

CONSCIOUS THOUGHTS AND THE CAUSATION OF BEHAVIOR

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Conscious experience is a defining feature of the human condition. As far as is known, no other creature has inner experience as rich and complex as does humankind. Subjective richness does not entail causal efficacy, however. In this chapter, we examine the surprisingly contentious issue of whether conscious thoughts do in fact exert a causal influence on behavior. We conclude that they do, though perhaps not in the way that many have surmised. We then consider the issue of just how conscious thoughts cause behavior.

In recent decades, expert opinion has fluctuated wildly as to whether conscious thoughts exert direct or even indirect control over behavior. Some have suggested that even if people can control behavior consciously, it would be unwise to do so, because conscious thought is prone to bias and distortion, whereas the unconscious would be wiser (Dijksterhuis & Nordgren, 2006). Some researchers have advocated making decisions on the basis of gut feelings and intuitive reactions rather than conscious thought (see Wilson, 2002).

As a brief, crude, and overly simplified account of these pendulum swings, we offer the following. In the 1960s, behaviorism was in high gear and exerted strong influence throughout research psychology, and it all but forbade discussion of mental events as causes of behavior. The cognitive revolution that began then and came to dominance in the 1970s and 1980s embraced cognitive causation of behavior, and many psychologists assumed that almost all human behavior was guided by conscious thoughts. Late in the 1970s, psychologists

began to distinguish consciously controlled thoughts from automatic and often unconscious mental processes (e.g., Schneider & Shiffrin, 1977), and some psychologists began to record unconscious causation of behavior (e.g., Bargh, 1997). At first they assumed that unconscious causes worked by way of altering conscious thoughts, so that a causal (mediating) role for consciousness was preserved, but then, emboldened by accumulated evidence, they began to assert that consciousness had at best a dispensable role.

By the late 1990s, leading thinkers were suggesting that most behavior was caused by unconscious processes (Bargh, 1997), that conscious control of behavior was illusory (Wegner, 2002), and that if conscious thoughts did intrude into the process, they generally had unhelpful, even counterproductive effects (Dijksterhuis & Nordgren, 2006).

To be sure, the questions of whether and how conscious thoughts could possibly cause physical movement did not originate with social psychologists in recent decades. Thomas Huxley (1874) had put forward the steam whistle hypothesis a century earlier. In that view, conscious thoughts were like the steam whistle on a locomotive: The steam whistle's processes derive from the activity of the engine and might even reveal some important things about what is happening inside the engine, but it has no causal impact on the train's movements. By analogy, conscious thoughts derive from unconscious processes, but behavior is driven entirely by the unconscious ones, and conscious thoughts have no causal force.

Much discussion of the efficacy of consciousness was stimulated by Libet's (1985, 2004) research. In his studies, research participants were instructed to make an arbitrary finger or wrist movement and to record the exact moment at which they consciously decided to make that movement. An increase in brain activity was recorded during a brief interval of about a quarter of a second before the time reported for the conscious decision. This uptick in brain activity is typically called the *readiness potential*. To many, the implication was that the conscious decision to move did not cause the movement because the movement was initiated by the brain activity before the conscious decision.

Considered carefully and rigorously, Libet's (1985, 2004) findings do nothing to disprove a possible role of conscious thought in causing behavior. Many works have spelled out these misinterpretations (e.g., Mele, 2009). For example, there is no proof that the brain activity of the readiness potential is the true cause of the action. Libet himself thought that the motor action could be initiated by the unconscious brain activity but could be overridden and prevented with a conscious decision.

The procedures used by Libet (1985, 2004) were severely biased against any chance for conscious thoughts to exert a causal influence. He specifically instructed research participants not to plan their movement—and planning is one of the few things that conscious thoughts might be useful for in that situation. Without planning, the model of behavior used in Libet's studies is nothing more than to make an arbitrary, meaningless movement of the hand. Even if consciousness were proven to be fully irrelevant to such behaviors, that would hardly offer a basis for generalizing to the majority of human actions, which are often planned and rarely as meaningless as an arbitrary finger movement.

This chapter summarizes our work on consciousness, with a particular focus on responding to Libet's (1985, 2004) work and other writings (dating back at least to Huxley, 1874) that have questioned the causal impact of conscious thoughts. It is based on our recent works, in which we sought to elucidate the functional value of conscious thoughts generally (Baumeister & Masicampo, 2010) and to survey evidence that conscious thoughts can cause behavior (Baumeister, Masicampo, & Vohs, 2011).

DEFINITIONS

This article follows standard practice in writings about consciousness, which is to distinguish two main levels or types. Roughly, one of them (denoted here as *phenomenal awareness*) is what humans share with many other animals: There is a central nervous system and an experiencing agent, and consciousness coordinates sensory input with the fruits of prior learning and the demands of the organism, so as to facilitate coordinated action (e.g., all feet move in the same direction). The other (here called *conscious thought*) involves things that set humans apart from other animals, and these things include symbolic understanding, notions of self, and reflective deliberation. In this chapter, we are mainly concerned with explaining the second, more or less uniquely human form of consciousness.

CAN CONSCIOUS THOUGHTS CAUSE BEHAVIOR?

Our first task is to summarize evidence dealing with the important but simple question of whether consciousness causes behavior. This summary is intended as a refutation of Huxley's (1874) steam whistle hypothesis and of the various interpretations of Libet's (1985, 2004) work and similar findings that purport to show that consciousness lacks causal impact.

It is useful to clarify what the opposing positions are. Few psychologists today deny the reality of mental states or even their importance in enriching the subjective experience of life. The question is simply whether overt behavior is initiated or altered as a result of conscious thoughts. The negative view suggests that consciousness is essentially an epiphenomenon, which is to say a result of other processes but not a cause of anything. In this view, unconscious and automatic processes (including brain events) cause behavior, and they also cause conscious thoughts to happen.

The contrary view, which asserts that conscious thoughts have some causal power, can be expressed in a variety of ways that differ as to how much they claim. To have any causal power, conscious thoughts would simply need to be part of the causation of a subset of behaviors. They would not have

to be the sole cause, nor the original (uncaused) cause. That is, all conscious thoughts could be entirely the result of unconscious processes and brain events, and yet they could change the behavior. Moreover, there is no assumption that the conscious causation is direct or immediate. One can infer conscious causation, for example, if the person mentally (consciously) makes a plan for what series of acts to perform tomorrow and then behaves differently tomorrow as a result of having made that plan. Meanwhile, much bolder claims about conscious causation could be supported insofar as the influence of the conscious mental event on behavior is direct, immediate, exclusive, or independent of previous causes.

