



## Suggested visual hallucinations in and out of hypnosis

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### ABSTRACT

We administered suggestions to see a gray-scale pattern as colored and a colored pattern in shades of gray to 30 high suggestible and eight low suggestible students. The suggestions were administered twice, once following the induction of hypnosis and once without an induction. Besides rating the degree of color they saw in the stimuli differently, participants also rated their states of consciousness as normal, relaxed, hypnotized, or deeply hypnotized. Reports of being hypnotized were limited to highly suggestible participants and only after the hypnotic induction had been administered. Reports of altered color perception were also limited to high suggestibles, but were roughly comparable regardless of whether hypnosis had been induced. These data indicate that suggestible individuals do not slip into a hypnotic state when given imaginative suggestions without the induction of hypnosis, but nevertheless report experiencing difficult suggestions for profound perceptual alterations that are phenomenologically similar to what they report in hypnosis.

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The domain of hypnosis consists of two central components (Hilgard, 1973; Kihlstrom, 2008; Kirsch & Lynn, 1995; Oakley, 2008). One component is the hypnotic induction, by means of which a hypothesized altered state of consciousness is induced. The second component involves the administration of suggestions for changes in perception, behavior, and cognition. In responsive individuals, these suggestions produce movements that are experienced as occurring automatically, temporary paralyses, and alterations in perception and cognition. Some of these responses (e.g., automatic movements) are displayed by large numbers of participants in hypnosis studies; others (e.g., hallucinations) are confined to a relatively small minority of participants. Because these suggestions request imaginative experiences, they have been termed *imaginative suggestions* (Brafman & Kirsch, 1999) to distinguish them from other forms of suggestion (e.g., placebo effects or misleading questions).

Although suggested experiences of this sort are most often obtained in the context of hypnosis, a large body of data has demonstrated that they can also be produced by suggestions administered in the normal waking state, without any prior hypnotic induction (reviewed in Kirsch, Mazzoni, & Montgomery, 2007).<sup>1</sup> These studies also show that hypnotic and waking responses to the same suggestions are highly correlated, and the difference between them is relatively small. Furthermore, the ability to respond to suggestions in and out of hypnosis is not limited to self-reported experience, but instead represents an objective skill, as shown by data demonstrating that suggestion can enable suggestible individuals to at least partially overcome the automaticity associated with the Stroop effect (Raz, Kirsch, Pollard, & Nitkin-Kaner, 2006).

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<sup>1</sup> The terms *waking* and *hypnosis* were coined because it was once believed that hypnotic inductions produced a sleep-like state. Although it is now known that hypnotized subjects remain fully awake, the terms have been retained as conventionally used.

Findings of this sort have led some authors to propose that the state of hypnosis is not a necessary precursor for the production of hypnotic responses, but instead enhances the production of suggested experiences to a relatively small degree (Hilgard, 1975), and has led others to reject the notion of a hypnotic state altogether (Lynn, Kirsch, & Hallquist, 2008). Another possibility that has been raised is that the induction of a hypnotic state may be necessary for the production of subjectively convincing hallucinations, but not for less difficult suggestions (Kallio & Revonsuo, 2003). Support for this latter hypothesis is provided in a PET study on the ability to alter color perception by hypnotic suggestion (Kosslyn, Thompson, Costantini-Ferrando, Alpert, & Spiegel, 2000). In that study, suggestions given in hypnosis produced bilateral changes in fusiform activation, but only right hemisphere changes when the suggestions were given out of hypnosis.

