

Automaticity in Goal Pursuit

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The intersection of competence and motivation involves the ability to attain one's goals, to accomplish what one sets out to do. Both modern and classic theory and research on goal pursuit have focused mainly on the conscious and deliberate ways that people strive toward desired end states. In this chapter, we focus on the role played by automatic or unconscious motivations in the competent pursuit of one's important goals. How can such unconscious goal pursuit add to a person's competencies in a given domain? We show that unconsciously pursued goals are especially effective in keeping a person "on task" and moving in thought and action toward the desired goal, even when the conscious mind is distracted or focused elsewhere. Automatic or unconscious motivations respond immediately and effortlessly to environmental conditions (triggers) that promote or support the goal in question, such as in recognizing and acting upon opportunities that otherwise might have been missed. And the efficient nature of unconscious motivation makes it an especially effective means of goal pursuit in complex and busy social environments in which con-

scious attention is divided and in short supply.

Two main forms of unconscious goal pursuit have been featured in our research: one (automatic motivations) a long-term, chronic form that develops out of extended experience; the other (implementation intentions) a temporary and strategic form by which one sets up intended actions in advance, so that they later unfold in an automatic fashion. Before describing these two lines of research, we begin with some historical background on the concept of unconscious motivation as it has come and gone within psychology over the past century.

HISTORY OF THE UNCONSCIOUS MOTIVATION CONCEPT

The unconscious has had a long and bumpy ride through the history of psychology. Few, if any, other psychological concepts have instigated this much contention and polarization of opinion. William James considered it "a tumbling ground for whimsies," and Jean-Paul Sartre railed against it as a way to

abdicate personal responsibility for one's actions. Sigmund Freud, of course, championed the unconscious as a causal force in human thought and behavior, yet his medical and therapeutic perspective led him to focus as well on the unconscious's negative effects. Many modern-day motivational psychologists continue to hold this negative opinion (Bandura 1986; Locke & Latham, 1990; Mischel, Cantor, & Feldman, 1996). In their treatments, unconscious influences are characterized as rigid, undesirable habits of thought or behavior that must be overcome by conscious acts of will.

Freud's dynamic unconscious was primarily motivational in nature, driving behavior to express and fulfill deep-seated needs and wishes, and guarding and defending conscious experience from unpleasant memories of the past or threatening stimuli of the present. Following Freud's lead, the early work on unconscious influences within experimental psychology also focused on the motivational properties of the unconscious. This was the classic "New Look" perception research by Bruner and Postman and their colleagues (see reviews by Allport, 1955; Bruner, 1957; Erdelyi, 1974). The idea of perceptual defense involved motivational influences on the initial perception and awareness of environmental stimuli. Many studies showed, for example, that significantly longer tachistoscopic presentation times were needed for a participant to recognize taboo words or other stimuli (e.g., swastikas, spiders) likely to produce negative emotional reactions, compared to the recognition of emotionally neutral or positive stimuli.

But the New Look ideas concerning motivational influences on perceptual recognition and identification had difficulty gaining acceptance into the then-mainstream of psychological science. Erdelyi's (1974) historical analysis and review of the New Look indicates that 1950s psychology was just not ready for the idea of preconscious influences on stimulus recognition. But this all changed with the so-called "cognitive revolution" in psychology of the 1960s. Neisser's (1967) influential book, *Cognitive Psychology*, for example, reviewed experimental evidence of preattentive or preconscious perceptual analysis (e.g., pattern recognition, figural synthesis). Most notably, the classic research and theory on attention allocation of

Broadbent, Treisman, Norman, and others, which showed how stimuli could be analyzed for meaning prior to the person's conscious awareness of them, made the idea of early motivational screening of environmental stimuli much more plausible than it had been in the 1950s (see review by Lachman, Lachman, & Butterfield, 1979).

Thus, the idea of unconscious influences on perception gained a great deal of traction from the cognitive revolution and soon flourished in social and clinical psychology as well. It is now completely uncontroversial in mainstream psychology. But what happened to the concept of unconscious motivation? It did not reap the benefits of the cognitive revolution; rather, within social psychology, one of the consequences of that revolution was an attempt to eliminate motivational explanations for as many phenomena as possible (e.g., Nisbett & Ross, 1980).

Unconscious motivation, as a scientific concept within social psychology, thus had to overcome two separate historical resistances—the long-standing one to the unconscious as an explanatory variable, and the more recent one to motivational explanations as well. But just as research on the unconscious snuck back into respectability through the sheep's clothing of "attention research" (Broadbent, 1958), motivation research made its comeback under the cover of "task goals" (Srull & Wyer, 1986; Anderson & Pichert, 1978). Social cognition researchers had shown that the outcome of information-processing activities—such as organization of material in memory and ease of retrieval—varied as a function of the particular task goals assigned to participants (e.g., memorizing behavioral information vs. forming an impression based on it; Hamilton, Katz, & Leirer, 1980).

Accordingly, by about 1990, it had become clear that any complete model of social cognition had to take into account the individual's task or processing goals. The goal concept began to be included in social cognition models, mainly by assuming that goals were represented mentally in a similar way as was known for other classes of social stimuli, such as types of social behavior, roles, and groups (Bargh, 1990; Kruglanski, 1996). The auto-motive model (Bargh, 1990; see below) grew out of this idea: If goals were represented mentally just like

other varieties of social concepts (e.g., stereotypes), then the same properties that had been found to hold for other social representations—such as the capability of becoming activated outside of conscious awareness—should hold for goals as well. And so the concept of unconscious motivation made its return to scientific psychology: It was “unconscious” because it was automatic in the sense of being triggered and guided by external stimuli instead of an act of conscious choice and subsequent conscious control (Bargh, 1994), and it was “motivation” because goal representations were the particular cognitive concepts being automatically activated.