How can one establish causality? The logic of experimental design prescribes the most widely accepted means of testing causal hypotheses. That is, the ostensible cause must be manipulated experimentally (by random assignment, in psychology) and the behavior measured overtly. Hence, when we set out to search for evidence of conscious causation of behavior, we specifically sought experimental studies in which the independent variable was a conscious state or act and the dependent variable was behavior (Baumeister et al., 2011).

To anticipate our conclusion, we found plenty of evidence of conscious causation of behavior in the relatively weak sense, but precious little support for the bolder versions of the hypothesis. There was no sign of conscious thoughts causing behavior without cooperation with unconscious processes. The causation was rarely direct or immediate. Indeed, many of the best results for conscious control indicated thinking at a remove and delay from the actual behavior.

Mental Simulation and Practice

Ample evidence has suggested that thinking about performing an action increases the likelihood of doing it. Gregory, Cialdini, and Carpenter (1982) showed that potential customers who by random assignment imagined themselves enjoying a cable television subscription service later were more likely to purchase that service. Likewise, students who imagined doing well on an exam and therapy patients who imagined themselves persevering in

therapy were more likely than controls to do so (Pham & Taylor, 1999; R. T. Sherman & Anderson, 1987).

Mental practice has been studied extensively. In mental practice, the athlete essentially imagines performing the feat of skill correctly. Although mental practice is no substitute for physical practice, it can improve performance above and beyond physical practice (e.g., Brouziyne & Molinaro, 2005; Grouios, 1992). Kosslyn and Moulton (2009) concluded that mental practice has been researched with almost every sport, and it has generally succeeded at improving performance. Thus, the conscious rehearsal of a difficult physical action can improve later success in performing that action physically.

Plans and Intentions

One powerful and well-replicated manner in which conscious thoughts can influence behavior involves the formation of highly specific plans, called *implementation intentions* by Gollwitzer and his colleagues (e.g., Gollwitzer, 1999). Typically, these studies compare people who already endorse the value of some action (e.g., performing a self-examination for breast cancer, writing a paper as assigned) with others who perform the conscious process of mentally articulating the precise circumstances in which they will take concrete steps to perform that action. The latter (e.g., “I will make notes for my report on Tuesday evening and start writing the paper on Wednesday afternoon”) constitute the implementation intentions. According to a recent meta-analysis by Gollwitzer and Sheeran (2006), implementation intentions increase the likelihood of performing the behavior substantially, which is to say by a medium to large effect size.

The implementation intention findings have received particular attention (e.g., Mele, 2009), in part because they seem to constitute clear and strong evidence for conscious causation of behavior. They also highlight what is missing from Libet’s (1985, 2004) procedures, namely, planning that integrates across time. Indeed, they suggest one system by which conscious and unconscious processes may complement each other. The unconscious can carry out highly specific programs for action but

may be less effective at implementing broad, vague, general values. Consciousness may be useful for translating broad values into specific plans for action.

A recent empirical investigation provided some support for the view that conscious and unconscious thoughts complement each other and cooperate in the usage of implementation intentions. Masicampo and Baumeister (2011) examined the often—though not always—replicated Zeigarnik effect, in which unfulfilled goals cause intrusive thoughts about that goal even when the person is trying to do something else. They found that those intrusive thoughts diminished sharply if the person formed an implementation intention to perform the behavior. Thus, even though the person had not done any actual work toward the goal, the thoughts of the goal subsided once the person made a plan for doing that work. This study did not contain measures of actual behavior, but it supports the view of conscious and unconscious systems operating in concert to guide behavior.

Anticipated Emotion

Psychologists widely assume that conscious emotions are a major cause of behavior. If that assumption was correct, it would constitute important evidence of conscious causation. Unfortunately, the evidence that conscious emotions directly cause behavior is remarkably sparse and idiosyncratic (for a review, see Baumeister, Vohs, DeWall, & Zhang, 2007).

Even when conscious emotions do exert a direct causal influence on behavior, the effect is often irrational or counterproductive, which suggests that direct causation of behavior is not the main and proper function of conscious emotion. (Otherwise, natural selection would have favored people with less and less emotion.) Although people do attempt to regulate their emotions to achieve their goals (Tamir, Mitchell, & Gross, 2008), for the most part emotions fail to produce adaptive behavior.

Anticipated emotion, however, does influence behavior, and generally in an adaptive manner. The most studied emotion in this context is probably anticipated regret. Experimental studies have manipulated the anticipation of regret and shown reliable shifts in behavior. Thus, people who

anticipate possibly regretting their actions exhibit various changes in decision processes, such as by gathering more information and becoming more vigilant (Janis & Mann, 1977), avoiding courses of action that carry risks or losses (Tetlock & Boettger, 1994), and favoring relatively safe choices that can be defended or justified easily, such as buying a product with a highly respected brand name (Simonson, 1992). Anticipated regret can also cause people to avoid or postpone making a decision (Anderson, 2003).

Anticipation of guilt can also alter behavior. In a campaign to solicit donations of bone marrow, Lindsey (2005) manipulated guilt, such as by instructing potential donors to imagine how bad they would feel if they refused to donate and a child died as a result of lacking bone marrow. The anticipatory guilt condition caused people to express higher willingness to donate and to take at least the initial behavioral steps toward making such donations. Indeed, many theories of guilt have argued that it operates most usefully and effectively through anticipation: As people learn what actions will cause guilt, they come to anticipate that certain actions will make them feel guilty later, and so they avoid such actions (Baumeister et al., 2007).

Perspective Taking

The question of why consciousness evolved turns on the assumption that being conscious would confer some advantage in survival and reproduction. Because unconscious thoughts can cause behavior, the benefits of mental causation are insufficient to explain consciousness. Hence consciousness must be able to do something that the unconscious does poorly or not at all. Baumeister and Masicampo (2010) proposed that the key purposive functions of human conscious thought are to be found in relating to others, including communication and sharing information. Consciousness might therefore make possible new forms of social interaction that would be limited to humans (and any other species that managed to acquire full conscious thought), such as group planning, storytelling, and economic trade.

If consciousness did indeed evolve to facilitate communication, then some of the best effects of consciousness should be found in connection with

mentally simulating the mental states of others. And they are. For example, experimental manipulations have randomly assigned some participants to engage in conscious imagination of the mental states and perspectives of other people, and their behavior changes as a result. For example, they show less stereotypical and prejudiced behavior after conscious reflection on the perspective of a target of prejudice (Galinsky, Wang, & Ku, 2008). A substantial difference can even be found on the basis of imagining how another person is feeling versus imagining how one would feel in that other person's place (Batson, 2009). Imagining another person's perspective can also cause one to protect oneself against possible exploitation by that person, insofar as one realizes how the other might be tempted to exploit (Caruso, Epley, & Bazerman, 2006).

