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Bypassing the Will: Toward Demystifying the Nonconscious Control of Social Behavior

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Paris, 1986: Doctor Lhermitte accompanies two patients of his to various locations around the city. Both of them had suffered a stroke, which had damaged portions of their prefrontal cortex, areas critical for the planning and control of action. First, in his office, the woman gives Dr. Lhermitte a physical exam using the available equipment and utensils. Later, after they spend a half hour in the professor's apartment, he escorts the two of them out to the balcony, casually mentions the word *museum*, and leads them back inside. Their behavior becomes suddenly different: they scrutinize with great interest the paintings and posters on the wall, as well as the common objects on the tables, as if each was an actual work of art. Next, the man enters the bedroom, sees the bed, undresses, and gets into it. Soon he is asleep. Across these and several other situations, neither patient is able to notice or remark on anything unusual or strange about their behavior.

New York, 1996: University students take part in an experiment on the effects of behavior-concept priming. As part of an ostensible language test, participants are presented with many words. For some participants, words synonymous with rudeness are included in this test; for others, words synonymous with politeness are included instead. After finishing this language test, all participants are sent down the hall, where they encounter a staged situation in which it is possible to act either rudely or politely. Although participants show no awareness of the possible influence of the language test, their subsequent behavior in the staged situation is a function of the type of words presented in that test.

People are often unaware of the reasons and causes of their own behavior. In fact, recent experimental evidence points to a deep and fundamental dissociation between conscious awareness and the mental processes responsible for one's behavior; many of the wellsprings of behavior appear to be opaque to conscious access. That research has proceeded somewhat independently in social psychology (e.g., Dijksterhuis & Bargh, 2001; Wilson, 2002), cognitive psychology (e.g., Knuf, Aschersleber, & Prinz, 2001; Prinz, 1997), and neuropsychology (e.g., Frith, Blakemore, & Wolpert, 2000; Jeannerod, 1999), but all three lines of research have reached the same general conclusions despite the quite different methodologies and guiding theoretical perspectives employed.

This consensus has emerged in part because of the remarkable resemblance between the behavior of patients with some forms of frontal lobe damage and (normal) participants in contemporary priming studies in social psychology. In both cases, the individual's behavior is being "controlled" by external stimuli, not by his or her own consciously accessible intentions or acts of will. Both sets of evidence demonstrate that action tendencies can be activated and triggered independently and in the absence of the individual's conscious choice or awareness of those causal triggers. In the examples that opened this chapter, for Lhermitte's (1986) patients as well as our undergraduate experimental participants (Bargh, Chen, & Burrows, 1996), individuals were not aware of the actual causes of their behavior.

In this chapter, I compare and contrast lines of research relevant to the nonconscious control of individual social behavior—that is, behavior induced to occur by environmental factors and not by the individual's conscious awareness and intentions. Such factors include, but are not limited to, the presence, features, and behavior of another person or persons (such as interaction partners). These are the environmental triggers of the behavior, which then occurs without the necessity of the individual forming a conscious intention to behave that way, or even knowing, while acting, what the true purpose of the behavior is (see Bargh & Chartrand, 1999). My main purpose is to help demystify these phenomena by showing how several very different lines of research are all converging on the same conclusions regarding the degree of conscious access to the operation and control of one's own higher mental processes. Another purpose is to demystify the seeming power over psychological and behavioral processes wielded by some simple words—namely those that are synonymous with behavioral and motivational concepts such as *rude* and *achieve.*

These lines of relevant research come from social psychology as well as cognitive neuroscience, cognitive psychology, developmental psychology, and the study of hypnosis. Yet they converge on the same story: that, at best, we have imperfect conscious access to the basic brain/mind processes that help govern our own behavior, broadly defined (i.e., from the motoric to the social and motivational levels). This harmony between the growing evidence of nonconscious influences on social behavior and higher mental processes (e.g., Bargh & Ferguson, 2000; Wilson, 2002) on the one hand, and the neuropsychological evidence from both imaging and patient research concerning executive functioning, working memory, and the control of action on the other (e.g., Baddeley, 2001; Fourneret & Jeannerod, 1998; Frith et al., 2000), is reciprocally strengthening of the conclusions of both lines of research.

Of course, there are key important differences between these two areas of research as well. For example, the fact that our undergraduate experimental participants could be induced by subtle priming manipulations to behave in one way or another does not mean they largely lack the ability to act autonomously, as Lhermitte's patients did. The damage to those patients' prefrontal cortices greatly reduced their ability to behave in any way except those afforded through external, perceptual means. Yet the priming and the patient studies do complement and support each other in demonstrating the same two principles: that an individual's behavior can be directly caused by the current environment, without the necessity of an act of conscious choice or will; and that this behavior can and will unfold without the person being aware of its external determinant.

