

Forensic psychology

Imagining the past

ON one of those dreaded airport layovers during which I was too nervous about arriving at my destination on time to sit and read, I wandered among the airport shop trinkets and came upon something I really wanted to buy. It was a credit-card-sized piece of plastic with a sketch of Albert Einstein on the front, and several of his pithy sayings on both sides. 'Imagination is more important than knowledge' is one of Einstein's most oft-cited musings. While I might not fully agree that a balance scale with 'Imagination' on one side and 'Knowledge' on the other would tip in favour of the former, there is at least one sense in which I am prepared to put some of my money on the power of imagination. Imagination has the power to change what we believe about our past, and what we think we know about ourselves.

My own foray into this particular power of imagination began when I was immersing myself in the large collection of writings aimed at survivors of childhood abuse and their therapists. I found a number of examples of mental health professionals encouraging patients who had no memories of abuse to imagine that they had had these experiences as children. Maltz (1991) explicitly advised readers to give rein to their imagination: 'Spend time imagining that you were sexually abused, without worrying about accuracy' (p.50). And, in a survey of doctoral-level psychotherapists in the US and Britain, Poole *et al.* (1995) found that more than a fifth reported using instructions to give free rein to the imagination as a memory recovery technique with patients who couldn't explicitly remember childhood abuse. My colleagues and I wondered aloud: 'What would such imagination activity do to people who had not had the experience in the first place?'

To address this question, we pre-tested participants on how confident they were that a number of childhood events had happened to them before age 10; events such as 'broke a window with your hand' (Garry *et al.*, 1996). Later some subjects got a script that said: 'Imagine that it's after school and you are playing in the house. You hear a strange noise outside, so you run to the window to see what made



ELIZABETH F. LOFTUS looks at a way that false memories can arise.

the noise. As you are running, your feet catch on something and you trip and fall.' The script went on to guide them through a detailed scenario in which they would break the window with their hand, and get cut and bloody. In a final phase of the study, they once again answered questions about their childhood experiences.

We found that a one-minute act of imagination led a significant minority of people to claim that an event was more likely to have happened (relative to controls who were not asked to imagine the item), even though they had previously said the event was unlikely to have occurred. We termed this phenomenon 'imagination inflation'. Put another way, imagination inflation is the phenomenon that imagining an event increases subjective confidence that the event actually happened. Some participants went so far as to claim, after the imagination session, that the event was 'likely' to have happened to them as a child.

In the next few years a number of other investigators replicated the basic finding and helped to answer a number of key questions about imagination inflation. How does imagination work? Does it lead to false beliefs or does it act as a retrieval cue to dredge up true beliefs? Does it change a person's belief about their past, or does it actually lead to the development of specific pseudomemories? Are there particular kinds of individuals who are especially susceptible to imagination inflation?

How does imagination inflation occur?

Charles Manning completed a doctoral dissertation in my laboratory that addresses the important question of how imagination inflation happens, as well as reporting the results of an unusual web-based experiment on the phenomenon (Manning, 2000). Participants first answered questions about their childhood by completing a 40-

item Life Events Inventory (LEI) via the internet. Later they came into a laboratory room and engaged in a variety of imagination exercises related to certain critical LEI items (i.e. 'broke a window with your hand', 'had a lifeguard pull you out of the water', 'got in trouble for calling 911' (the emergency phone number)). Finally, after a delay of either one day, one week, or two weeks, they completed the LEI again on the internet.

In all, 276 people completed this web-based imagination study. In the imagination session, participants were given about four minutes to imagine and write about each of the target events. Generally they were given guidance about what to imagine, but they also answered questions designed to fill in the details of their generated images. For example, one who was guided through the broken-window scenario was asked these questions and gave these made-up answers.

Who was involved?

— My brother, my father, my two younger brothers' mother, and I.

Where did it happen?

— At an old farmhouse that we used to live in.

When did it happen?

— After school one day, probably directly following dinner.

