

# Virtual patients in the hypnosis laboratory

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For many people, the word 'hypnosis' conjures up images of swinging pocket watches, mysterious magician-like figures, and people clucking like chickens on a stage. Even though hypnosis in research and clinical practice does not involve these sorts of theatrics, it can still be greeted with scepticism or dismissed as mere fakery because of these associations. Nevertheless, a large body of scientific research has shown that hypnotic suggestion is real and very different from mere faking (Kihlstrom, 1985; Nash & Barnier, 2008).

Hypnotised participants often report genuine changes in their subjective experience. For example, specific suggestions to hallucinate, to perform actions involuntarily or to adopt unusual beliefs can cause hypnotised participants to have these experiences. People, however, vary in their responses. Approximately 10–15 per cent of the population respond to most, if not all, suggestions; 70–80 per cent respond to some suggestions but not others; and 10–15 per cent respond to only a few suggestions or none at all (Hilgard, 1965). These differences in responsiveness are, for the most part, unrelated to differences in personality, mental illness or intelligence (Laurence et al., 2008)

"Researchers can use hypnotic suggestions to recreate the symptoms of clinical disorders in willing participants"

A lot of research has focused on understanding hypnosis. Other research has applied hypnosis to investigate other areas of psychology. One of these applications is the study of psychological disorders (Kihlstrom, 1979). Researchers can use hypnotic suggestions to recreate the symptoms of clinical disorders in willing participants. This produces what Oakley and Halligan (2009) have called 'virtual patients' (p.266) – hypnotised participants who serve as temporary models of clinical disorders. These participants and their hypnotic symptoms can then be studied in the laboratory to better understand the clinical disorders themselves. Importantly, the hypnotic effects are completely reversible and have no lasting effects for participants (Kihlstrom, 1979).

The advantage of using hypnosis in this way is that it allows researchers to produce symptoms easily and when required. These symptoms might otherwise be rare or difficult to study for practical reasons. In addition, generating possible causes of the disorder in hypnotised participants and looking at their effect can give researchers a better understanding of psychological processes that might play a role in the clinical disorder (Woody & Szechtman, 2011).

For these reasons, researchers have used hypnotic suggestion to model a wide range of clinical disorders. In this article,

I discuss three examples: conversion disorder, auditory hallucinations and delusions.

## Hysteria and conversion disorder

There is a long history of using hypnosis to investigate what was once known as 'hysteria' and is now known as 'conversion disorder'. Patients with this disorder show physical or sensory symptoms that are typically associated with physical damage to the nervous system. For example, the patients may have a paralysed limb, go into seizures or be unable to see. When examined, however, the patients seem otherwise healthy and there is no sign of any physical cause for the symptoms. It is estimated that up to 4 per cent of patients in neurology clinics have conversion disorder (Akagi & House, 2001).

Over a hundred years ago, famous neurologists, such as Jean-Martin Charcot and Pierre Janet, noticed that hypnotic suggestion could produce symptoms that were very similar to hysteria. Like clinical patients, hypnotised participants could experience paralysis, seizures or blindness in the absence of any physical cause. As a result, Charcot and Janet proposed that hysteria and hypnotic suggestion might involve similar processes.

More recently, researchers have tested these ideas using neuroimaging to reveal the areas of the brain involved in both phenomena. Peter Halligan and colleagues (2000) used hypnotic suggestion to produce left leg paralysis. They found that hypnotic leg paralysis activated very similar areas of the brain as hysterical leg paralysis. Importantly, these areas of the brain differed from the areas activated when participants were asked to malingering or fake their paralysis (Ward et al., 2003). On the basis of these findings, the researchers argued that hypnotic paralysis and hysterical paralysis share a similar basis. In particular, they argued that both involve brain areas and psychological processes responsible for

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the inhibition of voluntary movements.

Other researchers have repeated these studies with arm paralysis instead of leg paralysis, and also found similarities between hypnotic and hysterical paralysis (Cojan et al., 2009; Pyka et al., 2011). Overall, the findings from these studies indicate that by understanding hypnosis we might also be able to understand aspects of hysteria (see Bell et al., 2011).

### Auditory hallucinations

Hypnotic suggestion can also model auditory hallucinations, the experience of hearing voices or sounds when they are not actually present in the environment. Such hallucinations are common in

be very costly to run. Finally, hallucinations are experienced privately and researchers usually only know that patients are hallucinating when the patients indicate this. Some patients have difficulty distinguishing their hallucinations from real sounds and voices, so researchers cannot always rely on patients' verbal reports to know when they are present.

Hypnotic suggestion provides one way of overcoming these three challenges (Woody & Szechtman, 2011). By generating hypnotic hallucinations in healthy participants, researchers avoid problems associated with studying patients with other symptoms, have access to hallucinations when required,

able to examine the brain regions responsible for this misinterpretation. They scanned participants at three times: when they heard a spoken phrase; when they imagined hearing the phrase; and when they experienced a hypnotic hallucination of the phrase.