Social Psychology's Magical Mystery Tour

Two streams of research in social psychology have converged on the idea that complex social behavior tendencies can be triggered and enacted nonconsciously. One line of research focuses on ideomotor action or the perception-behavior link—the finding that mental content activated in the course of perceiving one's social environment automatically creates behavioral tendencies (Prinz, 1997). Thus, for example, one tends to mimic, without realizing it, the posture and physical gestures of one's interaction partners (Chartrand & Bargh, 1999).

This "chameleon effect" has been found to extend even to the automatic activation of abstract, schematic representations of people and groups (such as social stereotypes) in the course of social perception (see Dijksterhuis & Bargh, 2001). For example, subtly activating (priming) the professor stereotype in a prior context causes people to score higher on a knowledge quiz, and priming the elderly stereotype makes college students not only walk more slowly but have poorer incidental memory as well (both effects consistent with the content of that stereotype). Similarly, activating the African American stereotype (which includes the trait of hostility) through subliminal presentation of faces of young Black men causes young White participants to react with greater hostility to a request by the experimenter.

Thus, the passive activation of behavior (trait) concepts through priming manipulations increases the person's tendency to behave in line with that concept, as long as such behavior is possible in the subsequent situation. It is the tendency or predisposition to behave in a certain way that is created, but the situation must be appropriate or applicable (Higgins, 1996) for that behavior to be performed.

The second stream of research has shown that social and interpersonal goals can also be activated through external means (as in priming manipulations), with the individual then pursuing that goal in the subsequent situation without consciously choosing or intending to do so or even being aware even of the purpose of his or her behavior (Bargh, 1990; Bargh, Gollwitzer, Lee-Chai, Barndollar, & Troetschel, 2001). Again, all that is needed is for words or pictures closely related in meaning to the goal concept to be presented in an offhand and unobtrusive manner so that the person is not and does not become aware of the potential influence or effect those goal-related stimuli might have on his or her behavior (Bargh, 1992). For example, even though subliminally presented primes related to cooperation did cause participants to cooperate on a task more than did the nonprimed control group, participants' subsequent ratings of how much they had wanted and tried to cooperate during the task were uncorrelated with their actual degree of cooperative behavior. Yet the same items administered to participants who had been explicitly (i.e., consciously) instructed to cooperate did significantly correlate with their actual degree of cooperation (Bargh et al., 2001, Experiment 2).

Alternatively, words related to achievement and high performance might be embedded along with other, goal-irrelevant words in a puzzle, or words related to cooperation might be presented subliminally in the course of an ostensible reaction time task. Just as with single types of behavior such as politeness or intelligence, presenting goal-related stimuli in this fashion causes the goal to become active and then operate to guide behavior toward that goal over an extended period of time. People primed with achievement-related stimuli perform at higher levels on subsequent tasks than do control groups; those primed with cooperation-related stimuli cooperate more in a commons-dilemma game; and those primed with evaluation-related stimuli form impressions of other people while those in a control group do not (see review in Chartrand & Bargh, 2002).

Such effects are unlikely to be restricted to the laboratory environment; for example, merely thinking about the significant other people in our lives (something we all do quite often) causes the goals we pursue when with them to become active and to then guide our behavior without our choosing or knowing it, even when those individuals are not physically present (Fitzsimons & Bargh, 2003). And the nonconscious ideomotor effect of perception on action becomes a matter of widespread social importance when applied to the mass exposure of people to violent behavior on television or in movies (see Hurley, 2002).

For many years now, social psychologists have been busily documenting all of the complex, higher mental processes that are capable of occurring nonconsciously. Yet we still know little of how these effects occur, how they develop, and why so much in the way of complex, higher mental processes should take place outside of conscious awareness and control. Without some consideration of these issues, automatic behavior, judgment, and goal pursuit will continue to seem somewhat magical and mysterious to many people.[1]

Two aspects of these phenomena seem particularly magical. One is the profound dissociation between these varied psychological and behavioral responses to one's environment, on the one hand, and one's intentions and awareness of them on the other. People are behaving, interacting, and pursuing goals, all apparently without meaning to or knowing they are doing so. How is this possible? The second mysterious feature of these effects is that the same verbal or pictorial stimuli produce all of them. All it takes, it seems, is to activate the relevant concept in some manner—achievement or rudeness or cooperation or slowness, and so on—then, its activation and effect immediately spread and project to evaluations and approach-avoidance tendencies, to putting motivations and goals into play, and to creating traitlike behavior tendencies in the current situation. What accounts for this remarkable power of concepts?

