense that retrieval involves the reactivation and recombination from disparate brain areas of constituent elements, for example from specific brain areas processing vision and audition that were engaged while the event was being perceived (Danker & Anderson, 2010). Unlike the schema-based concept of reconstruction, however, this neuroscientific use of 'reconstructive' does not imply anything about the truth or falsity of the resulting recollections.

Another sort of comment uses the ambiguous term 'fallible', e.g. (Lynn & Payne, 1997) "This shift in emphasis signals an emerging zeitgeist that has developed around the idea that memory is fallible, quirky, and essentially reconstructive in nature" (p. 55). 'Fallible' does not just mean that memory is capable of error but can signify that it is liable to be erroneous or unlikely to work satisfactorily. The third sort of comment describes memory error without an appreciation of overall reliability, e.g. (Zajac, Garry, London, Goodyear-Smith, & Hayne, 2013) "…well over a century of scientific research shows that memories are surprisingly fluid and easily corrupted" (p. 614). These comments encourage an excessively pessimistic view of memory.

Consistent with this perspective, the state of New Jersey issued instructions to jurors suggesting that eyewitness confidence is generally an unreliable guide to accuracy (New Jersey Courts, 2012). In the U.K. Mr Justice Leggatt commented "in everyday life we are not aware of the extent to which our own and other people's memories are unreliable and believe our memories to be more faithful than they are" and "the strength, vividness and apparent authenticity of memories is not a reliable measure of their truth" ("Gestmin SGPS v Credit Suisse," 2013).

The Relation Between Confidence and Accuracy

One area in which memory has been particularly held to be unreliable is eyewitness identification. A common method of identifying suspects is the lineup, which is generally composed of images of the police suspect and fillers. The suspect is either innocent or guilty and the fillers are known to be innocent. Witnesses can identify the suspect, select a filler, or not make a selection. This process can result in two correct responses (identify the guilty suspect or reject the lineup with the innocent suspect) or three incorrect responses (identify the innocent suspect, reject the lineup with the guilty suspect, or identify a filler).

Early reviews summarized the relation between the confidence with which witnesses identified a suspect and their accuracy, i.e. their reliability, using a point-biserial correlation coefficient and found low (Bothwell, Brigham, & Deffenbacher, 1987; Deffenbacher, 1980; Wells & Murray, 1984) or moderate values (Sporer, Penrod, Read, & Cutler, 1995). Importantly, these summaries included decisions made even during the initial, pristine lineup test (e.g., Penrod & Cutler, 1995). The analyses correlated a binary outcome (correct versus incorrect) with a confidence rating across different participants, effectively averaging across levels of confidence. However, this kind of correlation coefficient is capable of masking a strong relationship between confidence and accuracy which emerges when the data are analyzed using calibration analyses to calculate average suspect and filler identification accuracy at each level of confidence (Juslin, Olsson, & Winman, 1996) or confidence-accuracy characteristic (CAC) analysis to calculate average suspect identification accuracy at each level of confidence (Mickes, 2015).

The ensuing studies show that confidence is undeniably diagnostic of accuracy (Wixted & Wells, 2017), whether in laboratory witnesses or real witnesses in a police department field study (Wixted, Mickes, Dunn, Clark, & Wells, 2016). This was the case when fair lineups

were administered (i.e., the suspect did not stand out among the fillers). Critically, the finding holds solely during the first and only lineup test because confidence can increase over repeated testing. In a comparison of available records of the initial identification and the courtroom identification from cases that were later exonerated, the initial identification was made with low confidence or no identification, but the courtroom identification was made with high confidence (Garrett, 2011). The increase in confidence can happen for various reasons, for example with post-identification feedback (Wells & Bradfield, 1998).

Moreover, the analyses conducted by Wixted and Wells included studies that manipulated a variety of variables, including whether or not 1) a weapon was present, 2) there was a long or short retention interval, 3) the target was seen briefly or a longer time, and 4) the target and witness were of the same or different race. In each case initial confidence was diagnostic of accuracy. Suspects who were identified with high confidence were likely to be the target, but suspects who were identified with low confidence were more likely to be innocent. Wixted and Wells concluded that initial confidence is diagnostic of accuracy when pristine testing procedures are used. These analyses corrected the earlier message that eyewitness memory, when tested on a lineup, is inherently unreliable.

Implanting False Memories of Childhood Events

The claim that it is easy to implant entirely false childhood memories (Conway, 2013; Wade, Garry, Read, & Lindsay, 2002) is repeated on the public website of the Wellcome Trust (Hopwood, 2019). This line of research developed in order to demonstrate that some memories of childhood abuse, rather than being true, might be the results of suggestion. One study reported that it was apparently possible to implant a false memory of having committed a crime in 70% of participants (Shaw & Porter, 2015). In these effortful and time-consuming studies experimenters target a particular event that a parent indicates did not happen, and then

encourage participants to recall over two or three sessions the details of the false event they are misleadingly told the parent has confirmed as happening. In some studies participants are also shown a doctored photograph that supposedly illustrates their presence at the false event. Their accounts are then rated for their correspondence to a complete memory by the investigators.