AUTO-MOTIVE THEORY: AUTOMATIC ACTIVATION AND PURSUIT OF PERSONAL GOALS

The auto-motive model of unconscious social motivations built upon the research of the 1970s, and especially the 1980s, that demonstrated the automatic activation capability of social mental representations, such as trait concepts (e.g., honest, aggressive), attitudes, and group stereotypes (see reviews by Bargh, 1989; Brewer, 1988; Wegner & Bargh, 1997). This research showed that frequently used mental representations will, over time, become active upon the mere presence of relevant information in the person's environment. For stereotypes, this would be easily identifiable group features such as skin color, gender, speech accent, and so on. For attitudes, the environmental trigger would be the mere presence of the attitude object in the environment (Fazio, 1986). For trait concepts, it would be features of observed social behaviors corresponding to the trait in question (Uleman, Newman, & Moskowitz, 1996).

The principle underlying all of these cases of automatic process development was that automatic associations are formed between the representations of environmental features (e.g., attitude objects, or common situations and settings) and other representations (e.g., evaluations or stereotypes, respectively) to the extent that they are consistently active in memory at the same time (Hebb, 1948). If one repeatedly and consistently thinks of members of a particular social group in stereotypical ways, for in-

stance, then the stereotype eventually would become active automatically upon the mere presence in the environment of a member of that group (Bargh, 1989; Brewer, 1988).

Under the assumption that goals, too, are represented mentally, and become automatically activated by the same principles, then goal representations should be capable of automatic activation by features of the contexts in which those goals have been pursued often and consistently in the past. If a given individual always competed with his or her siblings, then the goal of competition should become automatically activated upon just the mere presence of a sibling. In other words, it should become active even though the person may not intentionally and consciously choose to compete at that time and in that situation.

The auto-motive model further assumes that, once activated in this unconscious manner, the goal representation would then operate in the same way as when it is consciously and intentionally activated; that is, the model predicts that an automatically activated goal would have the same effects on thought and behavior as when the person consciously pursues that same goal (i.e., as when the goal is activated by an act of conscious will). In essence, then, the original auto-motive model (Bargh, 1990) derived the historical notion of unconscious motivation from the basic principles of modern-day cognitive psychology.

Such theoretical derivations are all well and good, but more was needed to establish the mundane reality of unconscious motivations in social life than logical or theoretical arguments. Accordingly, experimental research was conducted to test the model empirically. This research focused on three main questions: Can we observe goal attainment effects on thoughts, feelings, and behaviors by implicitly activated (primes) goals? Once activated, can unconscious goals keep operating outside of conscious awareness? And is automatic goal pursuit characterized by the same features as is conscious goal pursuit?

Goal Attainment Effects of Implicitly Activated Goals (Goal Priming)

The first question to be addressed was whether goals could be activated outside of conscious awareness. The standard method

used within social cognition research to test such a hypothesis is the priming or unrelated-studies paradigm (Bargh & Chartrand, 2000). In this design, the concept under study is first primed by causing the participant to think about or use it in some way that is unrelated to the focal task that comes next in the experiment. For example, to prime or passively activate the concept of honesty, the participant might be exposed to some synonyms of honesty in the course of working on a sentence construction task, such as the scrambled sentence test developed by Srull and Wyer (1979). The use of the concept in this first task should cause the concept to become activated. It is assumed that such activation persists for some time after the use of the concept, even though participants do not realize it (Higgins, Bargh, & Lombardi, 1985). Thus, the still-active concept can have an influence on information processing in the next experimental task (e.g., forming an impression of a target person), without the person being aware of this influence.

Chartrand and Bargh (1996) used this paradigm to test whether goal representations could be primed in the same manner. In one study, participants completed a scrambled sentence test that contained either some words related to the goal of impression formation (e.g., "judge," "evaluate") or to the goal of memorization (e.g., "retain," "absorb"). When this task had been completed, participants were given a second, ostensibly unrelated task to complete: to read each of a series of 16 behaviors performed by a target person and then answer some questions about them. After participants had read all of the behaviors, they were given a surprise recall task.

Previous research (Hamilton et al., 1980) had used the same procedure, but with explicit (conscious) instructions to participants either to memorize the presented information, or to form an impression of the person based on the behaviors. That study had found significantly better recall, and also greater thematic organization of the behavioral information in memory, for participants in the impression-formation condition. But in our study, no such explicit instructions were given; instead, all participants were given the same (generic) instructions about answering some questions later on. Nonetheless, the results were the same as

those in the previous study: participants in the impression-formation goal-priming condition both recalled more behaviors and showed greater thematic organization of them in memory compared to those in the memorization-goal-priming condition.

These findings suggest that goals can indeed be primed, and then produce the same outcomes as when consciously pursued. Subsequent studies found similar effects with a variety of other goals. For example, priming the goal of achievement (i.e., to perform well) causes participants to score higher on verbal tasks than do control group participants (Bargh & Gollwitzer, 1994; Bargh, Gollwitzer, Lee-Chai, Barndollar, & Trötschel, 2001), and priming the goal of cooperation causes them to make more cooperative responses in a negotiation task in which they were free to compete or cooperate (Bargh et al., 2001, Study 2).