Demystifying the Nonconscious Control of Higher Mental Processes

The Illusion of Conscious Control

One reason why these effects seem magical is our fundamental belief in our own free will, which is derived in large part from our subjective experience of possessing it. We (on occasion) experience making a choice or forming an intention, and then enacting the decision or behavior, and take this as incontrovertible evidence that the intention caused the outcome. Whether or not it does, the subjective experience of will alone is insufficient, and even flawed, evidence of the existence of free will. As Hume (1748) first noted, we can observe antecedents, and we can observe consequences, but we cannot directly observe causal connections between events; that is, causation is always an inference and never something directly observable.

Wegner (2002) has applied this principle to the subjective experience of free will, arguing that it is logically impossible for us to have introspective access to the causal connection between determining forces and influences, and their behavioral consequences. More than that, he has furnished empirical demonstrations that our experience of willing is rooted in a causal attribution process that can be experimentally manipulated to produce false experiences of will.

Wegner and Wheatley (1999) reported studies in which participants used a computer mouse to move a cursor around a computer screen filled with pictures of objects, doing so along with another participant (actually a confederate of the experimenters) so that the two of them jointly determined the cursor's location. While they were doing this, the names of the different objects were spoken to them one at a time over headphones. Unknown to the actual participant, the confederate was given instructions over his or her headphones from time to time to cause the screen cursor to point to a given object. By manipulating whether the name of the moved-to object had or had not been presented to the participant just (i.e., a second or two) before the cursor landed on it (as opposed to earlier, or after the cursor had landed on it), so that the "thought" about that object had been in the participant's consciousness just prior to the cursor's movement to it, the experimenters were able to manipulate the participant's attributions of personal responsibility and control over the cursor's movement. In these experiments, therefore, beliefs about personal agency could be induced by manipulations of the key factors presumed to underlie feelings of will, according to the authors' attributional model—even though those factors had not, in fact, been causal in the cursor's movement.

Such findings demonstrate that people do not and cannot have direct access to acts of causal intention and choice. Kenneth Bowers (1984) had anticipated this finding when he pointed out that it is "the purpose of psychological research to enhance our comprehension and understanding of causal influences operating on thought and action. Notice, however, that such research would be totally redundant if the causal connections linking thought and behavior to its determinants were directly and automatically self-evident to introspection" (p. 250).

Within (especially social) psychology, a further reason for the widely held belief in a free, undetermined will is the contrast often made between automatic (nonconscious, implicit) and controlled (conscious, explicit) cognitive processes in the many dual-process models of social (and nonsocial) psychological phenomena (see Chaiken & Trope, 1999). Here, automatic processes are seen as determined, mechanistic, and externally (environmentally) triggered, while controlled processes are largely seen as their antithesis, leading to an implicit understanding of them as internally instigated and somehow undetermined and without mechanism. But it is another logical error to consider only automatic processes as caused and having underlying mechanisms, while controlled processes (somehow) do not, and are thus "free" (see Bargh & Ferguson, 2000). Regardless, this implicit belief in the uncaused, almost metaphysical nature of conscious or controlled mental processes has existed in psychology for some time. Indeed, it was the main reason for their rejection as psychological phenomena by behaviorism, an irony noted many years ago by Donald Campbell (1969):

> The stubborn certainty I find in my experimental psychologist [behaviorist] friends on this point bespeaks not only a naïve realism . . . but also a mentalistic dualism. They tend to forget that thinking, decision making, or rational inference is carried out by brain tissue fully as much as are automatic reactions. They tend to think of them instead as purely mental. (pp. 64–65)

Neuropsychological Mechanisms of Nonconscious Control

Thus far I have argued for the existence of sophisticated nonconscious monitoring and control systems that can guide behavior over extended periods of time in a changing environment, in pursuit of desired goals. Recent neuropsychological evidence, reviewed in this section, is consistent with these claims, as well as with the core proposition that conscious intention and behavioral (motor) systems are fundamentally dissociated in the brain. In other words, the evidence shows that much if not most of the workings of the motor systems that guide action are opaque to conscious access (see Prinz, 2003). This helps greatly to demystify the notion of nonconscious social behavior, because such a dissociation between motoric behavior and conscious awareness is now emerging as a basic structural feature of the human brain.

The brain structure that has emerged as the primary locus of automatic, nonconsciously controlled motor programs is the cerebellum, and specifically the neocerebellum (Thach, 1996). With frequent and consistent experience of the same behaviors in the same environmental context, this brain structure links the representations of those specific behavioral contexts with the relevant premotor, lower level movement generators. In this way, complex behavior can be mapped onto specific environmental features and contexts and so be guided automatically by informational input by the environment (i.e., bypassing the need for conscious control and guidance). Critically, cerebellar output extends even to the main planning area of the brain, the prefrontal cortex, providing a plausible neurological basis for the operation of automatic, nonconscious action plans (e.g., Bargh & Gollwitzer, 1994). As Thach (1996) concludes from his review of research on the role and function of the cerebellum, "[it] may be involved in combining these cellular elements, so that, through practice, an experiential context can automatically evoke an action plan" (p. 428).