Logical Reasoning

The previous section raised the question of what conscious thought can do that unconscious thought cannot. Several authors (e.g., Lieberman, Gaunt, Gilbert, & Trope, 2002) have proposed that the unconscious is not capable of logical reasoning. Most recently, Nisbett (2010) has noted that logical thinking is not uniformly present across cultures, which suggests that it might be more a product of conscious thought (because unconscious thought processes should not vary much by culture). Of course, contrary arguments have been made (e.g., Dijksterhuis & Nordgren, 2006). If the view of logical thought being under the purview of consciousness is correct, it would offer a powerful contribution to the question of what consciousness is for, because logical reasoning is a highly adaptive form of thought that can contribute to enlightened self-interest (including survival and reproduction).

There is some theoretical basis for thinking that logical reasoning could be specific to conscious thought. The unconscious is highly efficient at processing simple stimuli, but integrating multiple ideas into a coherent sequence is a relatively difficult operation that seems not to be a common form of thought in the animal world. (Even animals who are taught by humans to communicate with sign language hardly ever show evidence of syntax, which conveys meaning on the basis of the ordered

sequence in which symbols are presented.) Baars (1997, 2002) summarized evidence to the effect that the unconscious can process single words effectively, whereas consciousness is needed to understand sentences. On the basis of that and other evidence, Baumeister and Masicampo (2010) proposed that consciousness can be thought of as a place where the unconscious constructs meaningful sequences of thought.

Experiments have indicated that performance on tests of logical reasoning depends on consciousness. The unconscious can be motivated to try to seem logical, but ultimately it is merely faking. Thus, De Neys (2006) presented people with arguments that were logically valid but, given false premises, produced conclusions that were intuitively wrong. Under cognitive load, people rejected those arguments as valid, preferring instead invalid arguments that happened to have intuitively appealing conclusions. Frederick's (2005) Cognitive Reflection Test has similar properties, in that the intuitive answer is wrong but feels right. In support of the importance of consciousness, Frederick has found that the best performance comes from when people use deliberate, conscious thought rather than quick, heuristic-based thought.

More extensive evidence that logic is the province of consciousness was provided by DeWall, Baumeister, and Masicampo (2008). In their studies, performance on logical reasoning tests was unaffected by manipulations that sought to engage or encumber the unconscious mind. Logical reasoning performance, however, rose and fell dramatically as a result of manipulations seeking to encumber or engage the conscious mind. Under cognitive load (which preempts conscious thought), performance on logic tasks dropped to chance levels, suggesting that people were no better than guessing. Conversely, logic performance improved under manipulations of conscious thought, such as telling people to try to be logical or telling them that they would have to explain their answers later.

The logical reasoning evidence could be interpreted as irrelevant to the behavior question, because reasoning is essentially "just" a form of thinking. The studies qualified for inclusion in our review of behavioral effects because they

were framed in terms of performance on tests of reasoning, and performance counted as behavior. Still, one could object that that is exploiting a definitional loophole to make reasoning qualify as behavior.

However, we think there are major behavioral implications (beyond a test score) that attend the conclusion that logical reasoning requires conscious thought. Consider the contrary view, which would insist that logical reasoning is just thought and therefore these findings do not refute the steam whistle hypothesis. If logical reasoning depends on consciousness, then all behavior that is shaped by logic is likewise causally dependent on conscious thought. It seems impossible to imagine human culture without logical reasoning. Science, technology, religion, morality, government, the law, military organization, and many other patterns of human cultural activity use logic. They shape human behavior in countless ways. If logic requires consciousness, much human behavior has a causal dependence on conscious thought. (That includes following procedures worked out by someone else's logical reasoning!) Insofar as culture itself uses logic, then cultural behavior has been causally shaped by consciousness.

Reflecting and Interpreting

Much conversation, and by extension much conscious thought, involves replaying past events so as to explore different ways to understand them. Although such ruminations are far from what Libet's (1985) studies used to operationalize conscious thought, it is highly plausible that such conscious reflection has behavioral consequences.

One does not have to look far to find evidence that conscious thinking about recent or important events can alter behavior (Wilson, 2011). Pennebaker and colleagues have demonstrated health consequences of controlled reflection on personal traumas (for a review, see Pennebaker & Chung, 2007). These consequences include taking fewer aspirin and visiting the physician less often. On a less positive note, ruminating about a recent insulting provocation has been shown to increase the aggressive retort (Bushman, Bonacci, Pedersen, Vasquez, & Miller, 2005).

Reflecting on one's unsuccessful task performances or on feedback about those performances has been shown to improve subsequent performance, which suggests a highly beneficial function for conscious thought. Anseel, Lievens, and Schollaert (2009) had participants perform a web-based work simulation. Some were provided with feedback, and some were encouraged to reflect on their performance and the feedback. The combination of reflection and feedback produced the best results in terms of subsequent improvements in performance. Ciarocco, Vohs, and Baumeister (2010) randomly assigned people to ruminate in different ways about a failed task performance. Ruminating about the implications of the failure and task-irrelevant ruminations had no benefit, but ruminating about what one might have done wrong led to significant improvements in performance.

Self-Affirming and Other Self-Regard

Over the years, many studies have manipulated the self-regard of participants and shown behavioral consequences. These manipulations typically rely on conscious processes to change how people evaluate or understand themselves.

In recent years, the most remarkable program of work involves manipulations under the rubric of self-affirmation. The core notion involves having people reflect on personal strengths or other key aspects of their self-concepts (Steele, 1988). In practice, many so-called self-affirmation manipulations have had people reflect on the values they hold most dear, leading to some question as to whether this process really has to do with affirming some positive evaluation of the self. For present purposes, however, that dispute is irrelevant. In either case, the relevant pattern is that conscious reflection leads to a change in behavior.

In general, self-affirmation manipulations appear to reduce defensiveness, allowing behavior to be freer and less constrained by concerns with avoiding threats. For example, having people engage in self-affirmations has been shown to eliminate stereotype threat effects in performance (Cohen, Garcia, Apfel, & Master, 2006; Martens, Johns, Greenberg, & Schimel, 2006). Exposure to fear-inducing messages about sexually transmitted diseases often has the

paradoxical (defensive) effect of making people reluctant to acquire condoms, but self-affirmation eliminates that effect (D. A. K. Sherman, Nelson, & Steele, 2000). Likewise, fear-inducing messages about smoking paradoxically make smokers avoid further information, including information about how to quit smoking, but that effect has been eliminated by self-affirmation manipulations (Armitage, Harris, Hepton, & Napper, 2008). Many studies have shown that narcissists are highly defensive and respond aggressively to criticism, but self-affirmation eliminates this effect also (Thomaes, Bushman, Orobio de Castro, Cohen, & Denissen, 2009).