Although these studies primed goal concepts rather directly, by presenting participants with words synonymous with the goal, goals can also become automatically activated indirectly, through their strong association with certain situational features that are primed instead. Indeed, this is closer to the way that the auto-motive model assumes that goals become automatically activated in the real world—that is, by the presence of situational features within which the goal has been frequently pursued in the past. Situational power is one such feature: priming the concept of power causes participants with sexual harassment tendencies to become more attracted to a female confederate than they otherwise would have been (Bargh, Raymond, Pryor, & Strack, 1995). It also causes people to behave more in line with their own self-interest, and against the interests of their fellow experimental participants (Chen, Lee-Chai, & Bargh, 2001). These findings support the model's assumption that strong, automatic associations develop between situational and goal representations, to the extent that the goal is pursued frequently and consistently within that situation.

Another important and common situational trigger for goal pursuit is the presence of a significant other. These are people such as our parents, siblings, children, dating partners, or spouses, friends, and close colleagues—people whom we think about a lot, and interactions with whom yield outcomes

that substantially impact on our moods and life satisfaction. Fitzsimons and Bargh (2003) assumed that our mental representations of these close others contain within them the goals that we frequently and consistently pursue when with them. For instance, a person might have the chronic and long-standing goals of making her mother proud of her, competing with her brother, and relaxing and having fun when with her best friend. Even though there may be people who share such goals with respect to these significant others, other people may want to avoid their mothers, to have fun with their brothers, and to look up to and emulate their best friends. Thus, there should be not only commonalities in goal pursuit across people but also some degree of individual variation in goals, given the same significant other (e.g., one's mother). This was confirmed in a preliminary survey of college undergraduates, in which they were asked to list the goals they pursued with five different types of significant others.

Next, in several laboratory experiments and one field experiment, participants' mental representations of a given type of significant other (e.g., a best friend) were primed without their awareness, and then participants were given an opportunity to pursue the goal chronically associated with that partner. In every case, participants did behave in line with this goal, even though their significant other was not, of course, physically present in the experimental situation. For instance, in participants who usually try to make their mothers proud of them, priming the representation of the mother caused them to outperform control participants on measures of verbal ability. In line with the auto-motive model's predictions, priming the mother had no effect on the verbal ability task performance of participants who pursued other goals with their mothers (e.g., friendship, helping her). Also, those who did have the goal of making their mothers proud, but who were not primed with the mother, did not perform any better than did the control group. Both ingredients were necessary: the priming or preactivation of the representation of one's mother, and the chronic, automatic association of one's mother with the goal of high performance. In practice, then, thinking about or being reminded of a certain significant other—which

can be prompted easily and innocently by merely glancing at their photograph on our wall or desk—is sufficient to put into motion those goals one chronically pursues when with that person. So even when they are not present, one starts to behave as if he or she were in their company.

A further real-life, implicit activation of goals may occur when we observe the goal-directed actions of others, even non-significant others. By perceiving other people's goal pursuits, the respective mental goal representations should become activated in ourselves, with the effect that we start to act on them as well. This goal-contagion hypothesis, according to which individuals automatically take on a goal that is implied by another's behavior, has recently been examined in a series of studies (Aarts, Gollwitzer, & Hassin, 2004). Participants were briefly exposed to behavioral information about another person, implying a specific goal (e.g., making money), and were then given the opportunity to act on this goal in a different way and context. Participants' own actions started to serve the same goal, and they acquired features of goal-directedness in the sense that they were affected by goal strength (i.e., were in line with the participants' personal need for money), showed persistence over time, and were more readily engaged when the given situation clearly lent itself to meeting the goal at hand. Most interestingly, participants were immune against the automatic adoption of the goals of others if these were pursued in an inappropriate, socially unacceptable way. Apparently, goal contagion will not occur if the observed goal pursuits of others are perceived to be unattractive and undesirable.

Unconscious Operation of Primed Goals

It is one thing to claim that goals can be activated automatically, but quite another to argue that once activated, goals continue to operate outside of conscious awareness. But this is indeed the strong form of the auto-motive model, and there is now evidence consistent with this claim. For one thing, in all such automatic goal studies, participants are carefully questioned and debriefed following the experiment, to make sure they were not aware of pursuing that goal during

the experimental task. Very few if any participants show this awareness (the data of those who do are removed prior to analyses); most are surprised, if not skeptical, that we, the experimenters, had caused them to pursue a goal without their knowledge. For example, in the Chartrand and Bargh (1996) study, impression-primed participants were no more likely to report having tried to form an impression of the target person than were memorization-primed participants, who in turn were no more likely to report having tried to memorize the information than were the impression-primed participants. More than that, very few participants reported having pursued either goal while reading the target's behaviors. In the Fitzsimons and Bargh (2003) research, participants in the field experiment at a major international airport, who were approached to participate while waiting for their flight to depart, largely did not believe the experimenter's explanation that they had been induced to volunteer to help the experimenter (or not) by first answering some questions about their friend (vs. coworker). People's personal theories about what causes them to do things just do not include the idea (and thus allow for the possibility) of unconscious motivations or causes (Wilson & Brekke, 1994).

Perhaps stronger evidence as to the unconscious operation of goals is furnished by Experiment 2 of Bargh et al. (2001), in which people were either primed (or not) to cooperate with their opponent in a negotiation task, or were told explicitly (or not) by the experimenter to cooperate. These two factors were crossed in the design of the study, in order to compare the conscious versus unconscious operation of the same goal. As in the other goal-priming studies, those who were primed to cooperate did so more than did nonprimed participants. Also, not surprisingly, those who were explicitly (consciously) told to cooperate did so more than those who were not. After the experimental task had been completed, all participants were then asked to rate how much they had tried to cooperate while performing the negotiation task with their opponent.