Evidence from the study of brain evolution also points to an important role for the (neo)cerebellum in the deliberate acquisition of new skills (see Donald, 2001, pp. 191–197). A major advance in human cognitive capacity and capability was the connection between the prefrontal cortex and the neocerebellum, which increased in size by a factor of five. This expanded pathway enables nonconscious control over higher executive mental processes, because it connects the main cerebellar receiving areas in the brain stem with the frontal tertiary cortex (two levels of analysis removed from direct sensation). This part of the cortex receives inputs only from secondary analysis areas of the brain (which take input only from other mental representations and not from sensory organs), and thus is entirely buffered from direct sensory areas. "The fact that these pathways are connected to high level cognitive regions places the cerebellum in a strategic location. . . . The overwhelming size of this connection to the prefrontal areas suggests an important executive role, probably in the generation of automated programs of executive control" (Donald, 2001, pp. 196–197). Hence, there appears to be a sound anatomical basis for the notion of nonconscious guidance of higher mental processes, such as interpersonal behavior and sophisticated goal pursuit.

Dissociations Between Mental Systems for "Knowing" versus "Doing"

Several lines of cognitive neuroscience research support the idea of a dissociation between conscious awareness and intention, on the one hand, and the operation of complex motor and goal representations on the other (Prinz, 2003). One major area of such research focuses on the distinct and separate visual input pathways devoted to perception versus action.

Separate Visual Input Pathways The first such evidence came from a study of patients with lesions in specific brain regions (Goodale, Milner, Jakobsen, & Carey, 1991). Those with lesions in the parietal lobe region could identify an object but not reach for it correctly based on its spatial orientation (such as a book in a horizontal versus vertical position), whereas those with lesions in the ventral-visual system could not recognize or identify the item but were nonetheless able to reach for it correctly when asked in a casual manner to take it from the experimenter. In other words, the latter group showed appropriate action toward an object in the absence of conscious awareness or knowledge of its presence.

Decety and Grèzes (1999) and Norman (2002) concluded from this and related evidence that two separate cortical visual pathways are activated during the perception of human movement: a dorsal one for action tendencies based on that information, and a ventral one used for understanding and recognition of it. The dorsal system operates mainly outside of conscious awareness, while the workings of the ventral system are normally accessible to consciousness. Jeannerod (2003) has similarly argued that there exist two different representations of the same object, one "pragmatic" and the other "semantic." The former are actional, used for interacting with the object; the latter are for knowing about and identifying the object.

Thus the dorsal stream (or activated pragmatic representation) could drive behavior in response to environmental stimuli in the absence of conscious awareness or understanding of that external information. It could, in principle, support a nonconscious basis for action that is primed or driven by the current or recent behavioral informational input from others—in other words, be a neurological basis for the chameleon effect of nonconscious imitation of the behavior of one's interaction partners (Chartrand & Bargh, 1999). Moreover, the discovery of "mirror neurons," first in macaque monkeys (Rizzolatti & Arbib, 1998) and now in humans (Buccino et al., 2001)—in which simply watching mouth, hand, and foot movements activates the same functionally specific regions of the premotor cortex as when performing those same movements oneself—is further compelling evidence for a direct connection between visual information and action control (see also Woody & Sadler, 1998).

Taken together, these findings implicate the parietal cortex as a potential candidate for the location of (social) priming effects. Recall that Goodale et al. (1991) had concluded from their patients that those with lesions in the parietal lobe region could identify an object but not reach for it correctly, but those with intact parietal lobes but lesions in the ventral-visual system could reach for it correctly even though they could not recognize or identify it. Lhermitte's patients had intact parietal cortices that enabled them to act, but solely upon the behavioral suggestions afforded by the environmental situations or objects (i.e., primes).

Lack of Conscious Access to Operating Behavior Procedures Related to this existence of a visual input pathway directly connected to the action system and relatively inaccessible to conscious awareness is that there is also minimal if any conscious access to any operating motor system (see review in Frith et al., 2000). This research is showing, to a startling degree, just how unaware we are of how we move and make movements in space. Again, this evidence is consistent with the proposition that our behavior can be outside of conscious guidance and control.

A person cannot possibly think about and be consciously aware of all of the individual muscle actions in compound and sequential movements—there are too many of them and they are too fast (see, e.g., Thach, 1996). Therefore they can occur only through some process that is automatic and subconscious. Empirical support for this conclusion comes from a study by Fourneret and Jeannerod (1998). Participants attempted to trace a line displayed on a computer monitor, but with their drawing hand hidden from them by a mirror. Thus they were not able to see how their hand actually moved in order to reproduce the drawing; they had to refer to a graphical representation of that movement on a computer monitor in front of them. However, unknown to the participants, substantial bias had been programmed into the translation of their actual movement into that which was displayed on the screen, so that the displayed line did not actually move in the same direction as had their drawing hand. Despite this, all participants felt and reported great confidence that their hand had indeed moved in the direction shown on the screen. This could only have occurred if normal participants have little or no direct conscious access to their actual hand movements.

