

# Posthypnotic Suggestion: Attention, Awareness, and Automaticity

Amanda J. Barnier, Ph.D.

Hypnosis is not only intrinsically interesting, but also research into hypnosis can shed light on issues across the psychological domain. This article explores ways in which hypnotic phenomena, in particular posthypnotic suggestion, can provide approaches to and understanding of complex issues in cognitive psychology. For instance, when subjects respond to a posthypnotic suggestion, they are presented with a stimulus that they appear to be attending to and which influences their behaviour, yet they lack phenomenal awareness of it. This discontinuity between attention and consciousness suggests that the assumed mapping of attentive processing and awareness is problematic. Relatedly, the finding that posthypnotic suggestion is not automatic in the technical sense used by cognitive psychologists, despite the fact that subjects often describe their experiences as such, underscores that the processes of response initiation, awareness, and experience interact in complex and sometimes illusory ways. Overall, posthypnotic suggestion, and hypnotic phenomena in general, offer valuable paradigms for exploring important issues in psychology. (Sleep and Hypnosis 1999;1:57-63)

**Key words:** posthypnotic suggestion, attention, awareness, automaticity

## INTRODUCTION

Nearly fifty years ago, the well-known Australian psychologist Gordon Hammer (1) argued that although psychologists generally do not need to justify their interest in exploring a particular phenomenon and that any topic is as worthy of attention as any other, the study of hypnosis is often not considered in the same generous spirit. Indeed, Clark Hull once said that those who investigate hypnosis must have “the courage to brave the semi-superstitious fears of the general public and the uneasy suspicions of their ‘orthodox scientific brethren’” (quoted in Hammer, 1961, p. 9). Despite fifty years of empirical research on hypnosis (2,3), these comments remain valid and many researchers remain unaware of the intrinsic interest and instrumental value of hypnosis across the spectrum of psychological (and indeed psychiatric and

medical) inquiry.

Hypnosis is intrinsically interesting. Moreover, hypnosis research can shed light on psychological issues in general. William James (4) strongly believed this to be the case, and experiments on posthypnotic suggestion by his contemporaries such as Myers and Gurney (see Gauld, 5), influenced James’ notions of the stream of consciousness, secondary consciousness, and dissociative mechanisms. For instance, James (4) wrote that under some circumstances “the total possible consciousness may be split into parts which coexist but mutually ignore each other, and share the objects of knowledge between them” (p. 206). There is also a strong empirical tradition of using hypnosis as a laboratory model for the investigation of phenomena outside the area of hypnosis. Clear examples of this can be seen throughout the past five decades in Naruse’s work on mental imagery and hallucinations, Reyher’s work on pathological symptom formation, and Kihlstrom’s work on posthypnotic amnesia, functional amnesia, and dissociative disorders (6-14).

In this article, I argue that hypnotic phenomena offer researchers useful paradigms to examine the operation and interaction of basic psychological processes that are generally considered to lie outside the area of hypnosis. In particular, I focus on posthypnotic suggestion and consider the degree to which research on this phenomenon highlights issues and processes that are of current concern to cognitive psychology.

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From the School of Psychology, University of New South Wales, Sydney, Australia.

Address reprint requests to: Dr. Amanda J. Barnier, School of Psychology University of New South Wales Sydney, NSW 2052 Australia.  
email: A.Barnier@unsw.edu.au

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### *Testing the Relationship Between Attention and Awareness*

It is generally accepted that the environment offers to us an almost unlimited array of stimuli, but because we have only limited cognitive or mental resources we must allocate these resources to particular stimuli in the most efficient way. As Pashler (15) argued “conscious perception is always selective. Everyone seems to agree that, at any given moment, their awareness encompasses only a tiny proportion of the stimuli impinging on their sensory systems.” (p. 2). One method of allocation is via attention, or more specifically, “selective attention”. This concept refers to the process (or set of processes) that determines which of the many competing stimuli we choose to focus on, and which subsequently get to consciousness and further processing.

