



Commentary

Prospects for de-automatization ☆

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ABSTRACT

Research by Raz and his associates has repeatedly found that suggestions for hypnotic agnosia, administered to highly hypnotizable subjects, reduce or even eliminate Stroop interference. The present paper sought unsuccessfully to extend these findings to negative priming in the Stroop task. Nevertheless, the reduction of Stroop interference has broad theoretical implications, both for our understanding of automaticity and for the prospect of de-automatizing cognition in meditation and other altered states of consciousness.

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Hypnosis is a psychological technique that can produce profound alterations in consciousness. After just a few words of suggestion, highly hypnotizable subjects can see things that aren't there, *fail* to see things that *are* there, feel like they are five years old again, and lose control over voluntary motor functions. After the termination of hypnosis, they can execute responses to previously arranged cues without knowing what they are doing, or why. And, if given appropriate suggestions, they can forget everything they did or experienced while hypnotized – until the suggestions are canceled, at which time the relevant memories come flooding back into awareness (see Kihlstrom, 2007, 2008b).

In a series of experiments, Raz and his colleagues have demonstrated that subjects given hypnotic suggestions for agnosia (or maybe alexia) – that the letter strings presented to them look like gibberish – show a reduction or elimination of Stroop interference (Raz, Fan, & Posner, 2005; Raz, Moreno-Iniguez, Martin, & Zhu, 2007; Raz, Shapiro, Fan, & Posner, 2002; Raz et al., 2003). This is true even when the subjects are not hypnotized – provided that the subjects are highly hypnotizable (Raz, Kirsch, Pollard, & Nitkin-Kaner, 2006). The effects are very profound – all the more so because efforts to eliminate Stroop interference with hypnotic suggestions for color-blindness have generally failed to do so (Harvey & Sippelle, 1978; Mallard & Bryant, 2006) – even though suggested color-blindness can have profound effects on both the experience of color and the visual system of the brain (Kosslyn, Thompson, Costantini-Ferrando, Alpert, & Spiegel, 2000). There is something very interesting going on here – too interesting to warrant dismissal of the results because they so far lack independent corroboration.¹

In the present study, Raz and Campbell (2011) once again replicate the reduction in Stroop interference reported in the previous studies: for high hypnotizables, the agnosia suggestion reduced Stroop interference from 118 ms to 16 s – not precisely zero, but still pretty impressive. In addition, they seek to strengthen the available evidence by moving beyond

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¹ Raz cites one paper as a replication by “other researchers” (p. 4) – and indeed, the replication was achieved in a laboratory other than his own, but because he is the first author of the study in question (Raz et al., 2006 (p. 4)), the replication cannot be considered entirely independent. He also cites replications that have succeeded “at the individual – but not group – level” but of course the performance of individual subjects could reflect random variations around a null effect. Still, I want to be clear that I do not doubt Raz's claims. I have had enough trouble replicating other investigators' effects in my own laboratory to know that even widely accepted effects are sometimes difficult to obtain for oneself. The whole thrust of this comment assumes that the effect is independently replicable.

the traditional Stroop paradigm to one involving negative priming. In much the same way that the word “blue” printed in red ordinarily interferes with naming the color in which it is printed, so the word “blue”, printed in red, should interfere with reading the next word in the list, whatever it is, printed in blue. And so it does: response latencies were significantly longer on the negative priming trials compared to control trials. Unfortunately, there was no reduction in negative priming when hypnotizable subjects received the agnosia suggestion – in fact, there was a numerical increase, from an average of 20 ms to 21 ms.

So we are presented with a new puzzle. The same modulatory process that eliminated Stroop interference should have eliminated negative priming as well, but it did not. There may be boring reasons for this outcome, beginning with the observation that Stroop interference was not *entirely* eliminated, and some may have carried over to produce negative priming. More important, perhaps, is the possibility of a floor effect: 20 ms may just not be enough time to allow us to see the suggestion do its work on negative priming. Alternatively, despite the best efforts of the authors their experiment may simply have lacked the power to reveal the effect of suggestion. The negative priming effect, while significant overall, failed to reach statistical significance in the critical cell of the experiment: high hypnotizables with the suggestion absent. It is hard to abolish, or even reduce, a nonsignificant effect.