Dissociations Between Intention and Action Within Working Memory

Under the original concept of working memory as a unitary short-term store, or that portion of long-term memory that was currently in conscious awareness (e.g., Atkinson & Shiffrin, 1968), the idea of nonconscious operation of working memory structures was incoherent at best. If working memory was a single mental "organ" that held both the current goal and purpose, along with the relevant environmental information on which that goal was acting, then one should always be aware of the intention or goal that is currently residing in active, working memory. There cannot be dissociations within the operations of the same mental structure.

Yet such dissociations do in fact exist between conscious intention and behavior, even complex social behavior as exhibited by Lhermitte's patients, and it is these dissociations that are most relevant to understanding the mechanisms underlying nonconscious social behavior and goal pursuit. Such complex behavior, which is continually responsive to ongoing environmental events and coordinated with the behavior of others, has to involve the operation of the brain structures that support working memory—namely the frontal and prefrontal cortex. But if working memory contents are accessible to conscious awareness (cf. chapter 8, this volume), how can such dissociations exist?

The answer to this apparent paradox, of course, is that working memory is not a single unitary structure. This idea was originally proposed by Baddeley and Hitch (1974; see also Baddeley, 1986), who envisaged a system comprising multiple components, not just for the temporary storage of information (the phonological loop and visuospatial scratchpad) but also for the direction and allocation of limited attention (the "central executive"). In a parallel development, psychiatrists working with patients with frontal lobe damage—the frontal lobes being brain structures underlying the executive control functions of working memory (Baddeley, 1986)—were noting how the behavioral changes associated with frontal lobe damage were exceedingly complex and variable, depending on the exact locations of the damage (Mesulam, 1986, p. 320). This too was consistent with the notion that executive control was not a single resource but rather comprised of several distinct specialized functions, located in different parts of the frontal and prefrontal cortex.

If so, then at least in theory it becomes possible that there are dissociations between consciously held intentions on the one hand and the goal-driven operation of working memory structures on the other. This is what is manifested in Lhermitte's (1986) syndrome; as he called it, "an excessive control of behavior by external stimuli at the expense of behavioral autonomy" (p. 342). Postmortem analyses of his patients showed inferior prefrontal lesions in the same location of the brain. These had produced excessive behavioral dependency on the environment (which he termed environmental dependency syndrome or EDS)—the imitation of others' gestures and behaviors without control; also utilization of tools and props to behave in the way they suggested or afforded. Lhermitte concluded that "EDS is a loss of autonomy: for the patient, the social and physical environments issue the order to use them, even though the patient himself or herself has neither the idea nor the intention to do so" (p. 341).

How exactly did damage to the inferior prefrontal regions of the brain result in this loss of autonomy, of one's behavior being so strongly controlled by the environment? This is a critical question for present purposes because, as noted at the outset of this chapter, there are striking similarities between the behavior of Lhermitte's patients and that of "primed" normal college students in this regard. Lhermitte (1986) reasoned that EDS is due to the "liberation of parietal lobe activity, which is no longer submitted to the inhibitory effect of the frontal lobe. . . . The frontal lobe systems that control the parietal sensorimotor systems have been known for a long time. The hypothesis that these systems link the individual to the environment is logical" (p. 342). Subsequent research in cognitive neuroscience has largely supported Lhermitte's deductions. Frith et al. (2000) concluded from their review of this research that intended movements are normally represented in the prefrontal and premotor cortex, but the representations actually used to guide action are in the parietal cortex. In other words, intentions and the motor representations used to guide behavior are apparently held in anatomically separate, distinct parts of the brain. This makes it possible for some patients to no longer be able to link their intentions to their actions if there is impairment in the location where intended movements are represented, but no impairment in the location where action systems actually operate.

The finding that within working memory, representations of one's intentions (accessible to conscious awareness) are stored in a different location and structure from the representations used to guide action (not accessible) is of paramount importance to an understanding of the mechanisms underlying priming effects in social psychology. If intentions and corresponding action plans were stored in the same location (or if there were conscious access to all of the operations of working memory; see chapter 8), so that awareness of one's intention was solely a matter of conscious access to the currently operative goal or behavior program, then it would be difficult to see how nonconscious control over social behavior could be possible. This finding alone—a dissociation within working memory itself between conscious intention and action—has the potential to remove much of the mystery behind the nonconscious activation and guidance of complex social behavior and goal pursuit. The storage of current intentions in brain locations that are anatomically separate from their associated and currently operating action programs would appear to be nothing less than the neural basis for nonconscious goal pursuit and other forms of unintended behavior.

