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8

Automatic Self-Regulation

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What is self-regulation, exactly? What does it involve? If one looks to classic social and motivational psychology for an answer to these questions, the answer is sure to include the ability to control and determine one's behavior consciously and intentionally. For example, Carver and Scheier's (1981) influential self-regulation model posits feedback loops such that individuals must become consciously aware of the discrepancy between the current and desired self-states, then consciously choose to engage in action to reduce that discrepancy. And for the "cool system" in Metcalfe and Mischel's (1999) self-regulation model to function, individuals must consciously and intentionally attempt to control their behavior to overcome the influences of the current environment (e.g., a dieter not eating a tasty but fat-laden dessert).

In short, conscious choices and strategies permeate psychological theories of self-regulation and goal pursuit as essential mediating variables (e.g., Bandura, 1986; Deci & Ryan, 1985; Locke & Latham, 1990). Yet considerable evidence suggests that such conscious processes are neither necessary or even typical for effective self-regulation: People manage quite well on a moment-to-moment basis, without needing to select and guide every action consciously.

Consciousness has been rather unceremoniously removed from theories of many social psychological phenomena in recent years, so perhaps it is no surprise to find that it is an unnecessary guest in models of self-regulation as well. On the other hand, self-regulation may be more complex, more dynamic, and more interactive than those other phenomena (Baumeister, 1998), so conscious, intentional processes seem more at home here than in, say, models of stereotyping and person perception. Self-regulation is indeed complex: More than willpower alone, and more than just goal pursuit, it is the capacity of individuals to guide themselves, in any way possible, toward important goal states (Baumeister, 1998; Gollwitzer, 1996). Therefore, it consists of a wide range of cognitive and motivational operations, such as acting quickly to take opportunities, ignoring dis-

tractions, acting flexibly in response to situations, overcoming obstacles, and managing conflicts between goals (see Gollwitzer & Moskowitz, 1996). These operations are essential to successful self-regulation, but accumulating evidence indicates that the role of conscious processes in these operations is considerably less than previously thought. Self-regulation, it seems, can be active, complex, dynamic—and automatic.

IN PURSUIT OF NONCONSCIOUS SELF-REGULATION

For higher order motivations to be fulfilled through self-action, goals must guide and regulate action through diverse and flexible means. For example, once a person sets a higher order goal of getting a job promotion, he or she may need to regulate many aspects of thought and behavior, such as to think about his or her boss more positively, to substitute cooperative feelings for competitive ones, to work hard to successfully complete a task, and to control the desire to snap at a coworker. We suggest that all of these acts of self-regulation—of cognition, emotion, and behavior—can occur without the need for conscious intervention or guidance. In fact, due to the apparently quite limited capacity of conscious self-regulatory abilities (Baumeister, Bratslavsky, Muraven, & Tice, 1998; Muraven, Tice, & Baumeister, 1998), much of self regulation *has* to occur nonconsciously to be successful. Because even the simplest acts of conscious self-control (instigated through experimental instructions) deplete this limited resource, it would seem that most moment-to-moment self-regulation must occur nonconsciously (i.e., without using this limited resource), if it is to be effective.

An alternative (or rather, complement) to the classic self-regulatory models that highlight the mediating role of conscious choice is the auto-motive model of self-regulation (Bargh, 1990; Bargh & Gollwitzer, 1994). According to this model, the full sequence of goal pursuit—from goal setting to the completion of the attempt to attain the goal—can proceed outside of conscious awareness and guidance. But how can goals operate to guide our behavior without our knowledge? First, in harmony with several motivation theorists (see Hull, 1931; Kruglanski, 1996; Tolman, 1932), goals are hypothesized to be mentally represented in the same way as are other cognitive constructs—that is, to correspond to internal knowledge structures containing information, such as opportunity conditions, possible means (e.g., plans) for attaining the goal, and behavioral procedures, to concretely enact those means. Second, it follows from the presumed existence of these goal representations that they are capable of being activated automatically by features of one's environment, that is, by the mere presence of situational cues strongly associated with the pursuit of those goals. Automatic activation means that no intervening conscious choice or involvement is needed for the internal representation to become active and operative. Just as other social knowledge structures, such as stereotypes and attitudes, have been shown to become automatically activated in the mere presence of highly relevant environmental features (such as racial features or the object of the attitude in question; see Fazio, 1986; Greenwald & Banaji, 1995), the auto-motive model assumes that goals, too, can develop nonconscious, automatic activation capabilities, under the same conditions.[1]

Nonconsciously operating goals enable people to control thoughts, feelings, and behavior, without the need to invoke conscious choice or control processes. Moreover, the special qualities of motivational states and self-regulatory mechanisms that make for successful conscious self-regulation also appear to hold true for automatic self-regulation (see Chartrand & Bargh, 2002) in the realms of cognition, emotion, and behavior.