(Manning, 2000, p.58)

First Manning analysed the percentage of participants who increased their confidence that they had experienced one of the target events in childhood, separately for the imagined and control events (where no imagination had been encouraged). After a delay of one day, only slightly more items increased after imagination than control (30 per cent versus 26 per cent, a non-significant difference). After a one-week delay, the difference between

imagined and control events was larger (34 per cent versus 25 per cent, now a significant difference). Finally, after a two-week delay, the gap between imagined and control events grew further (34 per cent versus 22 per cent). When Manning analysed the data in terms of mean change, the mean pre-test to post-test change was significant after the two-week delay, but not after one day.

Thus, it appeared as if people who were tested soon after their imagination activity showed little inflation, whereas those who were tested after a longer period showed inflation by both measures (percentage who increased their confidence, and mean change in confidence). Why should that be? Manning discussed his results in terms of a familiarity-attribution model (e.g. Jacoby & Whitehouse, 1989). He argued that when people fill out the post-test LEI, they respond to each item (e.g. 'broke a window with your hand') based on familiarity generated by the item. Imagination inflation depends on the person's ability to attribute any familiarity that occurs during testing to the prior imagination activity. If tested too soon, people can easily attribute the familiarity to the prior imagination activity. This will work against observing an imagination inflation effect. Increasing the time between the imagination session and the post-test LEI should decrease memory for what was imagined, and subsequently decrease the ability of participants to attribute familiarity to that session.

Of course eventually, with a sufficiently long interval between the imagination

session and the post-test LEI, memory for the imagination session could be expected to fade away (nearly) completely. Imagination inflation should not be observed. Put another way, we would hardly expect a few minutes of imagination to still be influencing our participants five years later.

Who inflates?

Once it was established, it was probably natural that various investigators would become interested in individual differences in imagination inflation. While most of us are undoubtedly susceptible to alterations in our confidence after imagination, the research suggests that some of us may be more susceptible. Several investigators (but not all) have found that people who have more lapses in memory and attention, or have a greater self-reported tendency to confuse fact and fiction, are likely to imagination-inflate (Heaps & Nash, 1999; Paddock *et al.*, 1998). This observation is consistent with the findings obtained with other memory distortion or memory illusion paradigms, also showing more influence of the suggestive manipulation in those who score high on tests of dissociative tendencies (self-reported lapses in memory and attention; see for example Hyman & Billings, 1999; Ost *et al.*, 1997).

Horselenberg *et al.* (2000) have found that the greater the imagery ability (as measured with questions like 'How vividly can you imagine the taste of salt?'), the greater the inflation. They called the shift in subjective confidence arising from a single, covert act of imagination 'relatively

small' but 'robust' (p.135). Change the procedure somewhat, such as getting people actually to write down their constructed imaginations, and 'huge effects' can be produced.

Changed beliefs about the past or pseudomemories?

Most of the studies of imagination inflation report results in terms of a change in confidence that an event like breaking a window occurred in the past. Obviously people can have a belief that the event occurred, while having no concrete narrative, episodic recollection. We believe that we had the umbilical cord cut moments after birth, but most of us have no actual memory for the experience. Most of the studies of imagination inflation have shown shifts in belief, but have not explored whether actual memories or pseudomemories accompany those shifts.

In the dream interpretation paradigm, subjects were told (by an expert) that a recently experienced dream probably meant that they had had an upsetting experience (e.g. getting lost or being rescued from danger) before the age of three (Mazzoni *et al.*, 1999). Many subjects later reported that they had had those suggested experiences. The researchers also examined whether the altered beliefs were accompanied by 'memories', and they found about half the time they were. Other paradigms, described in the next section, may be more suitable for addressing the question of whether 'memories' get planted in the process of engaging in imagination exercises.

False beliefs or revived true beliefs?

In most of the imagination inflation research, the key events being asked about are from childhood, and no proof exists about whether the events occurred. It is conceivable that imagining an event, such as breaking a window with your hand inside a house, might remind people of an actual event from their past. When later queried about the category of 'broken window' some might report that it happened, but they would be recalling a true event that had not been recalled earlier.