Similarities of Priming and Hypnosis

The classic phenomenon demonstrating a dissociation between conscious will and behavior is hypnosis. Here too, the phenomenon has long been seen as magical and mysterious, and in fact was often featured in carnival and county fair magic shows, in which subjects were somehow induced to do bizarre and even superhuman acts. But hypnosis is also used today as an alternative to anesthesia, such that the patient feels no pain although undergoing a normally quite painful procedure. In reviewing the hypnosis literature up to that point, Sarbin and Coe (1972) remarked on how the many behaviors induced by hypnotic means violate our expectations of the normal limits of human behavior, which we normally think of as being under our own control:

> [This] aspect of the hypnotic situation creates surprise and puzzlement. *How can we account for the apparent magnitude of response to such a benign stimulus?* How can only a verbal request bring about so dramatic a change as analgesia to the surgeon's scalpel? . . . The tendency is to interpret these exaggerated responses as being almost magical. (p. 17, italics in original)

The various modern theories of hypnosis, such as those of Hilgard (1986), Woody and Bowers (1994), and Kihlstrom (e.g., 1998) are dissociation theories of one sort or another; Hilgard and Kihlstrom propose that the person does not experience the control of his or her own behavior, while Woody and Bowers argued that hypnosis may alter not just the self-perception of the control of one's behavior but the actual nature of that control (dissociated control theory). In this theory, highly hypnotizable people's subsystems of control may be relatively directly or automatically accessed, without being governed by higher level executive control as much as they normally would.

There are obvious parallels between hypnotic and priming phenomena, and the neuropsychological research reviewed above supports the notion of dissociated will or control in hypnosis as well as in priming effects. In both cases, the will is apparently controlled from outside, by external forces. However, there are also important differences between hypnosis and priming phenomena. For one thing, only 15% or so of people are so deeply hypnotizable that they will carry out posthypnotic suggestions in which their behavior is not guided by their own conscious intention (Kihlstrom, 1998), whereas research that has demonstrated the priming of goals or social behavior involved randomly selected (normal) participants. The reason for this difference may lie in the participants' relative degrees of knowledge of the potential influence of the hypnotic suggestion versus the prime: in the former situation, one is certainly aware of the intent of the hypnotist to make one behave in a certain way, but in the priming situation one is not. The latter thus enables a more passive influence of the environment; it also allows a cleaner dissociation between awareness of what one is doing or trying to do, and one's actual actions. Nevertheless, given the obvious similarities between hypnosis and social priming phenomena, it would be interesting to explore further the potential common mechanisms underlying them. (For instance, do people who are more easily and deeply hypnotized also show stronger priming effects?)

Demystifying the Power of Concepts

One other "magical" issue needs to be addressed. How is it, in the goal and behavior priming research, that the same verbal or pictorial stimuli can produce such a variety of effects? In an automatic evaluation study (see Bargh, Chaiken, Raymond, & Hymes, 1996; Duckworth, Bargh, Garcia, & Chaiken, 2002), the prime "achieve," for example, immediately activates the concept "good" with spreading, unintended consequences for subsequent concept accessibility (see Ferguson & Bargh, 2002). The same word as a priming stimulus in an impression formation task causes the participant to view the target person as more achieving in nature. If the dependent variable is changed instead to a measure of the participant's own behavior, he or she shows higher performance on that task and also manifests the classic qualities of motivational states such as persistence and returning to finish an uncompleted task (Bargh et al., 2001). How can the mere activation of the identical concept, through presenting synonyms of it in an unobtrusive, offhand manner, produce such strong effects on such a variety of psychological dependent measures? What is the nature of this power of activated concepts over our judgments and behavior?

The Acquisition of Behavioral Concepts in Young Children

To answer this question, we must turn to how concepts develop in young children in the first place. According to the influential research and theories of Vygotsky (1934/1962) and Luria (1961), learning a concept involves invoking it, linking it with the performance procedure and external information for which it stands. This is Vygotsky's "outside-inside" principle: Symbolic thought first represents external action, and only later becomes internal speech (i.e., thought; see Bruner, 1961; Donald, 2001, p. 250). Vygotsky argued that concepts and functions exist for the child first in the social or interpersonal sphere and only later are internalized as intrapsychic concepts (see Wertsch, 1985, p. 64).

Thus, according to this framework, the child learns behavioral concepts initially by having them paired by the caretaker with the observable, external features of those behaviors. In this way, the early learning of behavior concepts is linked to the perceptual features of that behavior, to what it means to behave in that certain way. The strong associations formed in early development between the perceptual features of a type of social behavior and the behavior concept itself is likely a major contributor to the spontaneous behavior-to-trait inference effect documented by Uleman and his colleagues (e.g., chapter 14, this volume).