Automatic Regulation of Cognition

Research has demonstrated that even relatively low-level cognitive processes, such as those involved in memory and attention, can be regulated through nonconscious means. In the first set of studies to address this issue, Chartrand and Bargh (1996) showed that automatically operating information-processing goals affect the organization of information in memory and its recall. These studies conceptually replicated classic findings from the social cognition literature that had focused on the effect of various conscious goals on information processing (Hamilton, Katz, & Leirer, 1980; Hastie & Kumar, 1979). To activate these goals nonconsciously, Chartrand and Bargh (1996) used a standard "priming" manipulation in which goal-relevant stimuli were presented in a subtle and unobtrusive manner. In this task, participants formed grammatical sentences out of series of words presented in a scrambled order (Srull & Wyer, 1979). Embedded in the words presented were words related to either the goal of impression formation (e.g., "judge", "evaluate") or the goal of memorization (e.g., "remember", "retain"). Participants then read a list of behaviors ostensibly performed by a target person. Identically replicating the earlier findings involving consciously pursued goals, participants that were primed with an impression formation goal remembered more of the target's behaviors, and organized that memory around specific personality traits to a greater extent than did those primed with a memorization goal.

In a second study, words related to impression formation goals were subliminally presented during a computerized task. In this manner, half of the participants were primed with an impression formation goal, with the other half receiving no priming. All participants then read a list of behaviors allegedly performed by a target person. Again replicating previous work on consciously held impression goals (Hastie & Kumar, 1979), participants with nonconsciously activated impression formation goals automatically formed an impression of the target person while reading his behaviors, whereas those with no primed goal did not form such an impression. These findings were the first to demonstrate that basic and essential social cognitive processes can be effectively regulated through nonconscious means.

Subsequent research has supported and extended these results regarding the influence of nonconscious goals on low-level cognitions. For example, selective remembering and forgetting—both important components of optimal memory—have recently been shown to be regulated by nonconsciously activated memory strategies (Mitchell, Macrae, Schooler, Rowe, & Milne, 2002). Participants showed preferential memory for words followed by the subliminal cue "remember" and impaired memory for words followed by the subliminal cue "forget." In further evidence of the role that nonconscious goals can play in regulating low-level cognitive processes, automatic goals have also been shown to guide selective attention (Moskowitz, 2002). Selective attention is, without doubt, a strategic self-regulatory process: Individuals focus attention on what is important (the current goal) and are thereby vigilant for goal-relevant information in the environment (Gollwitzer & Moskowitz, 1996). Guided by the idea that goals can operate strategically, yet remain outside of conscious awareness, Moskowitz (2002) found that when goals were implicitly activated, attention was selectively drawn to goal-relevant items, both in a Stroop-like task and a reaction-time task. Thus, even selective attention can be regulated by nonconsciously activated goals.

Recently, such nonconscious regulation of cognitive processes has been found to extend to working memory itself—the mental system considered to be the seat of conscious control (or "executive") processes (e.g., Neisser, 1967; Smith & Jonides, 1999). To exam-

ine the nonconscious regulation of working memory, Hassin (2004) made use of a novel working memory paradigm that shared key features with standard working memory tasks, such as the reading memory span task (Daneman & Carpenter, 1980) and the N-back task (Smith & Jonides, 1999). In this novel task, sequences of disks appear individually at various locations onscreen in sets of five, each set ending with the presentation of a central fixation point. The participants are instructed to indicate on each trial, as a disk appears, whether the disk is full (i.e., a solid color) or empty (i.e., a circle). Thus participants' explicit, conscious goal is to respond to the physical nature of each disk presented. But a minority of the disk sequences follow predetermined rules or regularities, such that the implicit detection of that rule during that sequence would speed up responses to the final disk in the sequence (note that a particular sequence is never repeated, so this cannot be implicit learning). Other sequences follow a rule until the final disk (i.e., the location of the fifth disk violates that rule), so that implicit detection of that rule during the sequence would hinder (slow down) responding to the final disk. (In the remaining control sets, the locations of the disks do not follow any rules.)

The results of four experiments, in the form of the pattern of reaction times to the final disk in each series, strongly supported the implicit pickup of the location rules. Compared to control sequences, participants had faster reaction times to the final disk of rule-governed trials and slower reaction times to the final disk of rule-violating trials. This occurred even though participants were never told that any of the sets would follow rules, and were entirely unaware of the existence of such rules when questioned after the experiment; indeed, in other conditions in which participants were told about the rules and instructed to try to notice and use them, no such pattern of reaction times was obtained.

Thus, even on-line working memory processes, dealing with a novel task and unique, nonrepeated sequences of stimuli, contain nonconsciously operating components. These are the processes most closely associated with conscious, executive control operations: dealing with novel, unpredictable stimuli and novel task goals, actively keeping ordered information in memory for a period of time, and updating and integrating that information with subsequent incoming information (Miyake & Shah, 1999). Thus, even executive ("conscious") control processes themselves operate at least partly in a nonconscious manner. Evident from all of these studies is that automatic processes can play a key role in regulating and guiding cognition. Much less research has directly examined the nonconscious regulation of emotional processes, a topic to which we turn next.

Automatic Regulation of Emotion

Like most kinds of self-regulation, emotion regulation—the diverse set of processes whose proximal function is to regulate control over which emotions individuals have, when they have them, and how they are experienced and expressed (Gross, 1998)—is generally considered to belong to the domain of consciousness. When fighting back tears to avoid embarrassment in public, or trying to rein in feelings of sadness when alone, the individual is likely cognizant of the emotion regulation experience. However, emotion regulation need not be conscious; indeed, emotion researchers have speculated that the procedures in which people typically engage to manage their emotions may become automated over time (Gross, 1999; Mayer & Salovey, 1995). Habits that reduce anxiety—such as nail biting or cigarette smoking—are examples of such automatized emotion regulation strategies. Indeed, because people engage in emotion regulation so frequently (Gross, 1998), it is possible that the subprocesses have become overlearned to the point

of becoming automatic—at least in the sense of being efficient, or of requiring minimal attentional capacity to be performed (see Richards & Gross, 2000).