Typically, attentive processing is considered to be the “gateway to consciousness”; in other words, attention is assumed to map very closely onto consciousness, when consciousness is defined as “the process, mechanism, state (or whatever) that establishes when and what an honest human would claim to be conscious of, both concurrently or retrospectively” (16; p. 433; see also 17; an alternative but conceptually similar definition is Dennett’s [18] aware1). Thus, in general if an individual is attending to some stimulus, then they should be able to report their experience of it. However, Shiffrin (19) highlighted a number of instances in which the relationship between attention and consciousness is more complex, and he argued that researchers should test this relationship not with clear cases, but with ambiguous ones. By this he meant that situations in which there is discrepancy between the level of attention and the level of consciousness are much better tests of the relationship than situations in which there is both a high level of attention and a high level of consciousness. From this perspective, hypnosis is an ambiguous case. During hypnosis, individuals are presented with stimuli that they appear to be attending to and that influence their responses (in Dennett’s [18] aware2 sense), yet they demonstrate no phenomenal awareness of the stimuli. Note, however, these stimuli are not subliminal or masked in any way; the individual simply appears (or at least reports) to be unaware of them.

A good example of this discontinuity between attention and subjective awareness can be seen in research on hypnotic blindness (20,21), which involves a suggestion to the hypnotised individual that they will be unable to see stimuli presented to them. In one experiment, during hypnosis, Bryant and McConkey (20) gave high hypnotisable individuals a suggestion for hypnotic blindness and visually presented them with uncommon homophones (labelled the “unseen” words; an example of an uncommon homophone is “stake”, which is less common in the English language than “steak”). They also presented participants with additional uncommon homophones either before or after the hypnotic blindness item (labelled the “seen” words). Following hypnosis, Bryant and McConkey asked subjects to recall the words that they had seen during hypnosis and they also asked subjects to spell the seen, unseen, and some new homophones. Bryant and McConkey found that although

participants reported fewer unseen than seen words on the recall test, there was no difference in the number of unseen and seen homophones that they spelt the uncommon way. This indicated that participants’ spelling was influenced by the words that they were shown during hypnotic blindness, despite claiming (and appearing to be subjectively convinced) that they had seen nothing.

The flip side to the conjoining of attentive processing and consciousness, is the assumption of a similarly close link between automatic processing and unconsciousness (or the failure to reach consciousness). During the 1970s and within the context of a debate on definitions of attention, mental effort, and limited resources (22), there was increased interest in the concept of “automatic” processes (as opposed to “strategic”, “controlled” or “effortful” processes; 23-27). Various researchers argued that some processes or tasks require little or no cognitive resources either because they are innately automatic or because they have become automatic through extensive practice. From this perspective, automatic processes require no cognitive resources and no attentional effort, and they are typically considered to be unavailable to conscious awareness. Although recently, some commentators have argued that automaticity is more usefully conceptualised as a dimension rather than as a discrete category, attentive processing is still largely identified with consciousness, and automatic processing identified with the failure to reach consciousness (19).

Hypnotic phenomena, in particular, demonstrate that these mappings between the dichotomies of attentive/automatic processing and consciousness / unconsciousness are inadequate; rather, their relationship seems far more complex (see also 19). Posthypnotic amnesia is another good example of this. Posthypnotic amnesia involves a suggestion to the hypnotised individual that they will be unable to recall, upon termination of hypnosis, events experienced during hypnosis or material encoded during hypnosis. This deficit in recall is reversed, however, following the administration of a prearranged cue from the hypnotist, after which the “forgotten” material returns to awareness. Notably, whereas conscious, explicit retrieval of this information is disrupted during posthypnotic amnesia, it continues to influence ongoing behaviour (as indexed by implicit measures; 6,7).

I turn now to discuss research on posthypnotic suggestion and its relevance to the issues of attention, awareness, and automaticity. My intent is to highlight the ways in which posthypnotic responding raises questions about and suggests possible methods of exploring the operation and interaction of these processes.

### *Posthypnotic Suggestion as Responding without Awareness*

Posthypnotic suggestion is an excellent example of the processing of stimuli in the absence of subjective awareness. Indeed, Kihlstrom (28) suggested that posthypnotic behaviour is “a prime example of nonconscious mental processes at work” (see also 29). Typically, a posthypnotic suggestion is given during hypnosis and asks the individual to show a particular behaviour or to have a particular experience in response to

a specific cue following hypnosis. In the empirical and clinical literature, posthypnotic suggestions range from very simple, behavioural suggestions (e.g., touching the forehead, or scratching the nose) to very complex cognitive, perceptual, or experiential responses (e.g., visual hallucinations, mood alterations). As an example of “unconscious” responding, posthypnotic suggestion is of special interest because the individual is no longer hypnotised. For all intents and purposes, everything is back to normal; yet, subjects still demonstrate a lack of awareness for their behaviour. This aspect of posthypnotic responding has long been recognised as one of its defining features (28,29). For instance, Bernheim (30) described a typical response to a posthypnotic suggestion in the following way:

The patient hears what I tell him in his sleep, but no memory of what I said remains. He no longer knows that I spoke to him. The idea suggested arises in his mind when he wakes, but he has forgotten its origin, and believes it is spontaneous (p. 31).