For each participant, then, we could compare these ratings of how much they had consciously tried to cooperate with their actual cooperative behavior during the negotiation (measured in terms of the

relative numbers of cooperative moves they had made during the task). For those in the explicit, conscious cooperation condition, these ratings correlated significantly with actual behavior: Those who had reported having tried harder to cooperate actually had cooperated more than other participants. In other words, self-reports accurately reflected the actual behavior. But for those in the unconscious (primed) cooperation condition, self-reports of how much they had tried to cooperate did not correspond at all (correlations near zero) with how much cooperation actually occurred. This is our strongest evidence to date that, for automatically activated goals, people are not consciously aware of the operation of these goals, even while they are successfully pursuing them.

Similarities of Unconscious to Conscious Goal Pursuits

Thus far, the evidence shows that unconscious goal pursuit produces the same effects (in terms of goal attainment) on thought, memory, and behavior as are known for conscious goal pursuit. Whether the goal has to do with how incoming social information is to be processed, how well an intellectual task is to be performed, or how one is to interact with another person, significant performance differences emerge between groups primed to unconsciously pursue different goals, just as they did in previous studies between groups explicitly told (or not) to pursue such goals. As Bargh and Chartrand (1999) noted, exactly how a given goal is put into play (i.e., consciously or unconsciously) does not seem to matter with respect to goal attainment. Regardless of how it became activated, the active goal operates on the available information that is relevant to its purposes, and guides thought and behavior toward the desired end state.

Thus, on outcome measures (i.e., how well the person attains the goal), the findings to date show high similarity between conscious and unconscious goal pursuit. However, the classic literature on conscious goal pursuit has also documented various content-free features of conscious goal pursuit; thus, one wonders whether unconscious goal pursuits also carry these features.

Consequences of Goal Attainment

Whenever goals are attained, people are said to experience positive self-evaluative consequences (e.g., succeeding on a given goal leads to feelings of pride, expecting to be praised by others; Atkinson, 1957; Heckhausen, 1977) that should put them in a positive mood. Moreover, succeeding on a given goal is said to lead to striving for more challenging goals (i.e., proactive goal striving; Bandura, 1997). To test whether the similarity of conscious and unconscious goal operation extends to these aftereffects of goal attainment, Chartrand (1999; Chartrand & Bargh, 2002) conducted several studies in which participants were induced to unconsciously pursue a goal (via a priming manipulation), which they then succeeded on or failed to meet. In one experiment, for example, a high-achievement goal was primed or not, and then all participants were given a set of anagrams to solve. Critically, the anagrams were either very easy to solve or impossible to solve. In this way, Chartrand manipulated whether participants succeeded or failed at their unconscious goal to perform well. Following the anagram task, participants completed either a mood measure or a test of verbal ability. The mood measure was intended to tap the predicted emotional consequences of a positive self-evaluation following goal attainment; the verbal ability test was intended to tap the predicted proactive goal striving.

The results confirmed that unconscious goal pursuit is characterized by the same goal attainment effects as have been found for conscious goal pursuit. Take first the findings in the no-goal condition, in which no high-achievement goal had been primed; whether the anagram task was easy or difficult made no difference to mood or performance on the verbal ability test. This was expected, because participants in the no-goal condition had no high-achievement goal activated on which they could succeed or fail.

For participants in the unconscious high-achievement goal condition, however, their moods and subsequent task performance were markedly affected by whether they had just completed the easy versus difficult anagram task. On the mood measure, those in the easy anagram condition were significantly happier than were participants who

had just worked on the difficult anagrams; and the easy anagram participants also outperformed the difficult anagram participants on the subsequent verbal ability test. Because the high-achievement goal was unconscious, and operating without the participant's awareness, these findings indicate that one's mood and also subsequent pursuit of relevant, more challenging goals can be affected by whether one succeeds or fails at a goal one does not even know one has. Chartrand's findings therefore suggest that unconscious goal striving leads to goal attainment consequences (positive self-evaluations; proactive goal striving) similar to those of conscious goal pursuit.

Goal Projection

It has always been assumed that people project not only their traits but also their goals onto others. Holmes (1978) referred to more than just traits when he defined "projection" as a "process by which persons attribute personality traits, characteristics, or motivations to other persons as a function of their own personality traits, characteristics, or motivations" (p. 677). He even suggested that projection should be more easily observed with motivational impulses than with traits (Holmes, 1968). Accordingly, we recently tested whether the projection effects postulated for explicit goals also hold true for implicit goals (Kawada, Oettingen, Gollwitzer, & Bargh, 2004).

In one study, the experimenter explicitly assigned the goal to compete to some participants (i.e., explicit goal condition) and then asked them to rate the competitive orientation of a presumed partner participant, with whom they expected to play a Prisoner's Dilemma game. In the implicit goal condition, the goal to compete was activated using a scrambled sentence technique that exposed participants to words such as "compete," "win," and "succeed." Compared to control participants, who entered the presumed Prisoner's Dilemma game without any assigned or activated competition goal, both implicit and explicit competition participants expected the presumed partner to act more competitively throughout the game. These results indicate that goal projection occurs regardless of whether the goal is unconscious or consciously held.

In a follow-up experiment, the goal to compete was implicitly activated by subliminally presenting competition-related words; in the explicit goal condition, participants were again asked to take a competitive stand in the upcoming Prisoner's Dilemma game. Moreover, the experimenters weakened the goal to compete by allowing some participants to meet this goal in an alternative competition task (Wicklund & Gollwitzer, 1982), prior to performing the Prisoner's Dilemma game. First, we could replicate the goal projection effect (as compared to a no-goal control group) with implicit and explicit competition goal participants whose goals had not been weakened. Second, however, when the goal to compete had been weakened, goal projection effects were no longer observed in both the implicit and the explicit goal condition. This finding supports the claim that it was indeed the participants' goal to compete that was being projected onto others, and not just the trait concept of competitiveness. Moreover, it demonstrates that implicitly activated (primed) goals and explicitly assigned goals are both readily projected onto others, and that both seem to have the property of losing strength after having been served successfully.