The regulation of self-esteem may be particularly likely to occur in an automatic fashion: People are highly motivated to maintain a positive sense of self (see Baumeister, 1998, for review); thus, a situational challenge to self-esteem may elicit automatic recovery attempts on the part of the individual. Indeed, people whose self-image has been threatened engage in more automatic stereotyping, shown to facilitate the restoration of a positive sense of self (Fein & Spencer, 1997; Spencer, Fein, Wolfe, Fong, & Dunn, 1998). In the Spencer and colleagues (1998) studies, receiving negative feedback was hypothesized to automatically activate a goal to restore self-image; once people had such a goal, Spencer and colleagues hypothesized that they would respond to minority-group members by automatically using stereotypes, an action previously found to increase mood and self-image (see Fein & Spencer, 1997). In a modification of a paradigm used by Gilbert and Hixon (1991), participants who received negative feedback on an "ability" test demonstrated automatic stereotyping of minority-group members, even under conditions of high cognitive load (Spencer et al., 1998, Experiment 3). Motivation to restore their threatened egos caused participants to stereotype minority-group members, even under conditions that preclude conscious processing. Participants who had not received negative feedback, on the other hand, did not engage in automatic stereotyping. This research supports the hypothesis that people can automatically engage in behaviors that protect or restore a positive sense of self, and that these kinds of self-restoration effects can occur efficiently, not requiring much cognitive capacity.

However, research on the ego-depletion model of self-regulation has shown that at least the *conscious* regulation of emotional expression, like other forms of conscious self-regulation, requires substantial mental resources (e.g., Baumeister et al., 1998; Muraven et al., 1998). People who were told to suppress their emotional responses while watching emotional films performed more poorly on subsequent self-regulatory tasks, such as solving anagrams and squeezing a handgrip exerciser (Baumeister et al., 1998). People also have been shown to have less success at regulating their emotions when they are under cognitive load (Wegner, Erber, & Zanakos, 1993), which also suggests that conscious attempts to regulate emotions may require cognitive resources. Of course, emotion regulation is not a unitary process, but rather is one term for a set of diverse processes, some of which may require heavy cognitive resources, whereas others require very few (Richards & Gross, 2000). Importantly, no research to date has examined *nonconsciously activated* emotion regulation goals or strategies, so it is as yet unclear whether emotion regulation processes can be activated automatically, and if so, whether they would consume cognitive resources in the same manner as do conscious emotion regulation attempts (see Vohs & Ciarocco, Chapter 20, this volume). In contrast, much research has examined directly the nonconscious regulation of behavior and compared the effectiveness of nonconscious and conscious goal pursuit in the behavioral realm.

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Automatic Regulation of Behavior

Social behavior is automatically regulated (i.e., adapted to the current environment) in two different ways—one motivational, the other perceptual. First, goals that direct social behavior can operate nonconsciously, just as do goals that guide cognitive processing or emotion regulation. In one recent set of experiments, social and behavioral goals that were activated through subliminal and supraliminal priming manipulations were shown to guide behavior in a purposive, though nonconscious, manner (Bargh, Gollwitzer, Lee-

Chai, Barndollar, & Trötschel, 2001). In one study, after being exposed to words related to achievement (e.g., "succeed," "master," "achieve") in a word-search puzzle, participants performed significantly better on a verbal task (purportedly part of a separate experiment), though they were unaware of the relation of the priming task to the experimental task. In another study, participants presented with words related to cooperation (e.g., "fair," "share," "cooperate") behaved more cooperatively in a commons-dilemma game than did nonprimed participants. It is important to note that in both the achievement and the cooperation situations studied, the nonconscious goal operated to guide effective behavior over extended periods of time (10–15 minutes), and in complex interaction with the ongoing stream of environmental information. Thus, these behavioral effects are not one-off, reflex actions (as in the stimulus–response chains of radical behaviorism; e.g., Skinner, 1957) but instead represent a sophisticated interplay with the current environment, involving selective attention to task-relevant information, as well as its cognitive transformation, in order to meet the task goal: in short, working memory operations (Cohen, Dunbar, & McClelland, 1990). Once again, therefore, the very mental organs strongly associated with executive or "control" processes are found to operate without conscious choice, awareness, or guidance; instead, they are themselves under the control of the nonconsciously operating goal structure (see Bargh, 2004).

Importantly, participants in these studies are not only unaware of the source or cause of the given goal's activation (through priming manipulations) but also unaware of its operation. For example, immediately after playing the commons-dilemma game for five rounds, participants were asked to estimate how committed they had been during the task to the goal of cooperating with their opponent (Bargh et al., 2001, Experiment 2). For participants who had been given the conscious, explicit goal to cooperate (through experimental instructions), these goal-commitment ratings correlated positively and significantly with the actual degree to which they had cooperated during the task. But for those for whom the cooperation had been nonconsciously induced (primed), these correlations were essentially zero. Even though they had just cooperated (or not) as much as did participants in the conscious goal condition, those in the nonconscious goal condition showed no awareness of the cooperative nature of their just-completed behavior in the task.