Providing people with bogus personality feedback has been thought to cause changes in self-evaluations. Aronson and Mettee (1968) showed that receiving derogatory feedback made participants more willing to accept illicit gains on a gambling task. Baumeister and Jones (1978) showed that the effects of bogus feedback revolve more around concerns over how one is conceived by others than around how one perceives the self, but the potential for behavioral change is the same in either case. Sachdeva, Iliiev, and Medin (2009) had people simply reflect on how a particular randomly chosen trait word might apply to their personalities, and these reflections changed their subsequent donations to charity. Specifically, consistent with the compensatory pattern (Baumeister & Jones, 1978), people who thought about bad words applying to themselves made larger donations than people who thought about positive words.

Communicating

Studies of the impact of communication may seem unrelated to the question of how consciousness causes behavior. However, a plausible and even reasonably strong case can be made that one of the key functions of consciousness is to facilitate communication (Baumeister & Masicampo, 2010). It is, after all, close to impossible to talk unconsciously, and almost all conversing is done with full conscious participation. Insofar as talking and other intentional communication depends on consciousness, it is reasonable to consider the behavioral effects of talking (compared with no-communication experimental conditions) as evidence that consciousness can cause behavior.

Not surprisingly, many groups perform better when they can communicate than when they cannot, which is consistent with the view that consciousness evolved to facilitate communication (Baumeister & Masicampo, 2010). In one classic study by Jorgenson and Papciak (1981), participants played a commons dilemma game in which individuals could harvest individual gains from a collectively available resource that renewed and increased itself on the basis of how much was left each round. Such games pit individual desire to maximize short-term individual rewards against the restraint needed to sustain the resource for a long period of time (which in the long run will provide the greatest benefits to all). The common pattern in such games is that individuals take more and more so that the resource becomes depleted quickly, thereby reducing the ultimate amount that all participants could have. Jorgenson and Papciak showed that groups who were able to communicate during the process were better than noncommunicating groups at restraining themselves and sustaining the resource for a long period of time, thus increasing the benefits that everyone received. Indeed, in their study groups who communicated with each other were able to sustain the resource for the entire period of 50 trials, thus technically eliminating the usual commons dilemma effect in which the resource is exhausted prematurely. To be sure, it was not communication alone but communication combined with helpful information (feedback about the resource) that produced the best results. Still, this effect indicates that conscious processing (of both feedback and group communications) contributed to getting the best results.

One theme of multiple studies has been that communication improves cooperation (Dawes, McTavish, & Shaklee, 1977). When members of groups can communicate among themselves, they work together better, including increases in collective effort and decreases in free riding (Sutter & Strassmair, 2009). Intragroup communication makes people more willing to make sacrifices for the benefit of the group (Halevy, Bornstein, & Sagiv, 2008). Although traditional economic theory focuses on incentives, some evidence has suggested that leaders may get better results from their group

by communicating with them than by manipulating incentives (Brandts & Cooper, 2007).

Communication is generally about sending information to others who do not have it. Deliberate teaching is an especially important form, because the teacher must at some level understand the absence of knowledge in the student's mind and on that basis craft and communicate a message to help the student gain that understanding (Bloom, 2000). Although simple communication is found in many species, unambiguous evidence of intentional teaching is completely absent in nonhuman animals. If it happens at all in nonhuman animals, it is extremely rare (Tomasello, Kruger, & Ratner, 1993)—whereas it is a foundation of human culture, and in fact every country in the world has institutions (schools) deliberately set up for intentional teaching. Consciousness plays a vital role in this process. For best results, teachers tailor their message to the student.

Impressive evidence for the value of consciousness in teaching was provided by Rossmagel (2000). Adult participants were designated to instruct someone else in how to construct a model airplane. When their full powers of conscious thought were available, they tailored different messages according to whether their learner was a 7-year-old or a university student. Under cognitive load, however, they failed to make these adjustments. Thus, part of effective teaching involves using one's conscious thoughts to anticipate the mental state of the student, and when consciousness is preoccupied with other activities, people fail to teach effectively.

The effects of communication are not always beneficial. So-called cheap talk consists of nonbinding statements that group members might make to each other. These statements increase rewards, but some benefit more than others, and outright liars can use such communications to benefit themselves at the expense of other group members (e.g., Charness, 2000; Charness & Dufwenberg, 2006). In antagonistic situations, people may use communication to threaten and bully each other, thereby benefiting themselves at others' expense (Deutsch & Krauss, 1960). Nonetheless, these findings also support the basic principle that communication between interaction partners can change their behavior, and insofar as intentional communication

depends on conscious thought, they are further evidence of the causal impact of consciousness on behavior.

Overriding Automatic Responses

A last but very important way that consciousness causes behavior is by interrupting, altering, or otherwise overriding the link from automatic impulse to behavior. In this view, the function of conscious thought is not so much to dictate or guide behavior as to modify the control of behavior that originates unconsciously. One of the foundations of empirical work on self-regulation was Mischel's (1974, 1996) studies on delay of gratification, which examined how children use conscious strategies to prevent themselves from yielding to very salient temptations. Conscious control of attention and even deliberate revisualization of the stimulus were useful for preventing the automatic impulse from being realized. Indeed, even writers who have been broadly skeptical of conscious causation and who have contributed greatly to the understanding of how automatic and unconscious processes cause behavior have allowed some room in their theorizing for conscious thought to override automatic causation (e.g., Libet, 2004; Wegner & Bargh, 1998).

A broad assortment of research findings has provided evidence for the conscious overriding of automatic impulses. For example, many people, especially dieters, suffer frequent conflicts between automatic desires for tasty but fattening and unhealthy foods and rival inclinations to eat more nutritious foods. An early study by Shiv and Fedorikhin (1999) offered people a choice between cake and carrots. Those whose conscious minds were preoccupied with a cognitive load tended to choose the cake much more than those who were able to reflect consciously on the decision. The implication is that conscious thought served to override the automatic impulse to take the appealing but unhealthy cake. Another study found that dieters ate more when under cognitive load than when their full conscious mind was available to monitor their eating.

Even more elaborate evidence was provided by Friese, Hofmann, and Wanke (2008), who assessed both conscious and unconscious attitudes and then

measured whether people chose fruit or chocolate to eat. When they were under cognitive load of mentally rehearsing an eight-digit number, their unconscious attitudes dictated their choices. In contrast, when their memory task involved remembering a single digit (so that their conscious attention was free to oversee the food selection), their conscious attitudes predicted what they selected.

A quite different demonstration of a similar principle was provided by Verplanken, Walker, Davis, and Jurasek (2008). People's conscious beliefs and values regarding environmental issues had only a slight effect on whether they commuted by car when the behavior in question involved established routines and habits (in which automatic processes are presumably paramount). However, when habits were disrupted by relocating, the personal values had a much stronger effect. Thus, the disruption of habit likely brought greater need for conscious control, and as a result people acted more on the basis of their consciously held values.