For many participants, the hypnotic hallucination was very compelling. Indeed, a number of participants said they actually heard the phrase after the suggestion and refused to accept that it could have been a hallucination. By comparing the areas of the brain involved in the hallucination with the areas involved in hearing and imagining sounds, Szechtman and colleagues identified a specific area – the right anterior cingulate – as critically important to the experience of hallucinations. This corresponded very closely to an area of the brain involved in clinical hallucinations (Woody & Szechtman, 2011). Importantly, however, the study provided evidence that this area could be involved in misinterpreting internal speech as external reality.



### Hypnotic suggestion can readily produce unusual beliefs in participants

schizophrenia and a range of other conditions, and they can be challenging to study for three reasons. First, many patients have other symptoms and impairments. This makes it difficult to identify causes that are specific to hallucinations. Second, hallucinations are not present all the time in the patients who experience them and may not occur when the time comes to study them. This can be particularly problematic when using neuroimaging techniques that can

and know precisely when the hallucinations occur. As a result, studying hypnotic hallucinations can provide important insights into clinical hallucinations.

For example, one theory of clinical hallucinations is that patients misinterpret some of their own thinking as an external voice (Bentall, 1990). By using neuroimaging with participants experiencing hypnotic hallucinations, Szechtman and colleagues (1998) were

### Delusions

Finally, hypnotic suggestion can model delusions. Delusions are defined as false beliefs that people hold with unreasonable conviction despite evidence to the contrary. They occur in schizophrenia and a range of other conditions. Like hallucinations, delusions are difficult to study because they often occur in patients with other symptoms and impairments. This makes it hard to identify the specific causes of delusions. In addition, patients with delusions, by definition, believe their delusions, so they may not participate in research or treatment as they do not think anything is wrong with them. Hypnotic suggestion can readily produce unusual beliefs in participants and provides an additional way of studying delusions (Cox & Barnier, 2010).

Given this suitability, researchers have used hypnotic suggestion to model the

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'mirrored-self misidentification delusion', the belief that one's reflection in the mirror is a stranger. This delusion typically occurs in dementia. It is difficult to study because of the decline in brain function associated with dementia. Barnier and colleagues (2008) gave hypnotised participants a suggestion to see a stranger in the mirror. As a result, these participants reported seeing a stranger in the mirror and maintained this belief even when challenged with contradictory evidence (e.g. when the hypnotist asked them to explain why the person in the mirror always copied them). Overall, the participants showed striking similarities to clinical patients (see Barnier et al., 2011).

Importantly, however, hypnotic suggestion also has the capacity to investigate the causes of mirrored-self misidentification delusion. One theory of delusions holds that two separate factors are responsible for a delusion (Coltheart et al., 2011). The first factor explains the content of the delusion. In the case of mirrored-self misidentification, brain damage can cause either a deficit in recognising faces (leading the patient to not recognise their own face in the mirror) or a deficit in understanding mirrors (leading the patient to think that mirrors are windows). As a result of either deficit, a patient may think that there is a stranger in the mirror. An additional, second factor explains why the delusion is maintained. This involves a deficit in belief evaluation, also caused by brain damage, that causes the patient not to reject the implausible belief. Hypnotic suggestion can recreate both these factors without the brain damage and so test this theory.

Accordingly, my colleagues and I attempted to model mirrored-self misidentification delusion from its component factors (Connors, Barnier et al., 2012; Connors, Cox et al., 2012). We gave participants specific suggestions to model the first factor and create either a deficit in face processing or a deficit in mirror use. We used hypnosis itself to

model the second factor and disrupt belief evaluation. We found that these factors successfully recreated mirrored-self misidentification delusion. Like clinical patients, hypnotised participants said they saw a stranger in the mirror and maintained this belief when challenged. These findings are promising because it suggests that researchers could use a similar approach to identify the causes of other clinical delusions.

### Conclusion

These examples illustrate the versatility and usefulness of hypnotic suggestion. It is important to note, however, that hypnotic models are not intended to be a substitute for studying the disorders directly. There are some important differences between hypnotic models and clinical disorders in terms of duration and severity. Instead, hypnotic suggestion provides an additional tool that we can use to model and study clinical disorders. By looking at how this evidence fits with studies using other methodologies, researchers can get a more complete understanding of clinical disorders.

Hypnotic models may also provide a way of developing new treatment methods (Oakley & Halligan, 2009). For example, they allow researchers to try out different treatments without any risks to actual patients. In addition, novice clinicians could learn and practise new skills on hypnotised participants before moving to real patients. Overall, then, rather than being something to be viewed with fear or suspicion, hypnotic suggestion offers the hope of greater understanding of clinical disorders and more effective treatment methods.



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