To claim the existence of "automatic self-regulation," we must show both that the phenomenon is automatic by standard criteria and also qualifies as self-regulation. For it to be truly *automatic*, it must not require conscious, intentional intervention, neither in the selection of the goal to pursue in the situation nor in the guidance of behavior toward that goal. The experimental evidence, as we have shown, is consistent with this claim. For it to be truly *self-regulation*, it must adapt thought, emotion, or behavior to the demands of both the current situation and the individual's own goal(s) within that situation. The evidence supports this part of the claim as well, because nonconsciously operating goals operate in harmony with unpredictable, unfolding events in the environment, using and transforming the available informational input in ways that help to attain the activated goal.

NONCONSCIOUS SELF-REGULATION IN REAL LIFE

In the aforementioned studies, goals were automatically activated by the presentation of words tightly associated with the goal construct. These words are hypothesized to activate a conceptual representation of the goal, which then (due to associations within the

goal structure) automatically activates motivational components of the goal. However, in the real world, of course, people do not often encounter such neatly encapsulated conceptual representations of a goal; instead, they encounter varied situations that are rich with cues as to their social and psychological meaning. We certainly want to know how automatic self-regulation operates in these more natural contexts, so it is important to study how naturalistic situational cues might lead to nonconscious goal activation. Several recent studies do just that, providing evidence that a variety of real-world situational features can directly trigger self-regulatory responses.

First, characteristics of the social environment can directly prime goals. For example, being in a position of relative power can serve to activate goals that individuals associate with having power. In an important sense, having power means having the ability to attain one's important goals, so one would expect there to be strong cognitive associations between the concept of power on the one hand, and those important goal concepts on the other (Bargh & Raymond, 1995).

Having power is, of course, associated with different kinds of goals for different people. For individuals who associate power with sex, as do men who have tendencies to act in a sexually aggressive fashion, situational features that represent power have been shown to activate sexual motivations automatically (Bargh, Raymond, Pryor, & Strack, 1995). For individuals who associate power with social-responsibility goals (i.e., to take care of those over whom one has power, to use power fairly and unselfishly), as do people who possess chronically communal relationship orientations, situational power cues automatically activate such goals and lead to socially responsible behavior (Chen, Lee-Chai, & Bargh, 2001). For those who associate power with self-interest goals, as do people who possess chronically accessible exchange-relationship orientations, situational power cues automatically activate these motives and lead to self-interested behaviors (Chen et al., 2001).

In one illustrative study, researchers primed power naturalistically by seating participants in a professor's office and manipulating whether participants sat in the professor's chair (relatively high power) or in a small guest chair on the other side of the professor's desk (relatively low power). As predicted, sitting in the professor's chair led communally oriented participants to make more socially desirable responses on the Marlowe–Crowne Social Desirability Scale (Crowne & Marlowe, 1960) and the Modern Racism Scale (McConahay, 1986), reflecting their situationally accessible motives to behave in a socially responsible fashion. Situational power priming did not affect exchange-oriented participants, who do not associate power with social responsibility goals.

People as Nonconscious Triggers of Self-Regulation

Among the most frequent (and important) features of social situations are the other people with whom one has relationships, such as family, friends, and colleagues. Seeing, interacting with, and even just thinking about a significant other have been shown automatically to activate goals that guide and regulate the self's actions in a given situation (Andersen, Reznik, & Manzella, 1996; Fitzsimons & Bargh, 2003; Shah, 2003). Significant others can have nonconscious effects on self-regulation in at least two ways. First, they can serve as triggers for the goals that the individual commonly pursues with that significant other (Andersen et al., 1996; Baldwin, 1992; Fitzsimons & Bargh, 2003). Over time, goals that an individual frequently pursues with a significant other are hypothesized to become automatically associated with the mental representation of that other person, so that when that representation is activated, so are all the goals that the individual associates with that person.

In a set of studies, just thinking about a significant other was sufficient to lead to goal-directed behavior in line with goals that individuals associated with that significant other (Fitzsimons & Bargh, 2003). For example, at the beginning of the semester, college students reported the interpersonal goals they pursued with their mothers. Approximately half of the students reported wanting to please their mothers by achieving academically. Two months later, students returned to the laboratory and completed what was described to them as a "verbal achievement task." Before beginning that task, participants completed a supraliminal priming task disguised as a memory test, in which participants either answered questions about their mothers (e.g., describe your mother's appearance), or neutral, noninterpersonal, questions (e.g., describe the path you walk to school). Priming these students with questions about their mothers presumably activated interpersonal goals that students reported pursuing with their mothers, including the goal to achieve academically to please them. Indeed, participants primed with stimuli related to their mothers outperformed control participants on the verbal achievement task; importantly, though, the priming manipulation only affected participants who had previously reported a goal to please their mothers by achieving academically.

The second route through which significant others have been shown to exert a nonconscious effect on self-regulation is by activating goals that the other person has for the self, rather than the self's goals toward the other (Moretti & Higgins, 1999; Shah, 2003). To examine this issue, Shah (2003) asked participants to nominate a significant other who would want the participant to perform well on a certain task, as well as one who would not have that goal for the participant. Subliminally priming participants with these significant others produced significant effects on their goal commitment, goal accessibility, and task performance, in line with the motivations of their significant others. These effects were moderated by the closeness and importance of the relationship between the self and the significant other, as well as by the number of different goals the self associated with the significant other (Shah, 2003).

