

# 13

## What Can Magic and Science Tell Us About the Experience of Thought Insertion?

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### 13.1. Introduction

The conjuring techniques in performance magic allow us to experience things that we believe to be impossible (Kuhn, 2019). Throughout history, conjurers have learnt to use clever psychological tricks to create compelling illusory phenomena that violate our understanding of the world (e.g., psychic powers, violations of the laws of physics). Magicians have developed a wide range of tricks that allow them to push the limits of what their audiences believe is possible. Among other things, they often proclaim that they can insert specific thoughts into people's minds or unconsciously manipulate their behaviour. This form of magic is known as *mentalism*, and the context of such performances varies widely. For example, some performers attribute the effects to paranormal and psychic abilities while others frame it as psychological skills such as reading body language or using subtle suggestion techniques. Mentalism is the genre of magic that most often plays with the concept of thought insertion. In some instances, the magician genuinely influences and manipulates their spectator's thoughts, while in others they simply provide the illusion of thought insertion (Cole, 2020; Pailhès & Kuhn, 2021b). In recent years, scientists have started to systematically investigate the psychological mechanisms that underpin these magic tricks as well as the impact that they have on people's minds (Kuhn, 2019; Kuhn, Amlani, & Rensink, 2008; Pailhès & Kuhn, 2021a; Rensink & Kuhn, 2015). Understanding the cognitive mechanisms by which magicians can manipulate people's thoughts provides new insights into the nature of human cognition (Pailhès & Kuhn, 2021a). Moreover, researchers have started to implement conjuring techniques within their own experimental settings to learn more about the impact that this

form of mind control and thought insertion has (Olson et al., 2016). In these instances, the experimenter/performer relies on secret methods that mimic the appearance of thought insertion, rather than genuine thought insertion. In this chapter, we start by outlining some of the principles magicians use to insert thoughts into the spectator's mind and to covertly influence choices. In the second part, we examine the benefits of using magic to mimic thought insertion in non-clinical populations and discuss results from novel paradigms using magic as a tool to provide the illusion of a thought-inserting machine. In the final section, we explore common conjuring principles that are used to mimic thought insertion and how these could be applied in future research procedures.

### 13.2. Thought Insertion Through Forcing

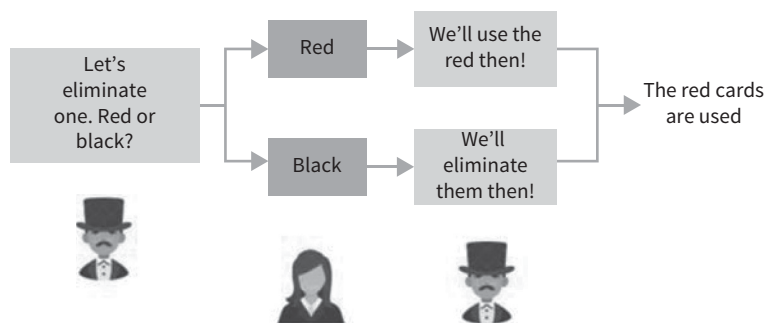
Magicians have developed a wide range of psychological tricks that allow them to manipulate their audiences' experience of the world (Kuhn, 2019). Some of these tricks rely on misdirecting people's perceptual experiences, while others involve manipulating people's thought processes. The latter processes are of particular interest here, as many of them involve inserting thoughts into people's mind. Let us examine a typical magic trick that might involve such thought insertion. The magician asks you to pick a card, and even though you have the experience of a free selection, the magician is able to predict this choice by influencing your decision. This principle, known as *forcing*, refers to any technique that allows conjurers to covertly influence a person's choices, or the outcome of this choice (Pailhès & Kuhn, 2021a; Pailhès, Rensink, & Kuhn, 2020). There are two key components that must be fulfilled for a force to be considered successful. First, the force must influence a person's choice towards a predetermined outcome. In some instances, the magician can guarantee that the spectator will choose a particular item, while in other instances they will simply increase the probability that a particular item is selected. Second, the spectator must be unaware of how their choice has been influenced. Magic relies on people being unaware of the true cause of an effect, and forcing techniques therefore rely on covertly influencing a person's decision, or the impact that their decision has on the outcome.