But social behavior and goal-priming research reverses this effect, by presenting synonyms of the concept under scrutiny and assessing whether the participant then behaves in that manner. Thus not only must concepts be learned by the young child in terms of their external observable features ("That is a polite boy"; "That was a mean thing to say"), but they also must be strongly associated with the behavioral procedures or action systems used to behave in that same way oneself. This was, in fact, another important part of the theory. According to Luria (1961, p. 17), it is through these behavior concepts that the parent or caretaker controls the very young child's behavior, naming objects and giving orders and instructions using behavior concepts. It is through the use of words that he or she steers the child's behavior. In this way, the behavior concept becomes strongly—and directly—associated with the mental representation of how to behave that way.

Note also that at this young age there is not a matter of choice or personal selection of the behavior. The child is not given an option: the behavior word is understood as an imperative and obligatory act to be performed. Luria (1961, p. 52) called this the "impellant or initiating function of speech." Thus the linkage, in early learning, of the concept with the behavioral procedure does not include an intervening choice point or act of will—rather, the child is told what to do. It is only well after this imperative nature of word-to-behavior associations is established that the child later learns to formulate his or her own wishes and intentions. But the original, early learning of the behavior concept is as an imperative, choiceless relation.

So in a very real sense, according to this developmental framework, the original and earliest learning of a behavioral concept is without free will or choice. This may help to explain how mere presentation of these concepts later in life, in hypnosis as well as in social behavior priming experiments, has such an imperative effect on the participant's behavior.

Cognitive Neuroscience Evidence: The Verb-Behavior Link

As with the other proposed dissociations between intention and action, cognitive neuroscience research findings are consistent with an automatic, nonconscious connection between behavioral concept representations and their corresponding motor representations. Perani et al. (1999) showed that merely hearing action verbs activates implicit motor representations, as well as working memory structures such as the dorsolateral prefrontal cortex, the anterior cingulate, and premotor and parietal cortices, all of which are needed to carry out that behavior in an uncertain environment. Jeannerod (1999) showed that this link works in the other direction as well: observation of a meaningful action activated the same brain area (Brodman 45) as did the generation of action verbs or the retrieval of verbs from memory. Grèzes and Decety (2001, p. 12) concluded from a review of the verb-motor program research that "motor programs can be seen as part of the meaning of verbal items that represent action."

Baddeley (2001) also highlighted the potential importance of verbal means of controlling action in an update of his model of working memory. In that model, the "phonological loop" is the working memory component corresponding to the temporary storage of verbal material (and thus may well be the component involved in verbal priming effects on behavior). Baddeley, Chincotta, and Adlam (2001) found that when the normal operation of the phonological loop in experimental participants is interfered with through articulatory suppression instructions, in which participants repeat out loud some task-irrelevant information in order to prevent or interfere with overt or covert rehearsal processes, working memory performance (such as the ability to switch between two tasks) suffered, as did performance on tests of executive functioning (such as the Wisconsin Card Sorting task). The authors concluded that their "results offer strong evidence for the verbal control of action . . . [and] the neglected but important role of the verbal control of executive processes" (pp. 655–656).

Implications for the Purpose of Consciousness

> There is a baffling problem about what consciousness is for. It is equally baffling, moreover, that the function of consciousness should remain so baffling. It seems extraordinary that despite the pervasiveness and familiarity of consciousness in our lives, we are uncertain in what way (if at all) it is actually indispensable to us. (Frankfurt, 1988, p. 162)

> What is consciousness for, if perfectly unconscious, indeed subjectless, information processing is in principle capable of achieving all the ends for which conscious minds were supposed to exist? (Dennett, 1981, p. 13)

I have argued here that conscious acts of will are not necessary determinants of social judgment and behavior; neither are conscious processes necessary for the selection of complex goals to pursue, or for the guidance of those goals to completion. Goals and motivations can be triggered by the environment, without conscious choice or intention, then operate and run to completion entirely nonconsciously, guiding complex behavior in interaction with a changing and unpredictable environment, and producing outcomes identical to those that occur when the person is aware of having that goal (see review in Chartrand & Bargh, 2002). But this is not to say that consciousness does not exist or is merely an epiphenomenon. It just means that if all of these things can be accomplished without conscious choice or guidance, then the purpose of consciousness (i.e., why it evolved) probably lies elsewhere.

In an important (if indirect) way, then, research on nonconscious forms of social cognition, motivation, and behavior speaks to the question of what consciousness is for, by eliminating some of the more plausible and widely held candidates. If we are capable of doing something effectively through nonconscious means, that something would likely not be the primary function for which we evolved consciousness.