Motivational Qualities: Sustained Goal Activation, Persistence, and Resumption

Since the time of Kurt Lewin, motivational states and processes have classically been distinguished by features and qualities different from those of nonmotivational, purely cognitive processes. These qualities include behavioral features, such as persisting in attempting to reach the goal when facing difficulties and returning to the goal activity after being disrupted, as opposed to giving up at the first obstacle or walking away from the interrupted activity (Lewin, 1935). Atkinson and Birch (1970) identified a further signature of motivational states: the tendency to stay activated or even increase in activation strength over time, until the desired outcome is reached or one has gone through an active, effortful process of disengagement from wanting to attain it. Cognitive (nonmotivational) representations, in contrast, tend to decrease quickly in activation strength over time since last use (e.g., Higgins et al., 1985).

Because much of the research that has tested and supported the auto-motive model has relied on the same priming techniques and manipulations as those previously used to study unconscious social perception and cognition (Bargh, 1989; Bargh & Chartrand, 2000), the following question arises: Could the same perceptual, nonmotivational social representations (e.g., trait concepts) that had been primed in those previous studies be responsible for the so-called "motivational effects" described earlier? Why should the same or very similar priming manipulations be said to produce perceptual or nonmotivational effects in some studies, but motivational effects in others?

This is an important and complex question for which we do not yet have a complete answer, but some additional findings shed light on what that answer might eventually be. At present, it appears that the same priming manipulation can activate qualitatively different concepts or processes at the same time (Bargh, 1997). Thus, stimuli related to the concept of achievement activate or prime the perceptual construct of achievement, the category used to identify achievement behavior in someone else, as well as the motivational or goal representation of achievement, which is used to energize and guide our own strivings for high performance on a task.

The best evidence to date for this proposition comes from Study 3 by Bargh et al. (2001), in which participants were first primed (or not) with achievement-related stimuli. Next, there was either a 5-minute delay before the participant worked on the next task, or he or she worked on it right away, with no interpolated delay. The final factor in the design was the type of task participants worked on: They either read a story about a target person who behaved in a somewhat ambiguous achievement-oriented manner (the social perception task), or they worked on a verbal task, in which they tried to find as many different words as they could in a set of Scrabble letter tiles (the performance task). Note that the achievement-priming manipulation was the same for all participants in that condition, whether they subsequently worked on the social judgment or the verbal performance task.

The expected priming effects were obtained on both tasks in the no-delay condi-

tion, with those primed with achievement-related stimuli either judging the target person as more achievement-oriented (in the judgment task condition), or finding significantly more words (in the verbal performance task condition), than did the non-primed participants. However, as predicted, the time delay differentially impacted the priming effect on the perceptual versus the motivational task. On the perceptual task, the significant priming observed under no-delay condition disappeared after the 5-minute delay; this is consistent with previous studies of the time course of priming effects on social-perceptual tasks (Higgins et al., 1985). But on the motivational word-search task, the priming effect actually increased significantly in strength over the 5-minute delay. This is what would be expected, following Atkinson and Birch's (1970) dynamic theory of action, if a motivational state were driving the verbal task performance.

These findings help to establish that our goal-priming manipulations are indeed activating a motivational state, as opposed to the same perceptual and nonmotivational constructs as in prior research. Other recent experiments provide additional supportive evidence. In another experiment by Bargh et al. (2001, Study 4), participants' goal of achievement or high performance was primed (or not), and they then worked on the same Scrabble word-search task. The experimenter told participants that she had to see to another study in a different room but would give them the signal to stop working on the task over an intercom when the time came. Unknown to the participants, a hidden video camera recorded their behavior when and after the stop signal had been given. The dependent variable was whether the participant would keep working on the word-search task, trying for even higher scores, after the experimenter gave the stop signal, or whether they would stop working when faced with this obstacle to better performance. The results were clear: Over 50% of the participants in the achievement-primed condition continued to search for words after the stop signal had been given, compared to just over 20% of the nonprimed participants.

Thus, when one places an obstacle in the way of an unconsciously motivated person, a hindrance to attaining the goal (in this

case) of the highest possible score on the task, the person will act to remove or bypass that obstacle if at all possible. Experimental participants for whom this unconscious goal is not operating show much less of a tendency to keep working on the task; for them, it is just an experiment, and not a very involving task at that. It is the activation and operation of the unconscious high-achievement goal in this experiment that makes participants care enough about their performance to persistently strive for an ever-higher score, even though they have to do so secretly and surreptitiously (they believe) after the stop signal has been given.

We have also tested goal-primed participants' motivational tendency to resume an interrupted goal, even in the face of more attractive behavioral options. In this study (Bargh et al., 2001, Study 5), participants were told that they would complete two different tasks. Participants were first primed (or not) to activate the achievement goal, and then all participants worked on a word-search task. Halfway through that task, a staged power outage forced everyone to stop work. After a 5-minute delay, the power was restored, but now (as the experimenter informed participants) there was no longer enough time during the session for them to complete both of the tasks. They were given the option of going back to the first task, or moving on to the second task, in which they would rate each of a series of cartoons as to how funny they were. Pretesting had shown that this cartoon-rating task was greatly preferred over the word-search task.

The dependent variable was the percentages of participants in the goal-primed versus not-primed conditions who went back and completed the word-search task, forgoing the opportunity to view and rate the cartoons. As would be expected if our goal-priming manipulation had produced a strong motivational state, significantly more participants in the goal-primed condition (66%) returned to the incomplete first task, compared to 35% of the no-goal participants.