Let us now examine how forces can result in the insertion of the thought. There are two different ways in which the thought insertion can be operationalized. In the most direct way, the magician will influence the card that will come to your mind, and thus the forcing principle will have a direct impact on your mental representation. The second process involves indirect

manipulations of thoughts. Here you are asked to physically select an item and the magician covertly influences this decision process, which results in the spectator thinking of the predetermined outcome. For example, the magician may ask you to physically select a playing card, and this selected card represents your thought. Unbeknown to the spectator, the physical selection process has either been covertly influenced (e.g., through the physical positioning of the presented items), or the selection does not have a direct impact on the outcome (e.g., using a deck in which all cards are identical). In both instances, the spectator ends up with the erroneous thought that they have selected a random playing card or item. Let us now examine these two forms of thought insertion in turn.

We have recently developed a psychologically based taxonomy of forcing that examines the psychological mechanisms that underpin all forcing techniques. This taxonomy is largely based on one central distinction regarding the target of influence (Pailhès et al., 2020). *Outcome forces* are forces in which the spectator makes a free choice, but the choice does not have an impact on the outcome of the decision. For example, the spectator picks a random card, but the magician secretly switches the card for another card. A large number of forcing principles fall within this category (Cole, 2020; Pailhès & Kuhn, 2020b; Pailhès, Kumari, & Kuhn, 2020) and the end product results in people erroneously believing that they were in control over the item that they chose. Another way of providing such an illusion might be through the use of the Equivoque, also called the magician's choice. In this technique, the magician uses ambiguous language to get the spectator to end with a predetermined outcome (Fig. 13.1). For instance, the magician might want to use red cards and say, 'We will proceed by elimination. Red or black?'. If the spectator says 'red', the magician keeps the red cards, and if the spectator says 'black', the magician does exactly the same thing while saying something like 'alright, let's remove the black!'. Results from scientific experiments show that this technique is very powerful to produce the illusion that the participants have control over the outcome item (Pailhès, Kumari, et al., 2020).

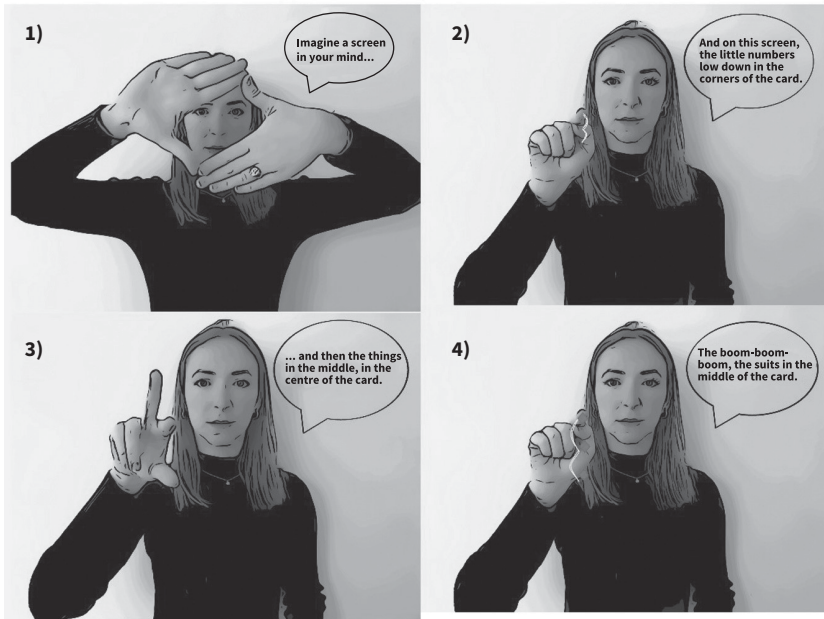
*Decision forces* are forcing principles in which the magicians directly influence your decision. Many of these forces rely on exploiting systematic cognitive biases that allow the magician to predict and influence your decision processes. Although you may feel that you were in control of your decision, many of the choices we make are highly predictable. Some of these decision forces directly involve manipulating thought processes, while others involve manipulating the physical behaviours that are responsible for making the decision.