For example, the fact that automatic goal pursuit involves monitoring the (perceived) environment and guidance or control over extended time periods of one's responses to it (e.g., Bargh et al., 2001) suggests that consciousness is not necessary for online monitoring and control, as is widely held by contemporary models of metacognition (e.g., Nelson, 1996; Paris, 2001). Of course, one can be meta-aware of one's perceptions, thoughts, and actions (monitoring) and also be aware of guiding those thoughts and actions toward a goal (control), but if this guidance can also occur without conscious awareness and intent, then these capabilities do not distinguish conscious from nonconscious processes. Thus online monitoring and control does not seem to be a viable candidate for the reason why we evolved consciousness.

But there is a second potential function and benefit of metacognitive awareness—of being aware at an abstract level, all at the same time, of what is going on in the current environment, along with one's current thoughts, purposes, actions, and their effects. This higher level, abstract domain of awareness enables the coordination and integration of all the various mental states and activities "to get them working together in the complex and sophisticated ways necessary to achieve complex and sophisticated ends" (Armstrong, 1981, p. 65; see also Johnson & Reeder, 1997). Just as active attention is necessary for object recognition and perceptual binding (integration of features into a single percept), as many experts have argued (see Donald, 2001, p. 182), metacognitive consciousness is the workplace where one can assemble and combine the various components of complex perceptual-motor skills. This ability has given humans a tremendous advantage over other animals, because "whereas most other species depend on their built-in demons to do their mental work for them, *we can build our own demons*" (Donald, 2001, p. 8, italics in original). With remarkable prescience, Neisser (1963) had similarly speculated that the ability to develop and carry out many complex processes in parallel outside of the "main line" of conscious thought was the special advantage that human cognition had over that of other animals:

> It is worth noting that, anatomically, the human cerebrum appears to be the sort of diffuse system in which multiple processes would be at home. In this respect it differs from the nervous system of lower animals. Our hypothesis thus leads us to the radical suggestion that the critical difference between the thinking of humans and of lower animals lies not in the existence of consciousness but in the capacity for complex processes outside of it. (p. 10)

In a very real sense, then, the purpose of consciousness—why it evolved—may be for the assemblage of complex nonconscious skills. In harmony with the general plasticity of human brain development, people have the capability of building ever more complex automatic "demons" that fit their own idiosyncratic environment, needs, and purposes. As William James (1890) argued, consciousness drops out of those processes where it is no longer needed, freeing itself for where it is. A major reason why it is adaptive for consciousness to be deployed only when needed is its limited-capacity nature, as shown best by findings of the dramatic "ego-depleting" consequences of even minimal conscious choice and regulatory processes (e.g., Baumeister, Bratslavsky, Muraven, & Tice, 1998).

Intriguingly, then, one of the primary objectives of conscious processing may be to eliminate the need for itself in the future by making learned skills as automatic as possible. It would be ironic indeed if, given the current juxtaposition of automatic and conscious mental processes in the field of psychology, the evolved purpose of consciousness turns out to be the creation of ever more complex nonconscious processes.

Conclusion

Action tendencies can be activated and put into motion without the need for the individual's conscious intervention; even complex social behavior can unfold without an act of will or awareness of its sources. Evidence from a wide variety of domains of psychological inquiry is consistent with this proposition. Behavioral evidence from patients with frontal lobe lesions, behavior and goal-priming studies in social psychology, the dissociated behavior of deeply hypnotized subjects, findings from the study of human brain evolution, cognitive neuroscience studies of the structure and function of the frontal lobes as well as the separate actional and semantic visual pathways, cognitive psychological research on the components of working memory and on the degree of conscious access to motoric behavior—all of these converge on the conclusion that complex behavior and other higher mental processes can proceed independently of the conscious will. Indeed, the brain evolution and neuropsychological evidence suggests that the human brain is designed for such independence.

These are tentative conclusions at this point, because cognitive neuroscience research is still in its infancy, and the cognitive psychological study of the underlying mechanisms of behavior and goal-priming effects in social psychology is perhaps in early childhood. But the two literatures clearly speak to each other. Indeed, Posner and DiGirolamo (2000) drew the more general and encompassing conclusion that the information-processing and the neurophysiological levels of analysis have achieved a level of mutual support greater than previously imagined. In opening their review, they remark on "how closely linked the hardware of the brain is to the performance of cognitive and emotional tasks, and the importance of environment and self-regulation to the operations of the human brain" (p. 874). The case of nonconscious social behavior reviewed in this chapter serves as an excellent example of that linkage: the neuropsychological evidence giving greater plausibility to the priming phenomena, and the priming phenomena demonstrating how deeply the neuropsychological phenomena affect the daily life of human beings.

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Note

1. In fact, early on, Thorndike (1913, p. 105) did attack the ideomotor action principle as "magical thinking," and his criticism effectively stifled scientific research on ideomotor action for the next 60 years (see Knuf et al., 2001, p. 780).

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