Simply making people aware of various common behavioral tendencies is often enough to activate conscious control and enable people to resist repeating them. Stereotype threat effects, in which performance is impaired by concern that one's performance could reflect badly on one's group because the group is stereotyped as being poor at that task, can sometimes be eliminated by teaching people about those effects (Johns, Schmader, & Martens, 2005). Speech anxiety effects are often mediated by a transparency illusion, which means that speakers fear that listeners can tell how anxious and nervous they are. Telling people that listeners cannot in fact discern a speaker's level of nervousness or anxiety is often enough to eliminate these effects (Savitsky & Gilovich, 2003).

Positive, beneficial effects can also be eliminated by making people conscious of them. Self-affirmation effects often improve performance by having people reflect on their good traits or personal values, but telling people about these effects—or even just telling people that the procedure is intended to bolster self-esteem—gets rid of them. These findings are of particular interest because one assumes that people still want to perform well and therefore may not be deliberately trying to resist the unconscious process

by which self-affirmation influences behavior. Nonetheless, it appears that the effect depends to some degree on lack of awareness, and consciousness can override or cancel the unconscious causation.

Pausing to engage in conscious reflection can alter behavior. Some evidence for this involves the identifiable victim effect, by which people are more helpful and generous toward a single, identified victim than toward a presumably much larger but anonymous set of victims. Small, Loewenstein, and Slovic (2007) showed that this tendency can be eliminated by having people stop and reflect for a period on their reasons for donating. Indeed, stopping to think is often standard advice for decision makers, especially those who may be about to act on the basis of emotion. Leith and Baumeister (1996) showed that angry people tended to make risky, self-defeating choices, but instructing them to pause and ponder the pros and cons of the various options eliminated this effect. Likewise, research with economic decision-making games has shown that various irrational patterns and biases can be eliminated by advising people to pause and think about their options before choosing (Abele, Bless, & Ehrhart, 2004).

Even learning from direct experience by classical conditioning—one of the foundational principles in all of psychology—can be undone by conscious control. When participants received electric shock immediately after seeing flashing lights, they soon learned to exhibit physiological arousal in response to the lights. However, if the experimenter told them he was turning off the shock machine, the lights no longer elicited arousal (Colgan, 1970). Learning theory would have predicted that it would require a period of extinction (i.e., seeing lights and not getting shocked) to produce a gradual reduction in the physiological response, but contrary to that the conscious communication produced an immediate cessation of the arousal response.

Conclusions Thus Far: Consciousness and Causation

The evidence we have presented provides strong and diverse support for conscious causation of behavior. A great variety of experimental manipulations of conscious thoughts have been shown to produce an

equally broad range of behavioral changes. The steam whistle hypothesis that consciousness has no causal impact is difficult to sustain in light of this mass of evidence. Human behavior would not be what it is if not for consciousness.

To be sure, these findings fall short of contradicting the findings of Libet (2004) and others. Those studies sought to show direct causation of behavior by conscious thoughts, presumably without mediation by unconscious processes. Contrary to such extreme views, it seems that conscious thoughts generally and perhaps always have their effects on behavior by way of influencing unconscious processes. Baumeister et al. (2011) speculated that almost all human behavior stems from a combination of conscious and unconscious processes. That is, they found no evidence for conscious causation without any unconscious processes, and conversely relatively little evidence (bar the occasional reflex or similar response) has been found of behavior produced by purely unconscious processes with no role of consciousness whatsoever. After all, most research studies that purport to show effects of unconscious processes typically rely heavily on conscious participation, including the obtaining of informed consent, the delivery of instructions for participation, and the proper focusing of conscious attention during the study. Such studies mainly show that people may be unconscious of one cause of their behavior, not of all relevant causes (see Winkielman & Schooler, 2008, for further discussion of this point). For instance, people have the conscious awareness of wanting to verbally communicate information but not of the unconscious processes that allow them to do so (Dell, Schwartz, Martin, Saffran, & Gagnon, 1997).

Several broad patterns in these data point to key aspects of how consciousness causes behavior. The naive assumption that behavior follows directly from conscious thoughts may be wrong. Instead, consciousness works in concert with unconscious processes, and the immediate and proximal causes of behavior may well be automatic and unconscious processes (including the activity of neurons by which muscle movements are initiated and controlled).

The unconscious mind may be powerful and vast, as some writers (e.g., Dijksterhuis & Nordgren, 2006) have asserted, but it has limitations. It seems to work best with highly specific and concrete issues in the immediate present. Consciousness helps integrate behaviors across longer time spans. That is, conscious thoughts enable the present behavior to be influenced by distant future goals and by reflection on past events. Likewise, it helps events in the present contribute to more adaptive behavior in the unspecified future (such as when reflection improves learning).

The specificity of the unconscious mind is another limitation that consciousness helps overcome. Conscious thoughts can translate broad, general goals and values into specific plans and intentions, thereby greatly increasing the likelihood that the person will actually perform the requisite actions and reach the goals. Masicampo and Baumeister's (2011) finding that implementation intentions eliminated the Zeigarnik effect is highly relevant. It suggests that the Zeigarnik effect (i.e., intrusive thoughts about unfulfilled goals) occurs because the unconscious mind tugs at the sleeve of the conscious mind to translate the general goal into a specific plan for action. The unconscious is quite capable of watching for a specific circumstance and initiating appropriate behavior. It is less successful at implementing vague, abstract goals, and so it depends on the integrative powers of conscious thought to translate those goals into specific plans for action.

Indeed, a growing body of evidence has suggested that consciousness is especially useful for integrating across time. This includes not just the evidence just cited (past and present outcomes into future behavior, etc.) but even perception of patterns that are spread across time. For example, Gordon, Hendrick, and Levine (2002) showed that cognitive load (i.e., preoccupying conscious thought) impaired understanding of sentences, and the more complex the sentence, the greater the impairment. Larigauderie, Gaonac'h, and Lacroix (1998) showed that participants under cognitive load could still detect typographical and spelling errors but were seriously impaired at detecting syntactic and semantic errors. Thus, without full

conscious attention, they were relatively unable to discern problems in how words fit together, but they could still spot mistakes within individual words.

Another important and well-documented effect of conscious thought is that it facilitates influence by social and cultural factors. This is consistent with the broad view that the evolved purpose of the (specifically) human brain is to enable the individual human being to participate in the cultural group, including sharing its information and participating in its social systems (e.g., Baumeister, 2005). Consciousness facilitates communication with others—both intentionally sending information to them and understanding complex communications from them. It helps people deal with feedback from others. It helps people understand the perspectives of others, thereby facilitating negotiation, cooperation, and coordination of multiple roles.