Linked with the idea that posthypnotic responding occurs outside of awareness, is the notion that it is also involuntary or at least experienced as such (28,29,31). Thus, posthypnotic suggestion meets the criteria for Weitzenhoffer’s (31) “classic suggestion effect”, which is “the transformation of the ideational content of a communication into behavior that is experienced as involuntary” (p. 259).

On the basis of these reported features, some theoretical and clinical accounts have characterised posthypnotic responding as “automatic”; certainly, subjects often describe their responding in this way. But one question is whether posthypnotic responding (or indeed hypnotic responding, in general) is “automatic” in the technical sense of the definitions used by cognitive psychologists (23-27).

### *Is Posthypnotic Responding “Automatic”?*

Cognitive processes are considered technically automatic if: (1) they do not impose capacity demands, (2) they do not interfere with other ongoing processes, (3) they run off to completion without interruption, and (4) they are outside of awareness. Such processes are either innate or automatised through extensive practice. In contrast, controlled (or strategic or effortful) processes are constrained by available attentional resources, interfere with other processes, are intentional, effortful, and available to consciousness (23-27).

A number of experiments have generated data relevant to the automaticity of posthypnotic responding (32-35). However, these experiments were not explicitly designed to test this issue, but rather were conducted in the context of a comparison between traditional dissociation theory, which predicts non-interference between simultaneously executed tasks (28,36), and Hilgard’s (37) neodissociation theory, which predicts “discontinuity despite interaction”. Thus, these experiments were designed to test whether simultaneously executed tasks interfere with one another when one of those tasks is outside of awareness.

In general, these experiments used a dual task interference paradigm. In this paradigm, subjects’

performance is compared on a “conscious” and an “unconscious” task executed either singly or simultaneously. The conscious task is operationalised as a task given during the waking state; and the unconscious task is operationalised as a task given as a posthypnotic suggestion. Knox, Crutchfield, and Hilgard (34) asked high hypnotisable subjects to perform a conscious or unconscious key-pressing task either alone or with a colour-naming task, Stevenson (35), in an application of Orne’s (38) real-simulating paradigm, asked reals and simulators to perform a conscious or unconscious arithmetic task either alone or with a colour-naming task, and Hoyt and Kihlstrom (33; see also 32) asked high hypnotisable individuals to perform a conscious or unconscious key-pressing task either singly or simultaneously.

The general findings of these dual task experiments can be summarised as follows: when the level of errors on a single, conscious task is used as a baseline, errors increase when (1) performance of a conscious task is attempted simultaneously with a second conscious task, (2) performance of an unconscious task is attempted alone, and (3) performance of an unconscious task is attempted simultaneously with a second conscious task. Thus, these findings indicate that posthypnotic responding is not automatic in the technical sense. Rather, posthypnotic information processing is indistinguishable from waking information processing, with the exception that it is performed without apparent awareness. Specifically, the information processing cost of a posthypnotic task is equal to that of a waking task, with the additional processing cost of maintaining amnesia (i.e., keeping the posthypnotic task outside of awareness). The important fact is that posthypnotic responding (and response to other hypnotic suggestions), although often experienced by the individual and appearing to an observer as automatic, does not meet the technical criteria for automaticity. Thus, this experience of automaticity is in this sense an illusory one.

This does not mean, however, that hypnotised subjects are lying when they say that their responses feel automatic or involuntary. Indeed, research suggests that they are reporting truthfully the experiences that they believe themselves to be having. For instance, Kinnunen, Zamansky, and Block (39) used physiological methods such as electrodermal skin conductance to test the nature of subjects’ reports, and concluded that “highly hypnotisable subjects do not, for the most part, give deceptive reports of their experiences of hypnotic suggestions ... their experiences are perceived as genuine and nonvolitional and not as the result of apparent intent or effort” (p. 190).

Hypnosis theorists have interpreted these findings in various ways. Some have considered hypnotic and posthypnotic responses to be truly involuntary (40,41). Others have considered these responses to be voluntary, but experienced or described as involuntary for particular cognitive or social-psychological reasons (42-45). This diversity of views underscores the need to focus more closely on posthypnotic responding and subjects’ reported experiences of automaticity or involuntariness. By doing so, the interesting questions that posthypnotic suggestion

raises about the relationship between attention and awareness both inside and outside of hypnosis are highlighted. Accordingly, I turn now to review some experimental findings on posthypnotic suggestion.