Summary of Goal Priming Research

Our research has demonstrated, first, that goals can be triggered without an act of will or conscious choice on the part of the indi-

vidual, simply by the presence of relevant situational cues. Moreover, once activated, the goal continues to operate in an unconscious fashion, with people unable to report or recognize immediately afterward that they have just pursued that goal, even though they have given every indication (on our dependent measures) of having done so. On several different types of commonly held goals—achievement, cooperation, impression formation, and memorization, the unconscious operation of the goal produced the same effects that others have observed when that goal is pursued with full conscious awareness and intent. These effects are not restricted to the outcome of the goal pursuit, but extend to content-free characteristics, such as self-evaluation, proactive goal striving, projection, sustained goal activation, persistence, and resumption. It appears, then, that successful goal pursuit does not require consciously held goals and conscious instigation and monitoring of respective goal striving. Rather, goals can be pursued and attained regardless of their status in consciousness.

STRATEGIC AUTOMATION OF GOAL PURSUIT: IMPLEMENTATION INTENTIONS

Classic theories of motivation (e.g., Atkinson, 1957, Fishbein & Ajzen, 1975; Heckhausen, 1977, McClelland, 1985; see reviews by Gollwitzer, 1990; Gollwitzer & Moskowitz, 1996; Oettingen & Gollwitzer, 2001) see the implementation of consciously set goals in direct relation to the strength of the goal, which in turn is a product of expected utility (desirability) of goal attainment and the likelihood that the goal can be attained (feasibility). However, even though (self-set or assigned) goals to do more good and less bad have been found to be reliably associated with actual efforts in the intended directions (Ajzen, 1991; Godin & Kok, 1996; Sheeran, 2002), these intention-behavior relations are modest. This is largely due to the fact that people, despite having formed strong intentions on the basis of high desirability and feasibility beliefs, fail to act on them (i.e., people are inclined but still abstain; Orbell & Sheeran, 1998).

The gap between intentions and behavior is largely due to the fact that the successful translation of goals (intention) into respective behaviors requires solving numerous problems of self-regulation, many of them having to do with being burdened by thoughts, feelings, and actions that are irrelevant to the goal pursuit at hand (Gollwitzer, 1996). In order to meet their goals, people often have to seize quickly viable opportunities to initiate relevant actions, a task that becomes particularly difficult when attention is directed elsewhere (e.g., when one is absorbed by competing goal pursuits, wrapped up in ruminations, gripped by intense emotional experiences, or simply tired). But even if the person has successfully started to act on a set goal, the ongoing goal pursuit needs to be shielded from getting derailed by negative influences from outside (e.g., temptations, distractions) and inside (e.g., self-doubts).

With all of these problems of goal pursuit, automatic control of goal-directed action should come in handy, because established routines linked to a relevant context would release the critical goal-directed behavior immediately, efficiently, and without a conscious intent. Often, however, such routines are not established, and the goal-directed behavior is not yet part of an everyday routine. Research on implementation intentions (Gollwitzer, 1993, 1999) suggests that—as a substitute—ad hoc automatic action control can be achieved by forming implementation intentions that take the format, “If Situation X is encountered, then I will perform Behavior Y!” In an implementation intention, a mental link is created between an anticipated future situational cue and an intended instrumental goal-directed response.

Implementation intentions need to be distinguished from goals or goal intentions. Goal intentions have the format (“I intend to reach Z!”), whereby Z may relate to a certain outcome or behavior to which the individual feels committed. Both goal intentions and implementation intentions are acts of willing, wherein the first specifies an intention to meet a goal, and the second refers to an intention to perform a plan. Commonly, implementation intentions are formed in the service of goal intentions, because they specify the when, where, and how of goal-directed responses. For instance, a

possible implementation intention in the service of meeting the health goal of eating vegetarian food would link a suitable situational cue (e.g., one's order is taken at a restaurant) to an appropriate goal-directed behavior (e.g., asking for a vegetarian meal).

The mental if-then links created by implementation intentions are expected to facilitate goal attainment on the basis of various psychological processes that relate to both the anticipated situation and the linked behavior (Gollwitzer, 1999). Because forming implementation intentions implies the selection of a critical future internal or external cue (i.e., a viable opportunity), it is assumed that the mental representation of this situation becomes highly activated, hence more accessible. This heightened accessibility should make it easier to detect the critical situation in the surrounding environment and to attend readily to it even when one is busy with other things. Moreover, once the critical cue is encountered, the response specified in the then part of the implementation intention should be triggered in an automatic fashion that is immediate, efficient, and without necessitating a conscious intent. In summary, the formation of implementation intentions is a strategy of regulating goal pursuit that switches conscious control of goal-directed action to automatic control.

Research on action control via implementation intentions to date has focused on the following three questions: Are implementation intentions of help in overcoming the various problems of goal pursuit? Do implementation intentions indeed allow for the automatic control of goal-directed action? And what kind of price do people pay when self-regulating their goal pursuits by forming if-then plans?

Implementation Intentions Help Overcome Classic Problems of Conscious Goal Pursuit

The conscious self-regulation of goal pursuit often runs aground. This is true, whether the problems at hand are related to getting started, staying on track in the face of internal or external disturbances, keeping up motivation in the face of difficulties, or switching from ineffective to more effective means. However, research on the effects of forming

implementation intentions on translating goal intentions into behavior shows that all of these problems benefit from the strategic automation of goal pursuit provided by implementation intentions.