It is common to think of consciousness as a matter of perceiving what is there. Yet human conscious thought is hardly needed for seeing what is there. Even the simplest animal minds, which presumably lack the powers of human conscious thought, can see what is there. The novel value and power of human conscious thought may lie in the capacity to envision what is *not* there. Consciousness may have its main usefulness in the ability to perceive and think beyond the immediate stimulus environment (see Sartre, 1943, for early articulation of this view). In the evidence reviewed here, conscious thought emerges as highly relevant to circumstances involving multiple alternative possibilities. That is, conscious thought is vital in counterfactual thinking, which involves imagining how events or circumstances could be or could have been different from reality. Conscious thought is powerful in negotiations, which by definition contain multiple, competing possible outcomes. The chain of causation may be leading toward one likely result, but imagining an alternative outcome increases its likelihood of coming true. Mental practice and other simulations increase the probability of one outcome (e.g., successful performance) rather than another.

To be sure, the idea that multiple possible outcomes exist for any situation is controversial in some quarters. Many scientists subscribe to a simple-minded deterministic faith, according to

which the future is as fixed and inexorable as the past, and so the very notion of multiple possible futures is to them always a mistaken illusion.

Accounting for this effect of consciousness in a deterministic framework requires complicated conceptual somersaults.

For those who accept the idea that the future is not fixed but rather probabilistic, and the associated idea that human responses have some power to steer the course of events toward one genuinely possible outcome instead of another (also known as free will), consciousness may be a powerfully useful tool. One essential and powerful function of consciousness may be to conduct mental simulations of alternative possible realities. Part of the contribution of conscious thought to the causation and control of behavior involves mentally simulating alternative sequences of actions and their outcomes and adjusting one's actions on that basis. Insofar as free will is a reality, it presumably depends on precisely such a process.

WHY CONSCIOUSNESS?

Eventually, all theories of consciousness come up against one rather hard question. If one concedes that thoughts in the mind can influence behavior, what is gained by having those thoughts be conscious? After all, considerable evidence has shown that unconscious thoughts can shape behavior (e.g., Bargh, 1997). Presumably it was costly in evolutionary and mind-design terms to make some thoughts conscious. Why bother? Why move beyond unconscious thoughts to conscious ones?

Three answers have been put forward (Baumeister & Masicampo, 2010). The first and simplest was proposed by Morsella (2005), and his answer applies not just to human conscious thought but to the broader and more limited form of animal awareness. It is that consciousness integrates information and therefore can resolve conflicts. After all, different areas of brain and mind may hold different prescriptions for how to respond in a given situation. When two (or more) different mental processes dictate different actions, some resolution is necessary. Flee or stay motionless? Spend or save? Resist or acquiesce? Indulge or abstain? Information about

how to respond is scattered across parallel distributed processing systems, but ultimately the animal has only one set of feet, one voice, one pair of hands. Baumeister and Masicampo (2010) proposed that the resolution of conflicting impulses for physical response may occur in the simple, animal-style phenomenal awareness, whereas the more complicated response conflicts that arise within human culture may require the more advanced, symbol-using powers of human conscious thought.

The second answer is that consciousness is for social participation. William James (1890) proposed that thinking is always for the purpose of behavior, and many other writers have echoed this, notably Fiske's (1993) "thinking is for doing." Perhaps conscious thinking is, however, for communicating. Conscious thought may have evolved to facilitate communication, which is useful for coordinating group effort, sharing information, influencing others, understanding social and cultural norms, and the like.

The third answer is that consciousness may be needed to think certain thoughts. That is, a variety of adaptively useful but difficult cognitive processes may be beyond the powers of the unconscious mind and therefore need consciousness. In simple terms, consciousness is a place in the mind where the unconscious constructs meaningful sequences of thought. The unconscious can process single words but not sentences (Baars, 2002). Logical reasoning depends on consciousness (DeWall et al., 2008; Lieberman et al., 2002). Clearly, this is compatible with the view that consciousness evolved for social communication: Vastly, indeed infinitely, more information can be encoded in sentences than in single words. Therefore, a species whose biological strategy rests on sharing information would benefit greatly from developing mental powers that facilitate combining concepts into sequences such as sentences and paragraphs.

In the final sections of this chapter, we elaborate on these three answers. Fuller, more thorough discussion is available in Baumeister and Masicampo (2010), which began by respecting the various, potentially devastating critiques of the efficacy of conscious thoughts. It has long been a standard assumption that human behavior is subject to direct

control by conscious thinking. Yet accumulating evidence, including critiques such as those put forward by Bargh (1997), Wegner (2002), Libet (1985, 2004), Gazzaniga (2011), and Nisbett and Wilson (1977), has suggested that conscious thought is at best flawed and at worst irrelevant to the direct control of behavior. As we have already indicated in this chapter, this view may be correct. Even if consciousness is essential to effective human behavior, its effects on behavior may be indirect. It is necessary to rethink what role conscious thought actually plays in guiding human behavior.

Debates about the value of consciousness have often pitted polar extremes against each other. On one side are the views that the conscious self is fully in control of most actions. On the other side are the radical views that consciousness is an epiphenomenon or steam whistle, with no impact whatsoever on behavior. Baumeister and Masicampo (2010) undertook to steer a middle course. Conscious thought plays a supporting role. It is neither the driver, fully in charge of the vehicle, nor a passenger, reduced to observing the trip and enjoying or loathing it. Instead, it may resemble a fancy navigational system that can provide valuable input into the operation system. Ultimately, conscious thought lacks the power to steer the vehicle directly, but it can have a decisive effect on whether it reaches its destination.

Integration and Resolving Inner Conflicts

Nearly all theorists recognize that the unconscious operates in parallel, distributed fashion, with many processes and subroutines processing information more or less independently of each other. Occasionally one of them is sufficient to dictate behavior, such as when a snake or leopard attacks, or the hand grasps a painfully hot object, or one loses one's balance. When someone plans a dinner party (or, for that matter, a bank heist, seminar, or courtship), though, many different processes furnish relevant outputs that may push in different directions. A person has only one mouth and one set of hands and feet. Somehow it is necessary to integrate the wealth of processes and outputs so as to decide just precisely what to do. Morsella (2005) has labeled this the *integration consensus*.

The brain is where stimulus meets response. If life were very simple—consisting, perhaps, of a small behavioral repertoire, responding to a small set of well-defined stimuli and essentially ignoring all else—it might be relatively easy to link the incoming stimuli to the relevant knowledge of how to act. Alas, life is not so simple, for humans and even for a great many other animals. A major, basic problem in brain design is therefore how to ensure that incoming stimuli, once interpreted appropriately, activate all (or at least most) of the relevant sites scattered around the brain, so that an optimal response can be formulated and coordinated.