### *Attention and Awareness in Posthypnotic Suggestion*

It is generally believed that if an individual is attending to some stimulus, then they should be able to report their experience of it (19). Relatedly, Lynn et al. (44) suggested that the more cognitive effort that is expended in a task, then the less likely it is that the task will be experienced as nonvolitional. I have argued that posthypnotic responding is a phenomenon that disproves this case; that is, despite attention and cognitive effort being directed at a stimuli (i.e., the posthypnotic cue), the individual's response to it is still experienced as involuntary. However, Sheehan and Orne (29) argued that the nature of the posthypnotic task would influence the experience of nonvolition, with only the more unusual acts disrupting the stream of consciousness. Thus, very simple tasks will not disrupt this stream and will be experienced as involuntary, whereas more complex, unusual, or demanding tasks will disrupt the stream of consciousness and will be experienced as effortful. In these latter instances, attention and awareness should be strongly associated.

Experimental investigations of posthypnotic suggestion have typically focused on very simple responses (46,47). For instance, individuals have been given posthypnotic suggestions to scratch their nose or cough out loud in response to a cue. Further, the test of these suggestions has been formalised and unambiguous, in the sense that subjects are in little doubt that they should respond at that moment. Under these conditions, posthypnotic responding may actually be experienced as involuntary because the requested behaviours are so simple, automatised, and akin to everyday gestures and behaviours of which we are usually unaware. In these circumstances, posthypnotic suggestion might not provide a very good test of the relationship between attention and awareness because it does not impose many attentional or cognitive demands on the individual. Of more interest is whether individuals would continue to respond, and more importantly, experience their responses as automatic or involuntary when the configuration of the posthypnotic suggestion or test was changed in ways that made the task more effortful or demanding.

We investigated this issue across a series of experiments that manipulated the nature of the posthypnotic suggestion and test (48-54). In terms of the nature of the suggestion, for instance, in two experiments (48) we examined response to a suggestion that asked for either a simple, motor response or a simple, verbal response, and with either a behavioural or an experiential focus. In another experiment (52) we examined response to a suggestion that asked for either a simple or complex behaviour; and in a fourth experiment (49), we examined response to a suggestion that either did or did not include a specific cancellation for the response. In terms of the nature of the posthypnotic test, in a number of experiments, we indexed

response to the suggestion across a series of different tests (48-50,53,54). For instance, Barnier and McConkey (49), included a formal test immediately after the deinduction procedure, an embedded test that included the response cue within an inquiry question, an informal test that was given after the hypnotist had appeared to terminate the session, and a postexperimental test during a postexperimental inquiry with an independent experimenter. We expected that as the configuration of the suggestion and test was altered in a way that required more effort for the subject to interpret the intent of the hypnotist's communications, then subjects' behavioural response would decline and they would be less likely to describe their experience as automatic.

As expected, an analysis of the behaviour of high hypnotisable subjects in the different conditions across these experiments indicated that the response rate declined dramatically when the posthypnotic suggestion or test was manipulated in a way that presumably required the individual to expend effort in deciding whether or how to respond. In other words, subjects did not necessarily respond under every circumstance. In the simplest case, when subjects were presented with a posthypnotic suggestion that required a simple motor or verbal response and were tested on a single or initial formalised test, the average response rate was 88%. However, when the suggestion was manipulated in a number of ways (e.g., the requested response was more complex, the suggestion focused on experience rather than behaviour, and/or additional information was included in the suggestion to guide responding), the average response rate fell to 64%. When the posthypnotic test was manipulated in a number of ways (e.g., multiple tests, ambiguous tests, tests outside of the experimental setting), the average response rate fell to 52%. Finally, when both the suggestion and the test were manipulated in the one experimental condition, the average response rate fell to 40%.