To circumvent this difficulty some investigators have examined the impact of imagination on memory for recent experiences where the truth is known. So for example, Goff and Roediger (1998) presented participants with statements (e.g. 'flip the coin') which they actually performed or imagined performing. In a second session they imagined that they had



Just your imagination?

done a number of acts. In a third and final session they were tested for their memory of what they had done in the initial session. A key finding was that as the number of imaginations increased in the second session, so did the likelihood of participants claiming that they had performed the action in session one. Subsequent studies showed that imagination could even make people believe that they performed actions that would have been rather bizarre or unusual such as 'kiss a plastic frog' or 'rub the chalk on your head' (Bulevich *et al.*, 2001; Thomas & Loftus, 2001). Of course, these were still relatively simple actions, and so a question arises about whether people would actually come to believe they had experienced more complex events after imagining those events.

In fact, people can be led to false-report that they experienced more complex events. Inducing people to imagine scenes that never occurred can make people believe they actually witnessed those scenes. This was shown clearly in a recent study in which participants first watched a two-minute video clip of a drunk-driving incident on a computer screen (Wright *et al.*, in press). In the video three police officers begin their Saturday night shift at a ferry dock. One of them is seen warning several men not to drive, as they may be drunk. After much discussion about whether to take the train or drive, the men get into the car. The one occupying the front passenger seat is seen looking drunk or asleep.

For half the participants, those whose data are relevant to the effects of imagination, the scene shifts to another policeman who is standing in the path of the car trying to stop it. After some yelling



Just remember this, a kiss is just a kiss

on the part of the passenger and police, the car hits the policeman, and he ends up hanging on to the roof of the car. Much chaos ensues, and the video ends with an arrest of the people in the car and attempts to care for the injured policeman.

Participants were then asked to imagine a variety of scenes from the video and to rate on a scale of 1 (difficult) to 11 (easy) how difficult it was to imagine each scene. The 'imagination' participants were asked to imagine a scene that was not actually presented: a policeman stops the car and asks the driver to take the keys out of the ignition and step out, but the driver refuses and drives off. The imagination phase lasted approximately five minutes.

Finally, after a short four-minute filler task, participants were tested on their memory for the video. In terms of free recall, while only 2 per cent of controls mentioned the false critical details, 15 per

cent of the 'imagine' group did so.

Recognition memory was also tested. A critical recognition question asked about the scene where the policeman had stopped the car, asked the driver to step out, and the driver refused and drove off. Only 15 per cent of controls, but 41 per cent of 'imagine' participants falsely recognised this critical aspect of the event.

Thus, imagination can influence memory for a complex event that occurred only a few minutes before the imagination activity. In less time that it takes to make an omelette, people can be led to report that they witnessed events that would have constituted criminal activity in real life.

Implications

How do false memories develop? One explanation is that during the suggestive activity, be it imagination or processing the stories of others, new bits of information

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are laid down into the memory system. When later asked whether a particular event was experienced first hand, people must grapple with a kind of reality-monitoring question: Did I experience that event? Did I see that detail for myself? Does it seem familiar to me because I imagined it, or for some reason other than personal experience? To the extent that people can remember clearly the imagination activity, they can attribute the excess familiarity to that activity, and consequently reduce the likelihood that they will fall sway to its suggestive power. However, if people do not recall the imagination activity, they may respond to the familiarity of the information processed during that activity by erroneously attributing that familiarity to their own personal past. Imagination supplies pieces of detail. Subsequent repetition of that detail (overtly or covertly) can turn those pieces into autobiographical memory facts.

The false beliefs or memories that are created as a result of suggestive interventions have relevance to everyday life. It is often more a matter of what one believes to be true, rather than what is true,

that determines what how people will act in a given situation. So much of human social interaction rests on what some have called 'theory of mind' or 'mentalising' (Frith & Frith, 1999). The real test of being accomplished at mentalising is being able to calculate what people will do on the basis of false beliefs that they hold; by examining what people do as a result of false beliefs, one can be sure that the action is governed by the person's mental state, and not by some physical reality.

The work on false beliefs and memories in the autobiographical context should provide new research territory that will help extend our understanding of how theories of mind influence who we are and what we do. Like other false beliefs, planted by deception, these will undoubtedly drive behaviour. But, more hopefully, like other false beliefs, perhaps these too can be removed or at least minimised by education.

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