The standard solution to this problem was apparently to broadcast an inner signal out to the full mind. This is one important function of consciousness. There is no reason to think it is specific to the advanced, human sort of conscious thought, and indeed it seems likely that the phenomenal awareness of many animals serves this function. The more basic of the two kinds of consciousness may thus function primarily to integrate information that is dispersed among many different locations in the brain and mind. In effect, consciousness displays the crucial stimulus so as to elicit associations from anywhere in the mind, so as to collect (and integrate) possible reactions.

Conscious Thought and Social Participation

The idea that conscious thought essentially serves social and interpersonal functions was perhaps the most novel contribution of Baumeister and Masicampo (2010). This is presumably less a reflection of any innovative brilliance of theirs than an odd side effect of the way that theory of consciousness has evolved. Consciousness theory has been spearheaded by cognitive psychologists, philosophers, and to some extent artificial intelligence theorists. Their approach has tended to focus in a parsimonious manner on how a single mind thinks and what it needs to accomplish various tasks. Indeed, the perennial view of consciousness as an epiphenomenon may stem from the sense that the unconscious mind can perform most functions by which thoughts cause behavior, and so the need for thoughts to be conscious is difficult to validate.

A famous and often-quoted passage by William James (1890) asserted that a person's thinking is ultimately in the service of guiding behavior. The idea that "thinking is for doing" has been reasserted repeatedly in the ensuing decades, such as in the authoritative overview by Fiske (1993). It has come to be regarded as almost a truism, as if it were impossible to dispute.

In a trivial sense, all psychological phenomena serve behavior. But if the dictum that thinking is for doing is to be taken seriously, possible alternatives must be found and considered. Baumeister and Masicampo (2010) proposed one: Perhaps one vital function of specifically conscious thinking is to serve communicative functions so as to facilitate social and cultural interactions. Put more crudely, maybe (conscious) thinking is for talking.

All theories about consciousness eventually encounter one formidable hurdle. If one concedes that thoughts can cause behavior, and ample evidence has indicated that unconscious thoughts can clearly cause behavior, then why do those thoughts need to be conscious? What does consciousness add to the ability of thoughts to direct behavior? The integrative function we have already discussed can constitute one answer, but is that really enough to have prompted natural selection to favor the radically new (in evolutionary terms) human conscious mind?

In contrast, the evolutionary value of communication is relatively easy to appreciate. If conscious thought enables people to understand each other better and to share information, the advantages would be palpable and possibly enormous.

It is hard to dispute the assertion that consciousness facilitates interpersonal, linguistic communication. People can neither talk nor effectively listen to and understand speech without consciousness. The unconscious can process single words but not sentences or paragraphs (Baars, 1997). Anyone can readily verify the extreme difficulty, if not outright impossibility, of carrying on a conversation while consciousness is focused on something else (a different conversation with another person, a television program, mentally rehearsing a telephone number, or an absorbing task). Evidence reviewed by Baumeister and Masicampo (2010) suggested that

the inner processes that produce speech overlap heavily with those that produce conscious thought. This fits the view that the two processes are fundamentally intertwined and that one may be a derivative of the other.

Reading aloud, for example, is not the simultaneous performance of two tasks (reading and speaking) but rather a single performance. If anything, reading silently is the more advanced performance, because it combines the basic task of reading aloud with the added task of inhibiting the vocalizing. That in fact reflects the learning sequence. Children do not first learn to read silently and then gradually become able to read aloud at the same time. Instead, they learn to read aloud, and over time they gradually become able to read while keeping silent. Even in adulthood, readers show signs of implicit or incipient vocal responses, as if they were still struggling to keep silent while reading (McGuigan, 1970). Even thinking aloud versus silently may follow the same sequence.

The idea that conscious thinking is for talking meshes well with current thinking about human evolution. An influential view holds that the most important differences between human and nonhuman primate cognition include understanding that others have mental states and their contents different from those of one's own and the desire or impulse to communicate one's thoughts to others (Tomasello, 1999; Tomasello, Carpenter, Call, Behne, & Moll, 2005). Presumably, some new mental capacities brought these about, and conscious thought seems ideally suited—indeed, seemingly indispensable—to make these possible. The evolution of primate communication, from mirror neurons to gestural communication to vocal speech, supports this analysis (see Baumeister & Masicampo, 2010). These things changed thinking fundamentally—from an individual, even solipsistic matter of solving problems and inferring patterns into “new, culturally based cognitive skills with a social-collective dimension” (Tomasello, 1999, p. 7).

All animals act in ways that advance survival and reproduction. Humans have taken a highly novel approach to solving the perennial problems of survival and reproduction. The human approach involves sharing information and accumulating

knowledge collectively, participating in social systems with interactive and complementary roles, and exchanging goods and services even among nonrelatives—in a word, culture. The distinctively human traits that uniquely define human nature can be considered to be mostly adaptations for making culture possible (Baumeister, 2005). Viewing conscious thought in that light seems to provide a persuasive fit to what is known and to sidestep many of the recent, empirically based critiques of the efficacy of consciousness. In other words, conscious thought may be a uniquely human power of mental activity that primarily enables people to communicate and cooperate far more extensively than any other known creature.

Conscious Thought as Big Thoughts

The third answer to the question of what conscious thoughts can do that unconscious ones cannot invokes the idea that some thoughts can only be thought with consciousness. Although the unconscious has a vast processing capacity and can perform many mental operations simultaneously, it may lack the capacity to combine a broad collection of concepts into sequences whose meaning emerges from the combination. As already mentioned, the unconscious seems quite capable of importing and processing single words but not sentences, let alone paragraphs and longer narratives. Research psychologists have been remarkably successful at influencing behavior by implanting or activating an idea with an unconscious cue involving a single word or concept. To our knowledge, implanting sentence-long thoughts or stories has not been done thus far and may be largely impossible.

Thus, human consciousness can be conceptualized as a place where the unconscious mind assembles complex sequences of concepts to conduct meaningful thought. Although the unconscious plays an extensive and indispensable role in creating all thoughts, there may be some thoughts it cannot construct or entertain without consciousness.

The capacity to facilitate construction of meaningful sequences of concepts may be closely intertwined with the social and cultural functions of consciousness. Most obviously, culture depends on shared information, for which sentences and longer

combinations are essential. Single words can express simple concepts, but the amount of information that can be expressed in sentences and paragraphs is vastly (indeed infinitely) greater. For a species that depends on communication, sentences represent a huge advantage over single words, and so there would be huge advantages in natural selection favoring the development of mental capacity to think in sentences.