**Figure 13.1** Example of an Equivoque in which the magician forces the outcome of using red cards by using ambiguous language in his question. Thanks to this procedure, the spectator's choice has no impact on the outcome of the trick, which is predetermined before the performance.

One such principle that we have investigated in the lab is the principle for priming. The idea of using unconscious stimuli to influence people's thoughts and behaviours has long attracted public and scientific interest (DeCoster & Claypool, 2004; Lucas, 2000; Newell & Shanks, 2014; Van den Bussche, Van den Noortgate, & Reynvoet, 2009). This idea has also been applied to magic, in the form of *priming forces—techniques* in which the magician alters the tendency of the spectator to name a target object. Conjurers typically use both verbal and nonverbal primes to influence decisions. For instance, we have investigated the Mental Priming force (Pailhès & Kuhn, 2020a), which relies on subtle hand gestures and key words to prime people to think of the Three of Diamonds. In this force, the magician declares that they will try to mentally transmit the identity of a playing card to the spectator, and then asks them to follow some instructions while imagining different things. For example, the magician gestures a diamond shape while asking participants to imagine a screen in their mind, or quickly draws little '3's in the air while asking them to imagine the numbers on the card (Fig. 13.2). Results showed that 18% of participants choose the Three of Diamonds, compared to a baseline of 2% given 52 cards. Nearly 40% of participants chose threes of any suits. Most importantly, these participants were oblivious to the fact that they were manipulated and reported that the card had simply popped into their mind.

Another popular way of biasing a person's decision is to increase the saliency of target items (i.e., the extent to which they visually stand out from their surroundings), making them more likely to be chosen. These forcing principles are well documented in the magic literature (Annemann, 1933; Banachek, 2002; Jones, 1994) and some have been studied empirically.



**Figure 13.2** Mental Priming Force’s four nonverbal primes to influence participants to think about the Three of Diamonds: 1) primes the diamond’s shape; 2) primes the number three by drawing little ‘3’s with the index finger in the corners of the card; 3) prime three suits/symbols in the centre of the card by pointing three fingers; and 4) prime three suits on the card by pointing three times at the imaginary suits and using the keywords ‘boom-boom-boom’, verbally priming three suits.

Olson et al. (2015) tested a popular force known as the visual saliency force, in which the magician flips through a deck of cards and asks the spectator to visually select one of them. Unbeknown to the spectator, the target card was shown slightly longer than the others, thus becoming more salient. In a live performance, almost all participants (98%) chose the target card while being unaware that their choice had been influenced and feeling completely free in their choice. Again, this provides an effective way of ‘implanting’ a thought into the spectator’s mind.

Some decision forces are based on the use of reverse psychology, misrepresenting the magicians’ true desires to influence the spectator’s choice towards a target card or object. A famous example of this type of force is Dai Vernon’s five card mental force (Banachek, 2002; Hugard, 1974), which consists in choosing five specific cards and pushing the spectator to be suspicious about them so that they end up choosing the ‘least obvious’ card, predetermined by

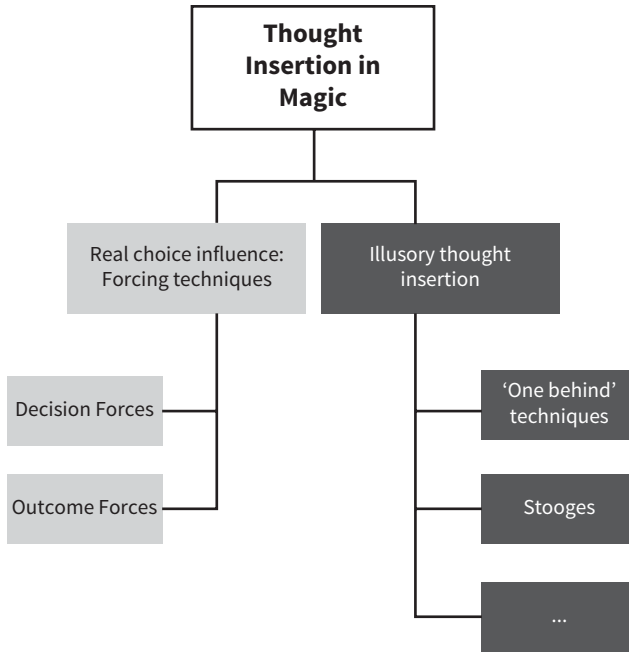
the performer. We have recently investigated this technique and found that reverse psychology plays a significant role in the success of this force (Pailhès & Kuhn, 2023).