These studies demonstrate that mental representations of the significant others in one's life contain both the goals that the self pursues toward the other, and the goals that the other has for the self. Thus, thinking of or interacting with a significant other will activate one's mental representation of that person and, therefore, these associated goals as well, and can lead to either of these kinds of automatic, goal-directed behavioral responses, without a person being necessarily aware of the source of these responses. Given the frequency with which people think about and interact with significant others, this source of nonconscious self-regulatory actions may be triggered frequently and on a daily basis.

Another route by which other people can trigger automatic effects on self-regulation is through what Aarts, Gollwitzer, and Hassin (2003) call *goal contagion*, or the process by which goal-directed activity is automatically triggered simply by observing the behaviors of another person. People have been hypothesized to automatically encode others' behavior in terms of goals (Brewer & Dupree, 1983; Read & Miller, 1989; Trzebinski, 1989). If so, these inferred goals may become activated in the minds of the observers, and upon being activated, they may also activate associated means that serve these goals (see Aarts & Dijksterhuis, 2003). In a set of studies, participants that observed another person attempting to reach a certain goal were indeed found to be more likely to pursue that goal themselves, but only when the goal was applicable to the current situation (Aarts et al., 2003). Goal contagion effects were shown to be automatic, proceeding outside of conscious awareness and control; thus, they constitute another case of an automatic but motivated process that operates to guide and regulate the self's behavior.

THE ORIGINS OF NONCONSCIOUS SELF-REGULATION

A burgeoning set of social-cognitive research has found evidence for an increasing role for automaticity in self-regulation. Goals can be activated nonconsciously by situational cues and go on to guide cognition, emotion, and behavior, all without need for conscious intervention or guidance. An as yet unanswered question is, where do these nonconscious self-regulation capabilities come from? How do they develop? Following Shiffrin and Schneider's (1977) model of the automatization of basic cognitive processes, an automatic self-regulatory process is usually assumed to result from the frequent and consistent pairing of that process with a certain situational cue. Conscious monitoring and guidance have long been considered to become less necessary for mental processes that are used frequently and consistently (see Wegner & Bargh, 1998, for review). In particular, research on skill acquisition has demonstrated that once put into motion by an explicit goal, well-practiced mental operations occur quickly and effortlessly (Newell & Rosenbloom, 1981; Smith & Lerner, 1986). The auto-motive model extends the automaticity of this process out into the environment, by arguing that goals become associated with features of situations in which the goals are typically activated and used, and can thus become automatically activated simply by the presence of those features in the environment (Bargh, 1990; Bargh & Chartrand, 1999). As reviewed earlier, empirical evidence supports the proposed link between real situational cues and goals (e.g., Bargh et al., 1995; Chen at al., 2001; Fitzsimons & Bargh, 2003; Shah, 2003).

Frequently pursued goals have been shown to be automatically associated not only with the situations in which they are commonly pursued but also with the lower order means that typically serve the goals (Aarts & Dijksterhuis, 2000). When a goal is activated, the habitual plan for achieving that goal appears to be automatically activated as well; for example, habitual bicycle riders were faster to indicate that cycling was an action than were non–bicycle riders, but only after they had been unobtrusively primed with the goal to travel. The goal to travel activated the means that usually serves that goal—for bicycle riders, that means is cycling. Thus, goals are associated not only with the situations in which they are frequently pursued but also with the habitual behaviors that frequently satisfy them.

Frequency does seem to play an important role in the automatization of goals. When people are highly committed to a certain goal, and pursue it frequently over time, the goal becomes so habitualized that it is considered to be a *chronic* motivation, guiding behavior much of the time. When such chronically operating intentions are applicable, even low-level cognitive processes such as categorization can be controlled in an automatic fashion (Moskowitz, Wasel, Gollwitzer, & Schaal, 1999). For example, when people have a chronic motive to be egalitarian, they are able to avoid making stereotypical inferences and judgments, even under time constraints that preclude consciously controlled processing.

Nonhabitual Self-Regulation

Frequent and consistent goal pursuit in stable settings is likely to lead to the reduction of conscious involvement. But are frequency and consistency always necessary for self-regulation to become automatic? Not all automatic processes have become so through repeated practice: perception–behavior effects (Dijksterhuis & Bargh, 2001) and automatic evaluation effects (Duckworth, Bargh, Garcia, & Chaiken, 2002) are both examples of automatic processes that do not seem to require practice. Furthermore, even the assump-

tion that automatic self-regulation, like other automatic processes, stems from frequent and consistent use has to this point gone largely untested. The development of automaticity has been a seriously underresearched topic in social cognition generally (for an exception, see Smith & Lerner, 1986), and essentially, no research speaks to how self-regulatory actions become automatized.

There is in fact evidence that considerable experience (frequency and consistency) may not be necessary for a self-regulatory strategy to become automated. Gollwitzer and colleagues have demonstrated that people can successfully use *implementation intentions* purposefully to delegate control of their behavior to the environment (Gollwitzer, 1993, 1999; Gollwitzer & Brandstätter, 1997). By designating a specific if–then contingency between an environment and a plan of action (i.e., if situation *X* arises, then I will perform behavior *Y*), individuals construct a mental association between a specific situational cue and the appropriate goal-directed behavioral response. Then, when future situational events occur, the preset behavior is enacted immediately and automatically, without conscious choice at that moment. For example, experimental participants that formed the implementation intention, "When a distraction arises, I will ignore it," were more successful at avoiding tempting distractions during a tedious task than those who simply formed a goal intention, "I will not let myself get distracted" (Gollwitzer & Schaal, 1998). Implementation intentions can guide both promotive self-regulatory behavior (i.e., behavior that makes a wanted outcome more likely), and preventive self-regulatory behavior (i.e., behavior that makes an unwanted outcome less likely).