Logical reasoning also depends heavily on consciousness (see earlier section for review of evidence). One could even use this advantage to argue that it is the crucial functional reason for the emergence of consciousness, insofar as solitary animals would gain various pragmatic benefits from being able to reason logically. In practice, though, people do most of their reasoning in language, which has to be learned from one's social group. Moreover, evidence has suggested that humans mainly engage in reasoning when arguing with each other, rather than when engaged in solitary ratiocination (see Mercier & Sperber, 2011). Indeed, various patterns of reasoning error and bias seem well suited to the assumption that reasoning is used more to argue one's case than to conduct a dispassionate, objective search for truth (Mercier & Sperber, 2011). With moral reasoning, also, the conclusion emerging from recent work is that people respond to moral choices and dilemmas by doing what feels intuitively right—and then engaging in moral reasoning afterward to defend and justify their actions to others (Haidt, 2006).

CONCLUSION

What is consciousness for? To many people, the answer is obvious: Conscious thoughts make up most human functioning and determine what one does. But the steady accumulation of research findings, many of them showing the extensive power of unconscious causes, have undermined that easy answer (e.g., Bargh, 1997; Libet, 1985, 2004; Nisbett & Wilson, 1977; Wegner, 2002). Some writers began to speculate openly that consciousness has little or no relation to behavior (e.g., Dijksterhuis & Nordgren, 2006).

The evidence reviewed in this chapter provides a new sort of basis for believing that conscious

thoughts do help cause behavior. These findings accept the validity of much of the critical evidence about the limitations, dispensability, and inadequacies of conscious thought. Consciousness does not fully or directly control behavior, nor does it even have access to all causes. The most proximal causes of behavior in the form of muscle movements are neuronal firings by the neurons connecting the brain to the muscles, and people are not conscious of these. In this and many other ways, consciousness is dependent on unconscious processes to get things done.

Still, consciousness has ample influence on behavior. We devoted the bulk of this chapter to covering a great deal of such evidence. This evidence took the form of experiments, which do permit causal conclusions. In all cases, some conscious event or state was the independent variable, and some behavior was the dependent variable. The significant results thus establish that conscious thoughts cause behavior. The wealth and diversity of evidence leaves little room for continuing to doubt that conscious thoughts can have extensive, powerful, and important effects on human action.

To be sure, the operation of consciousness was mostly indirect. There is even some evidence that attempts to control behavior directly can be counterproductive, such as when a person seeks to exert conscious control over the details of a well-learned skill and ends up disrupting the execution of the skill (e.g., Baumeister, 1984). In contrast, when conscious thoughts exert their influence in more roundabout and indirect ways, they have generally beneficial effects on behavior, such as in making plans for the future and communicating with partners.

If conscious thoughts do not directly move muscles, how do they exert their causal influence? The original review of evidence on which this chapter is based (Baumeister et al., 2011) drew a number of key conclusions about the causal impact of consciousness, which we summarize here.

Insofar as behavior starts from motivation, it does not start in consciousness. People may be conscious of their desires and urges, but these almost certainly originate and exist outside of consciousness. Still, consciousness can alter the link from motivation

behavior. Conscious thoughts can activate motivations, such as when a person ruminates about an event, comes to perceive it as unjust or disrespectful, and starts to feel a wish to take revenge. Conscious thoughts can also restrain or dispel motivations, such as when the person thinks better of the urge to behave aggressively.

Many findings indicated that conscious thoughts help integrate behavior across time. Reflecting on past events (including counterfactual replays) can produce learning in the present, resulting in behavioral change in the future. Contemplating the future can change behavior in the present. Planning, anticipating, and ruminating can all help present behavior be guided by realities and contingencies that are far beyond the present situation, thereby enabling human behavior to differ markedly from what almost all other animals can do. Consciousness is also good for integrating information across time, including discerning patterns in sequences of events—and, perhaps most important of all, processing sequences of words so as to understand the meaning of sentences and paragraphs spoken by other people.

Another valuable function of conscious thought is to connect general, abstract ideas to specific behaviors. The implementation intentions, for example, seem to be so effective precisely because the unconscious cannot implement broad, vague intentions. The implementation intentions translate those abstract goals and values into specific behavioral plans. That process enables the unconscious to watch for the activating stimuli and initiate the intended action.

Conscious thoughts are useful for working on and with information. Logical reasoning does not involve the input of new information; rather, it works with already known information (premises) to derive novel conclusions. Elaborating, explaining, reflecting, communicating, and otherwise performing mental acts to do something with information can vastly improve its usefulness and behavioral impact.

Another broad conclusion is that conscious thoughts help enable the individual's behavior to be guided by the social group and its culture. General cultural norms and rules (including laws) can be applied to specific cases. Even more crucially, much

human behavior is altered or guided by communication, and the majority of communication is conscious. People cannot have a conversation unconsciously. As we suggested, perhaps the key selection advantage that led to the evolution of consciousness involved communicating with other people.

Another important point is that consciousness seems particularly relevant to circumstances that offer multiple, competing possibilities for action. Mentally simulating actions and their likely consequences is an important part of the decision process and action control process for most people. A great deal of the evidence for conscious causation—such as negotiation, implementation intentions, mental practice, and counterfactual thinking—revolved around precisely the fact that different actions and outcomes are possible. Consciousness may be a vital tool for choosing.

As to the hotly debated question of what consciousness is good for, we have cited three broad answers (see also Baumeister & Masicampo, 2010). The first is the integration of information from assorted spots in the brain and mind so as to resolve inner conflicts about what to do. This integration pertains to phenomenal awareness and is thus not specific to humankind. It may therefore be the original function of consciousness.

The second was for participation in the social group. Consciousness enables people to communicate. This communication facilitates nonviolent conflict reduction (including negotiation), as well as joint cooperative action and collective planning. More broadly, it enables people to teach and learn the rules and systems that structure their group and to act on the basis of that knowledge.

Last, consciousness may permit certain sorts of complex, integrated thoughts that would be too cumbersome for the unconscious to execute in its normal mode of operation. Human social life and culture are heavily based on meaningful sequences of ideas, including religious stories, causal theories, personal narratives, group plans, arguments, laws, and much more.

The past half century has seen some huge pendulum swings in expert opinion about the causal efficacy of consciousness. The broad outlines of the

correct view may be emerging gradually now. Our review has found no evidence that conscious processes cause behavior without extensive help and mediation by unconscious processes. Yet we are also skeptical that much nontrivial behavior can be entirely caused by unconscious processes. It may soon be time to move beyond the simplistic debates as to whether behavior is conscious or unconscious. The vast majority of human behavior almost certainly emerges from a combination of conscious and unconscious causes, neither of which can be fully effective without the other.

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