Two shortcomings in the Kosslyn et al. (2000) render it less than definitive in answering the question of whether highly suggestible individuals can experience suggested hallucinations outside of hypnosis. First, participants were not asked to report whether they had experienced changes in color perception when suggestions were given outside of hypnosis. As Kihlstrom (2008, p. 36) notes, the failure to find physiologic indicators of a subjective state without first establishing self-reported experiential alterations “puts the cart before the horse.” A more serious problem is that Kosslyn et al. changed the wording of the suggestion when it was administered outside of hypnosis. In the hypnosis condition, participants were asked “to alter their perception of the stimuli” (p. 1281), whereas in the subsequent waking condition they were asked to “remember and visualize” (p. 1281) what the stimulus was like in its other form. The main reason for this change in wording was to avoid the possibility of participants inadvertently slipping into a hypnotic state when the suggestions were given outside of hypnosis. However, this meant that the effect of inducing hypnosis was confounded with the wording of the suggestions. As shown by Rainville and colleagues, hypnotized participants are very sensitive to subtle differences in the wording of suggestions (Rainville, Carrier, Hofbauer, Bushnell, & Duncan, 1999). Hence, as noted by Oakley (2008, p. 377), “this study does not allow any clear conclusion as to the role of the hypnotic state. . . as the cognitive demands were different in the two cases. Specifically, the participants’ task was to hallucinate color changes in the hypnosis condition and to imagine color changes in the no-hypnosis condition.”

The study reported here is part of an ongoing research endeavor aimed at establishing whether people high in hypnotic suggestibility are able to generate subjectively convincing hallucinatory experiences without the induction of hypnosis. The first step in this endeavor was to establish whether participants high in hypnotic suggestibility inadvertently slip into hypnosis when given suggestions for perceptual alterations. In a pilot study limited to highly suggestible individuals (Kirsch et al., 2008), participants were asked to rate the degree to which they felt hypnotized when responding to the color alteration suggestions used in the Kosslyn et al. (2000) study with and without a hypnotic induction. They reported being in hypnosis only when given a formal hypnotic induction; when not given a hypnotic induction, none of the participants reported being in hypnosis, despite having been given the identically worded color alteration suggestion. This indicates that it is possible to disentangle the effects of suggestions for perceptual alterations from the effects of inducing hypnosis, without undue worry that participants might slip into a trance state during the no-hypnosis part of the study.

In the present study, we administered suggestions for alteration in color perception to participants who had been selected for high and low levels of hypnotic suggestibility. The color alteration suggestions were administered twice, once in the normal waking state and once following the induction of hypnosis. As in the pilot study, we also elicited altered state reports to verify that participants had not inadvertently slipped into hypnosis during the no-induction part of the study. Slipping into hypnosis would be indicated if high suggestible participants were to report being hypnotized during the no-hypnosis part of the testing session. The main aim of the study was to assess whether highly suggestible individuals can hallucinate perceptual experiences both in and out of hypnosis when the wording of the suggestion given in the two conditions is exactly the same. We included a sample of low suggestible participants to verify that the ability to respond to the suggestions we used was specific to individuals with high levels of suggestibility.

## 2. Method

### 2.1. Participants

Participants were 30 highly suggestible undergraduate students at the University of Florence (12), University of Hull (9), Higher Institute of Applied Psychology in Lisbon (8), and University of Sussex (1). In addition, eight low suggestible participants at the University of Florence were assessed. British participants were paid for their participation. Participants in Florence and Lisbon participated without compensation. Sessions were conducted by authors of the study, all of whom were on the staff of their respective institutions.

The participants were among several hundred students who had been screened for hypnotic suggestibility. Screening was on the Waterloo-Stanford Group C scale of hypnotic susceptibility (WSGC) (Bowers, 1993) or a modified version of the Carleton University Responsiveness to Suggestion Scale (CURSS) (Corney & Kirsch, 1999; Spanos et al., 1983a). To qualify as highly suggestible, students had to score 9–12 on the WSGC or 5–7 on the CURSS. Low suggestible participants scored between 0 and 1 on the CURSS.

The WSGC is a group adaptation of the Stanford Hypnotic Susceptibility Scale: Form C (SHSS:C) (Weitzenhoffer & Hilgard, 1962), which is widely considered the gold standard in measuring responsiveness to hypnotic suggestion. Bowers (1993) has reported high level of internal consistency and a correlation of .85 between the WSGC and the individually administered

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