Getting Started

This problem of goal pursuit embraces three different issues, each of which militates against effectively getting started on one's goals. The first has to do with remembering one's goal intention (Einstein & McDaniel, 1996). When acting on a given goal is not part of one's routine, or when one has to postpone acting on it until a suitable opportunity presents itself, one can easily forget to do so. Dealing with many things at once, or becoming preoccupied by a particular task, can make this even more likely, especially when the given goal is new or unfamiliar. Empirical support of this reason for the intention-behavior gap comes from retrospective reports by inclined abstainers. For example, 70% of participants who had intended to perform a breast self-examination but failed to do so offered forgetting as their reason for nonperformance (Milne, Orbell, & Sheeran, 2002; Orbell, Hodgkins, & Sheeran, 1997). Also, meta-analysis has shown that the longer the time interval between measures of goal intentions and goal achievement, the less likely it is that intentions are realized (Sheeran & Orbell, 1998). These findings suggest that remembering one's goal intentions does not come easy to people.

But even if one remembers what one is supposed to do, there is another problem that may need to be resolved, namely, seizing the opportunity to act. This problem is likely to be especially acute when there is a deadline for performing the behavior, or when the opportunity to act is presented only briefly. In these circumstances, people may fail to initiate goal-directed responses because they fail to notice that a good time to get started has arrived, they are unsure how they should act when the moment presents itself, or they simply procrastinate. Oettingen, Hönig, and Gollwitzer (2000, Study 3) showed that considerable slippage can occur even when people have formed strong goal intentions to perform a behavior at a particular time. Participants were pro-

vided with diskettes containing four concentration tasks and formed goal intentions to perform these tasks on their computers at a particular time each Wednesday morning for the next 4 weeks. The program on the diskette recorded the time that participants started to work on the task from the clock on participants' computers. Findings indicated that the mean deviation from the intended start time was 8 hours, that is, a discrepancy of 2 hours on average for each specified opportunity. Similar findings were obtained by Dholakia and Bagozzi (2003, Study 2) when participants' task was to evaluate a website that could be accessed only during a short time window. Here, only 37% of participants who formed a respective goal intention were successful at accomplishing the task. In summary, people may not get started with goal pursuit, because they fail to seize good opportunities to act.

There are also many instances in which people remember their goal intentions (e.g., to order a low-fat meal) and recognize that an opportune moment is upon them (e.g., it is lunchtime at one's usual restaurant) but nonetheless fail to initiate goal-directed behaviors, because they start to reflect anew on the desirability of the goal intention (i.e., start to have second thoughts). This problem has to do with overcoming an initial reluctance to act that is likely to arise when people have decided to pursue a goal that involves a trade-off between attractive long-term consequences versus less attractive short-term consequences (Mischel, 1996). For example, a strong goal intention to order low-fat meals is commonly formed on the basis of long-term deliberative thinking, according to which eating low-fat food is perceived as highly desirable; however, once the critical situation is confronted, short-term desirability considerations are triggered that occupy cognitive resources at the moment of action (e.g., the low-fat meal is perceived as tasteless at the critical juncture). Such dilemmas between the head and the heart should thus also get in the way of readily acting on the respective goal in the face of good opportunities (Loewenstein, Weber, Hsee, & Welch, 2001; Metcalfe & Mischel, 1999; Trafimow & Sheeran, in press).

So the question arises: Does forming implementation intentions that plan out in ad-

vance when, where, and how one wants to move toward goal attainment ameliorate the problems of action initiation spelled out earlier. Various studies on the effects of implementation intentions on the rate of goal attainment suggest a positive answer to this question given the type of goals that have been found to benefit from forming implementation intentions. For instance, Gollwitzer and Brandstätter (1997) analyzed a goal intention (i.e., writing a report about how one spent Christmas Eve) that had to be performed at a time (i.e., during the subsequent Christmas holiday) when people were commonly busy with other things. Similarly, Oettingen et al. (2000, Study 3) observed that implementation intentions help people to act on their task goals (i.e., taking a concentration test) on time (e.g., at 10 A.M. in the morning of every Wednesday over the next 4 weeks). Other studies have examined the effects of implementation intentions on goal attainment rates with goal intentions that are somewhat unpleasant to perform. For instance, the goal intentions to perform regular breast examinations (Orbell et al., 1997), cervical cancer screenings (Sheeran & Orbell, 2000), resumption of functional activity after joint replacement surgery (Orbell & Sheeran, 2000), and engaging in physical exercise (Milne et al., 2002), were all more frequently acted on when people had furnished these goals with implementation intentions. Moreover, implementation intentions were found to facilitate the attainment of goal intentions when it is easy to forget to act on them (e.g., regular intake of vitamin pills, Sheeran & Orbell, 1999; the signing of work sheets with the elderly, Chasteen, Park, & Schwarz, 2001).

The results of these studies suggest that implementation intentions indeed facilitate the initiation of goal-directed behaviors by simplifying this process (i.e., making it less effortful). This conclusion is also supported by the finding that the beneficial effects of implementation intentions are commonly more apparent with difficult-to-implement goals compared to easy goals. For instance, implementation intentions were more effective in helping people to complete difficult, compared to easy, personal projects during Christmas break (Gollwitzer & Brandstätter, 1997, Study 1). And forming implementation intentions was more beneficial to fron-

tal lobe patients, who typically have severe problems with executive control, than to college students (Lengfelder & Gollwitzer, 2001, Study 2).