The hypothesized automatic nature of behavior guided by implementation intentions has also been supported by experiments examining how efficient and fast such behaviors can be, and the extent to which they require conscious intent at the time of action. Behaviors guided by previously formed implementation intentions are faster to be enacted (Gollwitzer & Brandstätter, 1997), and are highly efficient, functioning well even under conditions of heavy cognitive load (Brandtstätter, Lengfelder, & Gollwitzer, 2001). Even when the critical situation is subliminally presented, people who have formed implementation intentions react faster to goal-relevant words and behave in a more goal-directed fashion than do people who did not form implementation intentions (Bayer, Moskowitz, & Gollwitzer, 2002). In short, then, when people use implementation intentions, they are setting up automatic self-regulatory behaviors, without any need for frequent and consistent practice of these behaviors (Gollwitzer, Bayer, & McCulloch, 2003).

Situational Norms as Triggers of Automatic Self-Regulation

The process of self-regulation begins with the choice or selection of a goal to pursue (Gollwitzer, 1996), and nonconscious processes can play an important role in this first stage. Merely presenting goal-relevant information—even subliminally—to perceivers is sufficient to activate goals that guide behavior automatically (e.g., Bargh et al., 2001; Chartrand & Bargh, 1996). Beyond such conceptual primes, real-world primes such as significant others (Fitzsimons & Bargh, 2003; Shah, 2003), information about relative situational power positions (Bargh et al., 1995), and other people's goal-directed behavior (Aarts et al., 2003) can all activate automatic self-regulation.

Self-regulatory behaviors can also originate directly from situational norms, and this norm–behavior link need not be consciously mediated. Indeed, much of the transmission of social norms from the environment to the individual likely occurs in a nonconscious manner. Cultural norms are thought to influence, guide, and regulate behavior, while often bypassing consciousness altogether (see Bargh, 1990; Cohen, 1997). In examining the

potential mechanisms through which situational norms may automatically guide behavior, recent research has focused on the cognitive structure of situational norms, hypothesizing that norms are represented mentally as associations between situations and behaviors normatively performed in those situations (e.g., Aarts & Dijksterhuis, 2003). If so, then being exposed to a feature of a given situation can automatically trigger the self-regulatory behaviors commonly performed in that situation. Indeed, when participants anticipated visiting a library and were primed with photographs of a library setting, they talked less loudly than did participants who were not primed with photographs of a library (Aarts & Dijksterhuis, 2003). Similarly, participants primed with images from the business world behaved in a more competitive fashion than did those primed with neutral images (Kay, Bargh, & Ross, 2003). Within the minimal group paradigm, participants primed with norms of loyalty behaved in ways that benefited their ingroup more than did participants primed with norms of equality, and these priming effects were partially mediated by perceptions of situational norms (Hertel & Kerr, 2001; see also Kay & Ross, in press), even though participants reported no awareness of the link between the priming task and the subsequent tasks, or of being affected by the primes in any way.

Conforming to social norms is sometimes a very deliberate process in which an individual experiences an internal conflict before deciding to go along with the group norms. However, as the aforementioned research suggests, conformity to norms can also occur nonconsciously; people who conform often report no understanding of why they went along with the norm, or even that the norm influenced their behavior at all. In a study of automatic conformity (Epley & Gilovich, 1999), participants were primed with words related to either conformity (e.g., "conform," "comply," "mimic," "follow") or nonconformity (e.g., "rebel," "deviate," "differ," "individual") in a scrambled sentence task. Participants were then asked to rate the experiment in the presence of confederates who gave extremely positive ratings. Participants primed with conformity gave much higher ratings of the experiment than did those primed with nonconformity, indicating that the nonconscious activation of the conformity and nonconformity constructs implicitly guided participants' tendency to comply with social norms.

It is important to note that participants in these studies reported no conscious awareness that their behavior was influenced by the priming manipulations. Consequently, this research suggests that situational norms may cause self-regulatory responses that are not guided by conscious control but can instead be considered automatic responses to demands of the current environment.

Potential Limiting Conditions to Nonconscious Goal Activation

Like all automatic processes, nonconscious goals are not likely to operate in conditions under which their operation is wholly inapplicable (Higgins, 1996). A nonconsciously activated goal may primarily influence behavior when the individual possesses a preexisting need state that makes the primed goal applicable. For example, people who are subliminally primed with the concept of thirst only become more likely to choose a thirst-quenching beverage if they are already somewhat thirsty (Strahan, Spencer, & Zanna, 2002). Beyond applicability, goals must also be available (Higgins, 1996), in the sense that the individual already desires that goal or has pursued it in the past (i.e., it exists as a mental representation for the individual). As Kurt Lewin (1951) often stressed, one cannot give or induce in another person a goal that he or she does not already have. Thus, a goal cannot be nonconsciously activated, unless it already exists in the mind of the individual.

In summary, nonconscious self-regulatory responses can be set into motion by environmental features, whether they be the presence of significant others or the existence of situational norms. Typically, goals will become automatically activated by a mental association to a present situational feature that is caused by their frequent and consistent co-occurrence. However, it is also possible that automatic self-regulation may result from less habitual goal pursuit, stemming instead from highly successful self-regulation–situation pairings, or from strategic delegation of control to the environment. Once set into motion, nonconscious goals must guide the self's actions through diverse and flexible means, regulating thoughts, feelings, and behaviors, without the need for conscious intervention. As we discuss in further detail in the following section, nonconscious self-regulation shares some of the essential features of conscious self-regulation and strikes an adaptive balance of efficiency and flexibility.