Decision forces also often exploit stereotypical behaviour, or population stereotypes (French, 1992; Marks & Kammann, 1980), using the fact that when presented with a specific situation or question, most people choose and answer the same thing. In this case, the magician tries to influence the spectator's choice by presenting a specific set of options among which one is most commonly chosen. For example, if asked to name a number between 1 and 10, people are most likely to name 7 (Banachek, 2002; French, 1992). Although such techniques are not 'inserting thoughts' as such, the magicians can make use of such knowledge to present the different options in such a way that one will be more likely to be the chosen one.

Finally, a common way for magicians to influence the spectators' decision and force a particular item is by restricting the number of options that they can consider. These restrictions can be verbal (e.g., 'don't take number 3, it's too obvious'), perceptual (e.g., making only one card visible), or physical (e.g., pushing a card under the spectator's finger when he/she is reaching out to grab one). Forcing allows magicians to influence people's choices and in doing so provides the opportunity to insert the idea that they have freely chosen a particular item in their mind. In most instances, this form of mind control occurs indirectly, by getting people to physically select an object that represents a thought. It is important to note that many of the forcing principles in which spectators are simply asked to mentally select an object are far from perfect, and even though they can bias a person's decision, the magician does not have full control over their thought. In the next section we will examine how magicians can provide the illusion that they have full control of their audience's thoughts and mimic this ability of inserting thoughts into their audience's mind.

### **13.3. Why Use Magic to Mimic Thought Insertion**

Forcing allows magicians to covertly influence a person's thoughts. A force is only effective if the spectator feels that their decision was free and that they are oblivious to the principles that have been used to influence this decision. There are, however, instances in which magicians want you to believe that they have influenced your thoughts when in reality they had no way of controlling them (Cole, 2021; Pailhès & Kuhn, 2021b). For example, in a card trick the magician might ask you to pick a card after which they reveal how they have



**Figure 13.3** Principles of thought insertion in magic. Some techniques, called forcing (discussed in the first section of the chapter), focus on influencing the spectators' choice or the outcome of this choice. Other techniques simply mimic thought insertion and give the illusion that the performer influenced the spectator's thought process (see third section).

unconsciously influenced choice. In this instance your choice was indeed free, and the magician may use a different method to discover the identity of the playing card and simply pretended to have influenced you to choose it (Fig. 13.3). This form of magic has become very popular in recent years, and the principles are being used to study the psychological impact that such illusions of thought insertion have on an individual's beliefs and experiences.

Psychological research has shown that people often erroneously believe they have full control over their actions and thoughts. For example, studies using hypnosis or Ouija boards reveal that people can have control over their behaviours while feeling they do not (Connors, 2015; Gauchou, Rensink, & Fels, 2012). Conjuring techniques provide a new perspective and experimental tool to examine this discussion—what happens when people think that a machine, or another person, is able to influence their thoughts? Some of these mentalism principles allow us to simulate thought insertion phenomena. Other researchers have attempted to mimic thought insertion with

hypnosis. For example, Walsh and colleagues (Walsh et al., 2015) told people under hypnosis that an engineer would insert thoughts into participants' brains through the use of a brain scanner. The participants were asked to write sentences while the machine ostensibly influenced them; participants often reported that the thoughts seemed to be inserted into their head and their hand wrote them without their apparent control. The benefit of such techniques is that they allow researchers to mimic clinically relevant phenomena in healthy populations, who are often more accessible and avoids some of the ethical issues of studying vulnerable populations. One of the downsides of such techniques is that they only work for highly hypnotizable individuals, which are a minority of the population.

