A laboratory analogue of mirrored-self misidentification delusion: The role of hypnosis, suggestion, and demand characteristics

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ABSTRACT

Mirrored-self misidentification is the delusional belief that one's own reflection in the mirror is a stranger. In two experiments, we tested the ability of hypnotic suggestion to model this condition. In Experiment 1, we compared two suggestions based on either the delusion's surface features (seeing a stranger in the mirror) or underlying processes (impaired face processing). Fifty-two high hypnotisable participants received one of these suggestions either with hypnosis or without in a wake control. In Experiment 2, we examined the extent to which social cues and role-playing could account for participants' behaviour by comparing the responses of 14 hypnotised participants to the suggestion for impaired face processing (reals) with those of 14 nonhypnotised participants instructed to fake their responses (simulators). Overall, results from both experiments confirm that we can use hypnotic suggestion to produce a compelling analogue of mirrored-self misidentification that cannot simply be attributed to social cues or role-playing.

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1. Introduction

Hypnotic suggestions can cause dramatic alterations in participants' subjective experience and behaviour (Kihlstrom, 2007, 2008). These alterations can be used to investigate many aspects of consciousness. One application is in the study of psychopathology. Researchers can use specific suggestions to recreate clinical symptoms in the laboratory, yet do so in a way that has no lasting consequences for participants (Kihlstrom, 1979). According to Oakley and Halligan (2009), this approach creates "virtual patients" (p. 266), temporary analogues of clinical conditions that researchers can study to inform understanding of the conditions themselves. For this reason, hypnosis has been used to model a wide range of clinical disorders (Oakley & Halligan, 2009, 2013; Woody & Szechtman, 2011). In previous research, we applied this approach to study the mirrored-self misidentification delusion, the belief that one's reflection in the mirror is not oneself (Connors, Barnier, Coltheart, Cox, & Langdon, 2012; Connors & Barnier, et al., in press). In the current experiments, we examined how various components of a hypnosis procedure – namely the induction (instructions that define the situation as hypnotic), suggestions (instructions for specific imaginative experiences), and demand characteristics (unintentional cues that invite particular responses) – contribute to the hypnotic analogue.

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1.1. Mirrored-self misidentification

Mirrored-self misidentification commonly occurs in advanced global dementia, though it can also occur before other symptoms of dementia are detectable (see Connors & Coltheart, 2011; Connors, Langdon, & Coltheart, in press). Epidemiological studies have found that 2–10% of patients suffering from Alzheimer's disease misidentify their own reflection in the mirror (see Connors, Langdon, et al., in press). The delusion has also been reported in schizophrenia (Gluckman, 1968) and after right hemispheric stroke (Villarejo et al., 2011). For many patients, the delusion can cause considerable distress. Many patients cover up all mirrors to avoid seeing the stranger and some even throw objects at their reflection (Gluckman, 1968). Other patients remain largely indifferent (Breen, Caine, & Coltheart, 2001) or treat their reflection as a companion (Phillips, Howard, & David, 1996). The delusion can occur despite intact semantic knowledge of mirrors (e.g., being able to define their properties and function; Breen et al., 2001; Villarejo et al., 2011). The delusion can also occur despite an ability to accurately recognise other people's reflections in the mirror (Breen et al., 2001; Spangenberg, Wagner, & Bachman, 1998; Villarejo et al., 2011).