COMPARING CONSCIOUS AND NONCONSCIOUS SELF-REGULATION

Conscious self-regulation can be characterized by a set of unique motivational properties, including ignoring distractions, acting flexibly in response to situations, persisting in response to obstacles, resuming of goal pursuit after disruption, and managing conflicts between goals (e.g., Gollwitzer, 1990; Gollwitzer & Moskowitz, 1996; Heckhausen, 1991; Lewin, 1926, 1951; Locke & Latham, 1990). To what extend to the same qualities apply to nonconscious self-regulation? In a set of studies designed to assess whether nonconscious goal activation produces a "full-blown" motivational state, Bargh and colleagues (2001) found evidence that nonconscious goal pursuit possesses the same key features as conscious goal pursuit. For example, successful self-regulation requires individuals to *persist* toward goal attainment in the face of obstacles to success (Gollwitzer & Moskowitz, 1996). Participants in whom a nonconscious achievement goal was activated were more likely to continue working on a verbal task, even after having been told to stop (via an intercom), in an attempt to attain an ever-higher score, even if it meant violating the experimenter's explicit instructions (Bargh et al., 2001, Experiment 4).

Consciously pursued goals are also known to increase in strength over time until they are attained (Atkinson & Birch, 1970). To look at whether nonconscious goals also increase in strength over time, Bargh and colleagues (2001, Experiment 3) compared how goal priming affected performance on a verbal task immediately versus after a delay. Supporting the similarity of nonconscious and conscious goal pursuit, achievement-primed participants outperformed control participants in the no-delay condition, and this difference was actually magnified after a 5-minute delay. Achievement-primed participants in the delay condition, as predicted, outperformed those in the no-delay condition. No participants reported any conscious awareness of pursuing the achievement goal; these findings suggest that, like conscious goals, nonconsciously activated goals do increase in strength over time until they are acted upon.[2]

Another classic feature of conscious motivational states is the tendency to resume goal pursuit after a disruption (such as an interruption) has occurred (Gollwitzer & Liu, 1995). To examine whether people pursuing nonconscious goals would also resume the activity after a disruption, Bargh and colleagues (2001, Experiment 5) exposed half of their participants to achievement primes, then led all participants to engage in an intellectual task that was interrupted by an allegedly "accidental" equipment failure after 1 min-

ute. After these "equipment problems" were resolved, the experimenter announced that there would not be enough time to complete the study as planned; therefore, participants had a choice between returning to complete the intellectual task they had started or going on to the next task, a cartoon-rating task (judged in pilot testing to be far more attractive than the intellectual task). Participants with a nonconscious achievement goal were significantly more likely to return to complete the intellectual task than were nonprimed participants (66% vs. 32%, respectively), indicating that nonconscious goal pursuit possesses still another classic feature of conscious goal pursuit.

One crucial aspect of successful self-regulation is the ability to focus on one's current goal pursuit and inhibit other goals that may interfere with progress toward the current goal (Gollwitzer & Moskowitz, 1996; Shah & Kruglanski, 2002). Intergoal conflict arises whenever two accessible goals interfere with each other's fulfillment. To maintain focus on the current goal, participants may actively inhibit other accessible goals to give full self-regulatory resources to the goal at hand (Mischel & Ebbesen, 1970). But does this preservation of goal focus also occur for nonconscious goals? Recent research by Shah and colleagues on *goal shielding theory* has demonstrated that this inhibition of alternative goals occurs outside of conscious awareness (Shah, Friedman, & Kruglanski, 2002). When participants were subliminally primed with one of their own important goals, they responded by automatically inhibiting the activation of relevant alternative goals. Thus, active nonconscious goals also possess this capability to preserve goal focus by automatically inhibiting other, competing goals as distractions.

Although this inhibition of alternative goals is an automatic self-regulatory process, it is sensitive and flexible in its application, depending on the characteristics of the goals being pursued and inhibited, as well as on the motivations and emotions of the individual engaging in self-regulatory behavior. For example, people inhibit alternative goals more when they are highly committed to the current goal, when they feel more anxiety, and when they have a high need for closure; they inhibit alternative goals less when they feel depressed (Shah et al., 2002).

These findings further establish the important point that automatic processes are not just the negation or direct opposite of controlled processes; that is, just because controlled processes are sensitive to and flexible relative to present circumstances, for example, does not necessitate that automatic processes within the same circumstances be insensitive and inflexible. Rather, the present notion of "automatic control" suggests that successful self-regulation depends on the individual's flexible engagement in automatic processes.

Another important aspect of successful self-regulation is the ability to override temptations and pursue long-term goals: Momentarily tempting desires can cause the self to engage in behaviors that contradict important higher order, longer term goals (Fishbach, Friedman, & Kruglanski, 2003; Metcalfe & Mischel, 1999). However, note that such temptations may, over time, become automatically associated with the higher order goals with which they interfere. For example, seeing a delicious chocolate cake may remind dieters of their overriding goal to eat carefully and lose weight. If such associations do exist, then this may be an automatic form of self-regulation: The accessibility of a short-term desire may automatically activate a long-term motive, which can then regulate the self's actions.