While neuroimaging and brain stimulation methods are on the rise, neuroscientific techniques are attracting the curiosity from both scientists and popular media. Neuroenchantment—the fascination with brain science at the expense of critical thinking abilities—is born, with a tendency to overestimate the present state of skills and knowledge that science holds about the brain (Ali, Lifshitz, & Raz, 2014; Thibault et al., 2018). Olson and colleagues recently investigated whether it was possible to make people believe that a machine was influencing their thoughts and mental choices (Olson et al., 2016). Using a mentalism trick combined with an inactive fMRI machine, the researchers created a novel deceptive paradigm. They told participants that they were taking part in a study to examine how a brain scanner could read thoughts and influence their mind. Although the machine looked and sounded like a functioning scanner, it was completely inactive throughout the experiment. Participants had to lie into the mock scanner and were asked to do two tasks: a *mind-reading* task, and a *mind-influencing* one. For the mind-reading task, participants chose any two-digit number. After this, the machine allegedly analysed their brain recording to infer which number they chose, and the participants could see the technician writing it on a sheet of paper containing the machine's output. Next, participants exited the scanner, and the experimenter, holding the paper with the output, asked them which number they chose. After they responded, he showed the output, revealing that the machine guessed the right number. In the 'mind influencing' task, the protocol was reversed (Fig. 13.4). The researcher told the participants that the machine was programmed to influence their thoughts and insert a specific number into their mind. This time, the experimenter pretended to write down the number the scanner would 'transmit' before the participant was asked to choose it. Then, as before, the subject had to silently choose a two-digit number, while the machine was 'influencing them'. After this, using the same technique, the

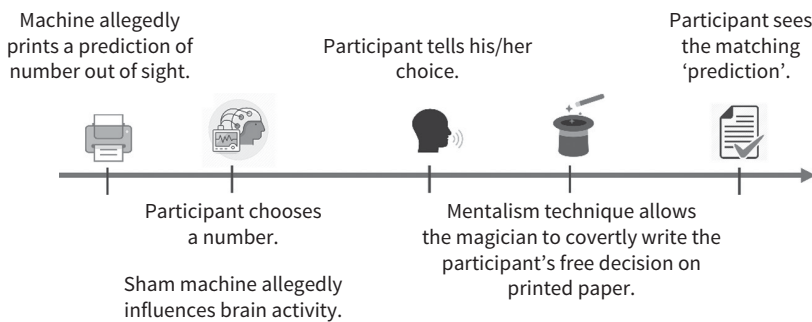


experimenter asked which number the participant chose and showed on his clipboard that it was matching with the machine's predicted number.

After each of these tasks, participants rated how much control they felt over their thoughts and choice of numbers. Participants felt significantly less sense of control over their thoughts when they believed that the machine was influencing their mind than only reading it. These results were replicated in a second experiment, also showing that the majority of subjects felt a range of physical and mental symptoms resulting in the machine's influence. Participants reported feeling things such as numbers 'popping in' their head, voices dragging them from a number to the other, feeling 'some kind of force' or even being stuck on one number.

These studies are the first to have used magic as a way to simulate thought insertion, and both quantitative and qualitative results show that the majority of people were convinced that the machine was controlling their thoughts. This belief resulted in a distorted sense of agency expressed differently among participants, and the study demonstrates the usefulness of magic techniques in scientific experiments. Pilot data from our research programme and using a similar procedure suggest that the alleged proof provided by the magic technique (i.e., showing the matching number) seems to be a significant factor contributing to the observed effects. Here, it seems that the deceiving method allows participants to be more confident in the procedure and enhance their expectations of what the machine is capable of doing to their brain activity.