Mirrored-self misidentification is an example of a monothematic delusion, a delusion limited to a single topic. An influential theory of monothematic delusions is the two-factor account proposed by Langdon and Coltheart (2000; see also Coltheart, Langdon, & McKay, 2011). According to this theory, two factors are required for a delusion to form and persist. The first factor (Factor 1) generates the content of the delusion and typically involves a neuropsychological anomaly affecting perceptual, emotional, or autonomic processing. In the case of mirrored-self misidentification delusion, Factor 1 can be either impaired face processing (and hence a difficulty recognising one's own face in the mirror) or mirror agnosia (an inability to use mirror knowledge when interacting with mirrors). Both of these deficits can generate the idea that there is a stranger in the mirror (Coltheart, 2007). Indeed, Breen et al. (2001) reported two patients with mirrored-self misidentification: one with impaired face processing and the other with mirror agnosia. The second factor (Factor 2) explains the maintenance of the delusion and involves a deficit in belief evaluation. The presence of Factor 2 accounts for why some patients with Factor 1 develop a delusion and other patients with Factor 1 do not (for a description of non-delusional patients with Factor 1 deficits, see Connors & Coltheart, 2011; Ellis & Florence, 1990). Thus, patients with both Factor 1 (either impaired face processing or mirror agnosia) and Factor 2 (a deficit in belief evaluation) will develop the delusion.

1.2. Creating a hypnotic analogue

Delusions can be difficult to study. Patients with delusions often have co-occurring symptoms and impairments that may interfere with or confound investigation. Mirrored-self misidentification delusion, for example, usually occurs in dementia and is particularly difficult to study because of the associated cognitive and neurological deterioration. Patients with delusions may also be reluctant to participate in research that could view their strongly held beliefs as pathological. Hypnosis provides a means of creating a laboratory model of delusions on demand and avoiding these challenges (Kihlstrom, 1979; Woody & Szechtman, 2011; for further background on hypnosis, see Barnier & Nash, 2008; Kihlstrom, 2007, 2008). As we have discussed elsewhere (e.g., Connors & Barnier et al., 2012), hypnosis is suited to modelling delusions for two reasons. First, delusions and hypnotic phenomena show many similarities. Both, for example, involve distorted beliefs about reality that are maintained despite counterevidence (Kihlstrom & Hoyt, 1988; Sutcliffe, 1961). Second, the two-factor theory of delusions is a general cognitive model (Coltheart, 2007). According to this view, disruptions at a cognitive level cause the delusion whether or not neurological damage is also present. Hypnosis can disrupt cognitive processes in a top-down manner. This allows researchers to produce an analogue of a delusion and simulate the impact of neurological damage in a way that is temporary and completely reversible (Connors, 2012; Cox & Barnier, 2010; Oakley & Halligan, 2009, 2013).

A successful analogue of a clinical condition, in this case mirrored-self misidentification, needs to meet at least two criteria (Kihlstrom, 1979). First, the analogue needs to demonstrate that it can model the surface features of the condition in question. Most critically in the case of mirrored-self misidentification, the analogue needs to model the core belief that one's reflection is a stranger and the delusion's resistance to challenge. Second, the analogue needs to demonstrate commonality with the condition in terms of underlying mechanisms. It must "move beyond mere 'demonstration' experiments and begin to analyse the underlying psychological processes in detail" (Kihlstrom, 1979, p. 464). A hypnotic analogue of mirrored-self misidentification informed by the two-factor theory thus needs to be able to recreate the delusion from analogues of its Factor 1 and Factor 2 components without using suggestions that are so directive as to specify the overall delusion (see Reyher, 1962).

Some preliminary work we conducted began to address these two criteria. In two experiments, we demonstrated that hypnosis could model the surface features of the delusion (Barnier, Cox, Connors, Langdon, & Coltheart, 2011; Barnier & Cox et al., 2008). In Barnier et al. (2011), we gave 38 high hypnotisable participants a hypnotic induction and a suggestion to see a stranger in the mirror (we refer to this here as a 'Fully-Formed suggestion' because it specified the fully-formed experience of seeing a stranger). In response, 68% of participants reported seeing a stranger in the mirror. We also gave participants a series of challenges to determine the strength of the hypnotic delusion and its similarity to the clinical condition. For example, we asked participants to touch their nose while looking in the mirror and to explain why the person copied them. We found that, for many participants, the delusion was resistant to challenge. Overall, participants displayed features that were strikingly similar to the clinical condition. These findings were limited, however, by the overly prescrip-