Based on their belief that such associations reflect an adaptive self-regulatory mechanism, Fishbach and colleagues (2003) predicted that although temptations would indeed activate higher order goals, such higher order goals would actually inhibit temptations.

Unlike resource-consuming, conscious self-control operations, these facilitative and inhibitive links between temptations and higher order goals are likely to become overlearned when practiced repeatedly; thus, they require very little in terms of mental resources. Indeed, a set of studies found support for these hypotheses: The activation of temptations led to the increased accessibility of goal-relevant stimuli, whereas the activation of higher order goals inhibited the accessibility of temptation-relevant stimuli (Fishbach et al., 2003).

In summary, then, nonconscious self-regulation shares many of the essential properties that make conscious self-regulation successful. People pursuing nonconscious goals respond flexibly to situational challenges by engaging self-regulatory mechanisms: They persist toward goal progress even when obstacles arise; they increase their goal strength when their goals are unfulfilled; and they tend to resume goal pursuit after disruption. Some kinds of self-regulation appear to function mainly in an automatic fashion: Alternative goals are automatically inhibited in order to maintain focus on the goal being pursued, and temptations seem automatically to activate higher order goals with which they interfere, reminding individuals of their important goal pursuits. Thus, nonconscious self-regulation can function similarly to conscious self-regulation, but more efficiently and consistently, and may also complement conscious kinds of self-control with additional, unique mechanisms.

CONSEQUENCES OF AUTOMATIC REGULATION FOR THE SELF

When people consciously pursue goals, they inevitably engage in some kind of self-assessment procedure, following the attempt, regarding their progress toward fulfilling that goal. This "postactional" phase of goal pursuit is crucial to self-regulation, because the self needs to evaluate current progress to plan for future action (Carver & Scheier, 1981; Gollwitzer, 1990). Chartrand (2003) theorized that if nonconscious goal pursuit is to be useful for self-regulatory success, it should produce the same kinds of mood and self-evaluative consequences as does conscious self-regulation: Failure should induce a negative mood and impaired future performance in the same task domain, whereas success should induce a positive mood and enhanced future performance (Bandura, 1990).

To investigate this hypothesis, Chartrand (2003) primed some participants to induce a nonconscious achievement goal. Participants then engaged in what was presented to them as a filler task—a verbal anagram task that was either extremely difficult or extremely easy to complete. The difficulty of the task served as an implicit manipulation of success or failure at the nonconscious achievement goal; note that participants were not given any explicit goal or feedback regarding the filler task. As predicted, participants who were pursuing nonconscious achievement goals were happier (in a more positive mood) after working on the easy anagram task than on the difficult one, whereas the mood of control (no primed achievement goal) participants was entirely unaffected by success or failure at the task. Similarly, in another experiment, the filler-task-difficulty manipulation produced subsequent verbal task performance differences as well, but only for those participants with a nonconsciously operating achievement goal.

Thus, the similarity between conscious and nonconscious goal pursuit extends even to this ultimate stage of self-regulation, in which the self evaluates its performance and plans future action accordingly. One important difference between the effects of con-

scious and nonconscious goal pursuit on self-evaluations, however, is that after engaging consciously in goal pursuit, it is possible for people to be aware of how this has affected their mood and self evaluation; in contrast, after engaging in nonconscious goal pursuit, people cannot pinpoint the cause for any effects on the self (Cheng & Chartrand, in press). These two qualitatively different experiences—moods with and without attributable causes—can lead to different self-regulatory effects (Chartrand, Cheng, & Tesser, 2003). For example, negative moods that result from failures at nonconsciously activated goals may invoke stronger self-enhancement responses than do negative moods that originate from failures at conscious goals (Chartrand et al., 2003). In a series of studies, Chartrand and colleagues found that participants who failed at nonconscious goals created more self-serving definitions of success and engaged in more stereotyping of minority-group members than did participants who failed at conscious goals (who engaged in these behaviors more than did control participants). When participants were given the chance to understand the reason for their negative mood, these effects dissipated, again, suggesting that there are unique consequences of nonconscious goal pursuit.

CONCLUSIONS

Self-regulatory action is commonly believed to be a heavy consumer of cognitive resources. Certainly, self-control attempts can often be arduous and require the input of a great deal of effort and mental resources (e.g., Baumeister et al., 1998; Mischel, 1996). The research described in this chapter presents another form of self-regulation, one that, although is not nearly as labor-intensive, is effective nonetheless in guiding the self toward attainment of important goals. Because of the (oversimplified) dichotomy created between automatic and controlled processes in many dual-process theories, however, the concept of *automatic self-control* presents a challenge to our commonly held assumptions about what it means for a self-regulatory process to be automatic or controlled. As Baumeister (1998) has said, self-regulation is "active (rather than passive) and controlled (rather than automatic)" (p. 724). From our perspective, however, self-regulation can be both active and automatic.

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NOTES

1. Namely, that individuals pursue the given goal within the given situation both frequently and consistently (see Bargh & Chartrand, 1999; Shiffrin & Dumais, 1981), although research has yet to address the issue of automatic goal development.
2. There must be limits to this effect of goal strength increase over time, of course, but these are expected to follow from the same factors as for the consciously held goals studied by Atkinson and Birch (1970), for example, loss of opportunity conditions, increase in strength of a more important or pressing goal at the same time, and so on.

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