With the use of such highly suggestive procedures in which participants are encouraged to suspend disbelief, it is critical to ensure they have not just accepted that the event occurred (i.e., a false belief) and have speculated about the details, but that they actually have a recollective experience that they are confident accurately reflects the event (i.e., a false memory). Reanalysis of the Shaw and Porter (2015) data suggested that over half of the 70% in fact reported false beliefs, not false memories (Wade, Garry, & Pezdek, 2018). All false memory implantation studies find that some participants generate visual images in response to the experimental demands but their confidence in them varies greatly. A systematic review found that whereas on average 47% of participants were rated as having some recollective experience associated with the suggested false event, no matter how vague, uncertain or speculative, only 15% of participants were classified as having fully accepted the false memory (Brewin & Andrews, 2017). Another more limited review concluded that 11% showed evidence of a ‘robust’ false memory, 10.8% a ‘full’ false memory, and 8.5% a ‘partial’ false memory, reflecting the authors’ decreasing degree of confidence in whether the false memory had been successfully implanted (Scoboria et al., 2017, Table 4).

These figures may be an over-estimate because investigator ratings are a poor substitute for participants’ own metacognitive judgements about whether they believe in a memory (Shaw, 2018). On the few occasions these judgements have been recorded, adult participants’ confidence in clear false memories identified by investigators was below the scale midpoint (Hyman & Billings, 1998) and over half were not classified as memories by

participants themselves (Otgaar, Scoboria, & Smeets, 2013; Table 1). Memories of false events also consistently have less of a recollective quality and are less vivid than corresponding true events (Brewin & Andrews, 2017). The findings correct the notion that in the laboratory false memories of childhood events are easy to implant and clarify that only a small minority of people are susceptible. In real life the specific circumstances (e.g., availability of deceptive information, or opportunity for more extended suggestive influence) are likely to be very different but empirical data are unavailable.

The Notion that Memory is Like a Video Camera

The video camera view of memory has been described as "typical" (Lacy & Stark, 2013) and "pervasive" (Clifasefi, Garry, & Loftus, 2007) among the lay public and non-experts, as well as being classified among the "50 great myths of popular psychology" (Lilienfeld, Lynn, Ruscio, & Beyerstein, 2010). This is puzzling since the public are in a sense all experts, having had multiple opportunities to observe and test the workings of their own memory. The claims are largely based on answers to a single survey question: "Human memory works like a video camera, accurately recording the events we see and hear so that we can review and inspect them later" (Simons & Chabris, 2011).

Survey methodology, however, cautions against the use of single items and warns that statements phrased in the positive may be answered differently if phrased in the negative, or may be answered differently in another context. Moreover, there are many other metaphors that people may use in describing their memory and these may have different connotations.

A recent study (Brewin, Li, Ntarantana, Unsworth, & McNeilis, 2019) contrasted responses to this video camera statement with alternative statements including "Human memory is not like a video camera because we cannot play back events exactly as they happened". The items were designed to probe beliefs in more detail by minimizing

expectations about what answers were correct, and by providing items that were not only worded differently but gave participants a broader context to consider. In two studies significantly more non-expert respondents agreed with the item stating that memory was *not* like a video camera than with the original statement stating that it was.

Follow-up questions also probed people's beliefs about memory accuracy and completeness in more detail and found that lay beliefs about memory were much more nuanced and sophisticated than the earlier research had suggested. Over 90% of respondents acknowledged the influence of attentional factors at encoding, and personal beliefs and biases, in shaping memory. Many respondents reported subjectively experiencing their memory as sometimes like a sequence of unfolding scenes, much like a video recording. These findings correct the notion that ordinary people have failed to understand their own memory and indicate other plausible reasons for the survey responses obtained.

Conclusions

The claims examined here, repeatedly cited in textbooks and articles, paint a picture of memory as being highly prone to error and suggestion to an extent that the public are unaware of. All three, however, rest on research with methodological weaknesses that invite alternative interpretations of the findings. Re-analysis of this research and the collection of new data suggest that more modest conclusions are appropriate. One implication is that research on the 'dark side' of memory has not yet provided grounds to overturn the long-held consensus of memory as essentially doing a good job although limited by its capacity and prone to manipulation. Memory is clearly malleable but not unreliable, under normal circumstances and in the absence of contamination or prolonged suggestion by psychologists, therapists, or anybody else (Koriat et al., 2000; Wixted, Mickes, & Fisher, 2018).

Another implication is that psychologists should be much more cautious in assuming that their understanding of memory is superior to that of the ordinary person and that institutions such as the criminal justice system need educating about research. This may well be true in some areas but it fails to consider the possible costs of disseminating findings that do not rest on a solid foundation. Ironically, when questioned about the relation between accuracy and confidence, non-experts have been found to give answers that are more consistent with the latest research than do psychology students, who rather than probing their own experiences had been misled by the conclusions in the literature (Brewin et al., 2019).

Ultimately psychologists are responsible for the way in which our research is interpreted by the outside world. There is a real danger that over-enthusiastic championing of conclusions based on limited data, without proper regard to methodological caveats or issues of external validity, will be damaging both to our reputation as scientists and to potential recipients such as the legal profession who rely on us to guide them with restraint and impartiality.

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Recommended Reading

Brewin, C. R., & Andrews, B. (2017). Creating memories for false autobiographical events in childhood: A systematic review. *Applied Cognitive Psychology, 31*, 2-23.

Reviews the three paradigms mainly used to suggest false beliefs and memories concerning autobiographical events.

Brewin, C. R., Li, H., Ntarantana, V., Unsworth, C., & McNeilis, J. (2019). Is the public understanding of memory prone to widespread "myths"? *Journal of Experimental Psychology: General*. doi:10.1037/xge0000610

Reports three studies investigating public beliefs about memory as a video camera, confidence/accuracy, and repression.

Wixted, J. T., Mickes, L., & Fisher, R. P. (2018). Rethinking the reliability of eyewitness memory. *Perspectives on Psychological Science, 13*(3), 324-335.

Documents how eyewitness memory has been wrongfully convicted of mistakes that are better construed as having been made by other actors in the legal system.