On the other hand, if the dissociation between Stroop interference (eliminated) and negative priming (intact) is confirmed in an experiment with sufficient power to test the hypothesis, it might be possible to interpret preserved negative priming in terms of implicit perception (Kihlstrom, 1996; Kihlstrom, Barnhardt, & Tataryn, 1992). That is, the negative priming effect may be evidence that the meaning of the “gibberish” was processed anyway, outside of conscious awareness, giving rise to the negative priming. But any substantive interpretation should await future research.

So let us return to the authors' clear and replicated finding of a suggested modulation of Stroop interference. Hypnotic agnosia is relatively unstudied in the literature, but the finding is not entirely unprecedented (for a review, see Kihlstrom (1997)). The Stanford Profile Scales of Hypnotic Susceptibility (Weitzenhoffer & Hilgard, 1967) contain a suggestion to forget the meaning of the word “house”, and another to forget how to use scissors. Evans found that suggestions that the digit “6” would disappear from subjects' number systems had interesting effects on the performance of simple arithmetic calculations (Evans, 1972). Spanos and his colleagues found that hypnotic suggestions that subjects would be unable to think of certain words eliminated semantic priming (Spanos, Radtke, & Dubreuil, 1982). But mostly, these interesting effects have not been pursued by investigators with specific interests in language and number processing. Perhaps now is the time.

Researchers who want to pursue these kinds of effects may be misled by the terminology used by Raz and Campbell to characterize the subjects who display them. They are not simply “highly suggestible individuals”, as opposed to “less suggestible individuals”. They are *highly hypnotizable* individuals, identified through performance-based scales specifically designed to measure responsiveness to hypnotic suggestions. The distinction is important, because suggestibility is not a monolithic construct (Kihlstrom, 2008b). There is primary ideomotor suggestibility, involving direct verbal suggestions for bodily movements (and two forms of primary suggestibility, involving direct and challenge suggestions), and secondary suggestibility, involving indirect, nonverbal suggestions for sensory-perceptual experiences. There is tertiary suggestibility, covering various social influence effects such as persuasion in attitude change. There are variants on the placebo effect, and there is interrogative suggestibility. What is measured by the standardized scales of hypnotizability is related to ideomotor suggestibility, but goes beyond to involve suggestions for alterations in perception, memory, and cognition (positive and negative hallucinations, analgesia, and amnesia). Subjects capable of experiencing suggested agnosia are more likely to be identified through the rigorous sort of hypnotizability assessment practiced by Raz and Campbell, than by testing that relies on a less formal, and more undifferentiated, concept of “suggestibility”.

Why should we bother? Because phenomena like the modulation of the Stroop effect have implications for broader theories of consciousness and cognition. Although there are continuing controversies at the margins (Kihlstrom, 2008a; Moors & DeHouwer, 2006), the distinction between automatic and controlled processes is widely accepted within cognitive psychology, and there is further consensus that truly automatic processes are unconscious in the strict sense of being unavailable to conscious awareness. Stroop interference is the classic example of automatic processing. If hypnotic suggestion can modulate Stroop interference, then maybe Stroop interference is a bad example after all – or, just maybe, we should rethink the automatic–controlled distinction entirely.

There is another reason to be interested in this effect, and it is no less revolutionary. Whether an automatic process is innate or acquired through learning and proceduralization, the (mostly unexpressed) assumption has been that you cannot unring the bell: automatization, once achieved, is permanent. At the same time, one of the central psychological concepts in certain meditative traditions, such as Zen and Yoga, is *de-automatization* – the idea that, through disciplined meditation, we can break the bonds of received categories and other habitual modes of thought, so that we can see ourselves and the world in new ways (e.g., Deikman, 1966; Rosch, 2002, 2007, 2008). Until recently, discussions of de-automatization have been fairly impressionistic, but now we have in hand a technical concept of automaticity that can be used to study the effects of meditation on cognition and consciousness. There actually is some evidence that meditation reduces Stroop interference, and has some other effects that smack of de-automatization (Alexander, Langer, Newman, Changler, et al., 1989; Wenk-Sor-maz, 2005). Hypnosis is not the same as meditation, but the reduction in Stroop interference repeatedly obtained by Raz and his associates show that de-automatization is possible. If nothing else, that should spur investigators to take another, rigorous look at the cognitive effects of various forms of meditation.

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