This type of paradigm, much like the ones using hypnosis (Connors, 2015; Walsh et al., 2014), allows researchers to model symptoms of mental disorders and explore the loss of agency over thoughts with a high level of control in non-clinical populations. Likewise, it opens several possibilities for future



**Figure 13.4** Representation of a mind-influencing task mimicking thought insertion. The magician/experimenter uses a gimmick to covertly write the participant free choice after they have named it.

research. If it is possible to make participants believe that a machine can read and influence thoughts, it might extend to inserting other phenomena such as memories, judgements, or emotions. Adapting established techniques from magic and mentalism performances offers a powerful way to create experimental methods that can simulate thought insertion. The next section will examine different means of achieving these various thought insertions.

### 13.4. How to Mimic Thought Insertion with Magic

Magicians, and especially mentalists, have a great number of techniques that give the illusion that they can control and influence spectators' mental processes. Mentalism is a branch of magic that involves creating illusions of highly developed mental skills or paranormal abilities. In these performances, the performer may appear to make use of things such as precognition, hypnosis, telepathy, or mind control techniques. For example, magicians may give the illusion that they influence a person's thoughts through telepathy or psychological priming. However, several principles can be used to provide such an illusion of thought insertion. Some of them are very simple and risk-free for the performers, while others are a lot more elaborate or do not guarantee a hundred per cent success rate.

#### 13.4.1. 'One behind' choice techniques

The most commonly used techniques to mimic thought insertion rely on either switching a prediction so that it fits the spectator's thought, or by using a special writing gimmick that allows the magician to covertly write the selected item *after* the spectator told what they were (freely) thinking about (Corinda, 1961). These techniques allow magicians to give an illusion of thought insertion despite the spectator being in full control over their choice.

Let us examine the one behind principle in more detail and what it would look like in practice. The magician might perform a trick as follows: The performer states that they will try to mentally insert a thought into the spectator's mind. The performer then selects a card from a deck and inserts it into an envelope which they give to the spectator. The magician then explains that this card represents a prediction about the choice that the spectator is about to make. The spectator is then asked to think of a playing card and the magician falsely claims that they are using their special powers to influence their thought process, after which the spectator names the card. The performer reveals that

the prediction in the envelope matches the card they have just thought about, providing ‘proof’ of their thought insertion powers. In reality, the magician simply switched the card in the envelope for one that matched the prediction, thus providing false proof. There are many other ways in which the prediction can be switched but they all essentially rely on the same principle. Other techniques allow magicians to covertly write a spectator’s free choice after they have said it out loud—this is what was used in the studies described in the previous section (Olson et al., 2016), and the same type of effect can be easily done with any other prediction beyond merely two-digit numbers.

### 13.4.2. Use of stooges

One of the simplest ways of creating illusions of thought insertion is by using confederates, or stooges—magicians’ associates pretending to be spectators. In this case, although the person involved in the performance does not experience the illusion, the rest of the audience does indirectly, and the possibilities are endless. The magician and stooge simply have to agree on specific answers and choices before the show and mimic a performance in which the conjurer successfully inserts a thought in the spectator’s/stooge’s mind. Scientific experiments frequently use this principle: a lot of psychological studies work thanks to the use of confederates (Olson & Raz, 2021). For instance, Asch’s well-known work on social conformity could not have been possible without the use of stooges pretending to give obvious incorrect answers to pressure real participants to do it as well (Asch, 1951). Following this idea, it would therefore be possible for instance to use one or several confederates to mimic thought insertion in front of genuine participants, and then investigate whether this can lead them to experience a loss of agency over their thoughts and choices when they believe it is their turn to experience thought insertion.

## 13.5. Concluding Remarks

Magicians have developed a great number of techniques that either allow them to insert thoughts into their audience’s minds or produce the illusion of thought insertion. Empirical research and new theoretical perspectives on these principles are providing new insights into the ease by which our thought processes can be manipulated. These conjuring techniques also provide novel and powerful tools to mimic thought insertion, and recent psychological

research has already provided promising results. Diverse methods—more or less costly and sophisticated—can be used and easily implemented in experimental research to simulate thought insertion in non-clinical populations. By adapting magicians' techniques to experimental settings, we can answer important questions regarding agency over thoughts, and uncover psychological processes involved in thought insertion phenomenon.

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