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Scientists Making a Difference

One Hundred Eminent Behavioral and Brain Scientists Talk about Their Most Important Contributions

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In December 2004, the *New York Times* reported on that year's winners of the Grawemeyer Awards. The Grawemeyer Awards are given in Psychology and also several other fields (e.g., education, religion, improving world order). That year they were accompanied by a \$200,000 prize—amongst the largest for an award in a field that does not have a Nobel Prize. It was with enormous pride that I learned that I had won the award in Psychology. Another news outlet reported that I was the most controversial researcher ever to win the prize, and the most controversial winner since former Soviet President Mikhail Gorbachev won the 1994 prize for improving world order. The award is for a big, important idea in Psychology. So what was my big, important idea?

A staff member sent me an email about that time, letting me know what the external awards committee had said when summarizing my “idea.” Their summary practically made me weep. The committee said that I had “changed the way that both scientists and lay citizens think about the nature of human memory,” and had “made it clear that human memory is not a literal and faithful recorder of experience.” Of course, we’ve known for some time that memory is fallible, and just how easy it is for us to forget things. But what my work has shown is that we can also falsely remember things differently from the way they happened, and can remember entire events that never happened.

This work teaches us about the malleable nature of memory. Information suggested to an individual about an event can be integrated with the memory for the event itself, so that what actually occurred, and what was discussed later about what may have occurred, become inextricably interwoven, allowing distortion, elaboration, and even total fabrication from suggestions.

People often ask me how I came up with this idea, and to answer I have to take us back to the 1970s. Back then I was interested in what happened when witnesses were questioned about events they had experienced, important events such as crimes or accidents. I did several studies in which I showed that leading questions could bias what people claimed to have seen. For example: “How fast were the cars going when they

smashed into each other?” led to higher estimates of speed than the same question asked with the verb “hit.” “Did you see *the* broken headlight?” led to more reports of seeing non-existent objects than the same question asked with the indefinite article, as in “Did you see *a* broken headlight?” But eventually I began to see the leading questions as a form of post-event misinformation, one of many forms of post-event information that had the potential to contaminate memory. Witnesses pick up misinformation not only from biased or leading questions, but also when they talk with other people who (consciously or inadvertently) give an erroneous version of a past event, or when they see news coverage about some event that they may have previously witnessed. I began to explore the myriad ways in which our memories could be contaminated as we encounter new information. My collaborators and I showed that distorted memories could be created not only in the minds of young children, or college students in laboratory experiments, but in the minds of all sorts of individuals. For example, we readily distorted the memories of people who had highly exceptional personal memories. We even distorted the memories of highly trained soldiers who were attending a survival school where they learned what it would be like if they were ever captured as prisoners of war. Without much effort at all, they could be led to believe that they had seen a telephone or a weapon in the interrogation room where they had spent a half hour. These objects were not there.

What I love about this research program is that not only does it tell us a great deal about the malleable nature of human memory, but it also has important implications for society. Precise memory, even for minute details, is often provided in court cases involving crimes and accidents and other legally relevant events. My research showed that we cannot always trust this testimony. We cannot assume that the degree of conviction expressed by an eyewitness is a reliable indicator of the accuracy of that testimony. Even when witnesses are trying to be as accurate as possible, they may not be describing what really happened. The testimony is honest in the sense that the witness fervently believes it to be valid and yet it can be partly or completely wrong.

Another real-world setting where memory has been important is psychotherapy. Often in therapy, patients are pressed for details about their childhood or an earlier phase of life experience. Sometimes even talking about a possible past can create a false sense of recollection that the event actually did occur. My collaborators and I established clearly that this can happen, showing that after a few discussions, a fabricated experience takes on a sense of verisimilitude that can fool someone into thinking that they remember the event as if it really did occur. The implications for how we should probe a person's memory, or for the advisability of

engaging them in hypothetical thinking about possible past events, are enormous. Not only do these observations have implications for law and for psychotherapy, but they also have ramifications for one's sense of one's own past.

This is where the "controversial" part comes in. Some patients were producing false memories in psychotherapy and innocent lives were being destroyed in the process. Some of my critics did not like facing this truth.

These ideas about our malleable memory did not come out of nowhere. Current psychological science often builds on past work done by many others in the field. In the case of the malleable nature of memory, there certainly were some past giants. For example, the British psychologist F. C. Bartlett had shown in the 1930s that recollections of a story often contain distortions and additions that were not part of the material that was original read. The American psychologist Ulrich Neisser had described, in the 1960s, remembering as a reconstructive process, working a bit more like the paleontologist who constructs a skeleton of a dinosaur from a few bone fragments. Much later, I would liken memory to a Wikipedia page – something that is created with bits of information that can come from different times and places. You can change it, but so can other people.

After hundreds of studies showing how memory could be contaminated by post-event misinformation, my collaborators and I would wonder just how far you can go with people in terms of distorting memory. We showed that you could plant entirely false memories in the minds of people for events that never happened, false memories of events that would have been pretty traumatic had they actually happened. These include false memories of getting lost, or being bullied, or being harmed in a serious way. And these false memories had repercussions – they affected people's later thoughts, intentions, and behaviors. So, when we planted a false memory that as a child a person got sick eating eggs, pickles, or strawberry ice-cream, they didn't want to eat these foods as much. When we planted a warm fuzzy memory about a healthy food, they wanted to eat the foods more.

In the future, we will get even more skilled at tampering with memory. The techniques might include behavioral interventions (as we have done), perhaps enhanced by pharmaceutical elements. The work will show that falsely planted memories can affect people long after the distortions have taken hold. And with this power to contaminate memory and control behavior, some serious ethical considerations rise to the fore. When should we use this kind of mind technology? And should we ever ban its use? Future generations will grapple with these concerns.

In the meantime, my hope is that I have left the world with a deeper appreciation of the constructive and destructive ways in which memory can work. We would all do well to keep in mind a lesson I've learned over the decades: that just because someone tells you something with confidence, with details, and with emotion, it doesn't mean that it really happened.

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