Another way of looking at these results is from the perspective of "attentional set". This concept refers to the fact that individuals who have advance information about a stimulus can perceive that stimulus more effectively (for a review, see 15). In other words, they are able to "set" their perceptual system to process certain stimuli or to carry out certain discriminations more effectively than would otherwise be possible. So, for example, an observer might be able to recognise a scene of complex objects such as beds and wardrobes more quickly if they know in advance that it will be a bedroom rather than a street scene. Research on attentional set suggests that the benefits of developing such a set will increase depending on the match between the cue that is expected (target) and the cue that is given, as well as on the presence of confusing, irrelevant (nontarget) cues. From this perspective, the success of a posthypnotic suggestion should depend upon the match between the cue that subjects expect to receive in order to initiate their response and the communications of the hypnotist following the suggestion. Response success should also be

influenced by the presence of information that makes the posthypnotic cue difficult to discriminate. Thus, if the match between the expected cue and the hypnotist's communications in the posthypnotic period is very good, and there is little competing or confusing information, then processing of the response cue should be fast, efficient, and experientially automatic. If, however, the match is poor and/or there is a great deal of competing or ambiguous information, then processing should be slow, inefficient, and experientially nonautomatic. To concretise this, if the posthypnotic cue to respond is the phrase "Well, what did you think of that?", we would expect a faster, more efficient, and more experientially automatic response if the first thing that the hypnotist says after the deinduction is "Well, what did you think of that?", rather than a long question within which the cue phrase is embedded (49). Such a mechanism may better explain the dramatic decline in responding seen in our experiments as the nature of the suggestion and test were manipulated (48-53). Further, it highlights the value of considering explanations drawn from outside the area of hypnosis.

Turning now to subjects' reports of their experience, an analysis of their comments and ratings across the experiments indicated that a compelling experience was associated with successful responding regardless of the degree of effort required to interpret and respond to the suggestion. Specifically, there was a clear correspondence between the manner of responding and ratings on various dimensions of subjective experience. Across the experiments, for example, those who responded completely generally gave higher ratings of compulsion than those who responded incompletely, who in turn typically gave higher ratings than those who made no response (48,52). In addition, even subjects who were faced with conflicting information about how to respond and who reported that they actively decided whether to respond, gave similar ratings of compulsion and involuntariness and described their experience in similar terms to those who were not faced with conflict (54). That is, a compelling experience was associated with successful responding regardless of apparent attentional or cognitive effort.

This finding is in contrast to Lynn et al. (44) argument that the greater the amount of cognitive effort needed to carry out a task, the less likely it is that the behaviour will be experienced as compulsive and involuntary. Rather, these data suggest that, even in the face of information that subjects must process or conflict that they must resolve, some high hypnotisable subjects describe their responding in ways that do not appear to involve any active recognition of their own involvement, as it were, in the processing of the information; rather, they report a relative lack of awareness and an experience of effortlessness. Thus, the discontinuity between attention and awareness is maintained even under circumstances that appear to be

cognitively demanding. What is less clear, is how to distinguish between posthypnotic suggestions that are associated with high levels of awareness and posthypnotic suggestions that are associated with low levels of awareness. Or to use Gordon Hammer's (1) terminology, those that are experienced as compulsions or "impulses like foreign bodies" and those that are "woven into the waking life and experienced as ego-syntonic". One possible way is to look to experimental paradigms, concepts, and findings (such as attentional set) from outside the area of hypnosis, in the same way that researchers from other areas of psychology would benefit from an understanding of the paradigms, concepts, and findings from inside the area of hypnosis.

## CONCLUSION

Just like other hypnotic responses, posthypnotic responding is not automatic according to the technical definitions used by cognitive psychologists (23-27). It consumes attentional resources, it interferes with other processes, it is effortful, and it is intentional; yet it remains unavailable to phenomenal. Although this lack of awareness is often considered the most salient feature of posthypnotic responding, it is important to highlight another very significant feature; that is, response to a posthypnotic suggestion is intentional and strategic. Here lies the essential paradox in posthypnotic responding (and indeed hypnotic responding in general). Our research findings demonstrate that some hypnotised individuals are very active in working out the demands in the setting, in resolving conflict in the communications they receive, and in responding in the appropriate way. However, irrespective of the level of those demands, many high hypnotisable subjects still make an attribution about their responding that highlights effortlessness and involuntariness. This lack of recognition of their self-involvement in the experience that they are having is an enduring aspect of hypnosis that remains fascinating. Equally, it is very relevant to an understanding of the complex relationship between attention and awareness.

Across the history of psychology, the processes of attention and awareness have been a fundamental concern for many theorists and researchers. Shiffrin (19) argued that cases in which the relationship between these concepts is clear and uncontroversial are far less interesting and important to our understanding than "the ambiguous cases that abound in our cognitive systems" (p. 49). Hypnosis and posthypnotic suggestion is just such a case. As such, it offers an opportunity for researchers outside the area of hypnosis to explore these issues in new and meaningful ways. Thus, it is my hope that our 'orthodox scientific brethren' will look again at hypnosis and hypnotic phenomena and recognise both its intrinsic interest and its instrumental value.

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