Staying on Track

Many goals cannot be accomplished by simple, discrete, one-shot actions but require continuous striving and repeated complex behavioral performances to be attained. Once a person has initiated these more complex goal pursuits, bringing them to a successful ending may be very difficult when certain internal (e.g., being anxious, tired, overburdened) or external stimuli (e.g., temptations, distractions) are not conducive to goal realization but instead generate interferences that could potentially derail the ongoing goal pursuit. Thus, one wonders whether implementation intentions can facilitate the shielding of such goal pursuits from the negative influences of interferences from inside and outside the person.

There are two major strategies in which implementation intentions can be used to shield an ongoing goal pursuit: (1) directing one's implementation intentions toward the suppression of negative influences, and (2) directing one's implementation intentions toward spelling out the ongoing goal pursuit, so that it becomes sheltered from these negative influences. For example, in the realm of social competence: If a person wants to avoid being unfriendly to a friend who is known to make outrageous requests, she can protect herself from showing the unwanted unfriendly response by forming suppression-oriented implementation intentions. Suppression-oriented implementation intentions can take different formats. The person may focus on reducing the intensity of the unwanted response by intending not to show the unwanted response: "And if my friend approaches me with an outrageous request, then I will not respond in an unfriendly manner!" But the person may also try to reduce the intensity of the unwanted response by specifying the initiation of the respective antagonistic response: "And if my friend approaches me with an outrageous request, then I will respond in a friendly manner!" Finally, suppression-oriented implementation intentions may even focus a person away from the

critical stimulus: "And if my friend approaches me with an outrageous request, then I'll ignore it!"

Two sets of experiments analyzed the effects of suppression-oriented implementation intentions. The first looked at the control of unwanted spontaneous attention to tempting distractions (Gollwitzer & Schaal, 1998). Participants had to perform a boring task (i.e., a series of simple arithmetic tasks) while being bombarded with attractive distracting stimuli (e.g., video clips of award-winning commercials). Whereas control participants were asked to form a mere goal intention ("I will not let myself get distracted!"), experimental participants in addition formed one of two implementation intentions: "And if a distraction arises, then I'll ignore it!" or "And if a distraction arises, then I will increase my effort at the task at hand!" The ignore implementation intention always helped participants to ward off the distractions (as assessed by their task performance), regardless of whether the motivation to perform the tedious task (assessed at the beginning of the task) was low or high. The effort-increase implementation intention, in contrast, was effective only when motivation to perform the tedious task was low. Apparently, when motivation is high to begin with, effort-increase implementation intentions may create overmotivation that hampers task performance. It seems appropriate therefore to advise motivated individuals who suffer from being distracted (e.g., ambitious students doing their homework) to resort to ignore implementation intentions rather than to implementation intentions that focus on the strengthening of effort.

The second set of experiments analyzing suppression-oriented implementation intentions studied the control of the automatic activation of stereotypical beliefs and prejudicial evaluations (Gollwitzer & Schaal, 1998). In various priming studies, with short stimulus-onset asynchronies of less than 300 ms between primes (presentations of members of stigmatized groups) and targets (adjectives describing relevant stereotypical attributes or neutral positive-negative adjectives), implementation intentions helped to inhibit both the automatic activation of stereotypical beliefs and the prejudicial evaluations relative to women, the elderly, and the

homeless. These implementation intentions (i.e., if-then plans) specified being confronted with a member of the critical group in the if part, and either "Then I won't stereotype" (respectively, "Then I won't evaluate negatively") or "Then I will ignore the group membership" in the then part. Regardless of which then parts were used, both types of suppression-oriented implementation intentions were effective.

The research presented in the preceding two paragraphs used implementation intentions that specified a potential interference in the if part. The specified interference was linked to a then part that described an attempt at suppressing the unwanted negative influence of this interference on one's goal pursuit. Self-regulation by this type of implementation intention implies that one has to be in a position to anticipate these potential interferences on the way to the goal; one even needs to know what kind of unwanted responses these interferences elicit, if one prefers to specify not showing this response in the then part of the implementation intention (rather than showing a goal-directed response or simply ignoring the interfering event). Fortunately, a simpler way to use implementation intentions to protect an ongoing goal pursuit from getting derailed is also available. Instead of gearing one's implementation intentions toward anticipated potential interferences and the disruptive responses they trigger, one may form implementation intentions geared at stabilizing the ongoing goal pursuit at hand. We again use the example of a tired person who is approached by her friend with an outrageous request, and who will likely respond in an unfriendly manner: If this person has stipulated in advance in an implementation intention what she will converse about with her friend, the critical interaction may simply run off as planned, and being tired should thus fail to affect the person's relating to her friend. As is evident from this example, the present self-regulatory strategy should be of special value whenever the influence of detrimental self-states (e.g., being tired, irritated, anxious) on derailing one's goal-directed behavior has to be controlled. This should be true whether or not such self-states and/or their negative influences on one's goal-directed behavior reside in consciousness.

Gollwitzer and Bayer (2000; Gollwitzer, Bayer, & McCulloch, 2005) tested this hypothesis in a series of experiments in which participants were asked (or not) to make if-then plans regarding the implementation of an assigned task goal. Prior to beginning work on the task, participants' self-states were manipulated, so that the task at hand became more difficult (e.g., a state of self-definitional incompleteness prior to a task that required perspective taking; Gollwitzer & Wicklund, 1985; a good mood prior to a task that required evaluation of others nonstereotypically; Bless & Fiedler, 1995; and a state of ego-depletion prior to solving difficult anagrams; Baumeister, 2000; Muraven, Tice, & Baumeister, 1998). The induced critical self-states negatively affected task performance only for those participants who had not planned out in advance how they wanted to perform the task at hand (i.e., had only set themselves the goal to come up with a great performance). Implementation intention participants were effectively protected from the negative influences associated with the induced detrimental self-states.

This research provides a new perspective on the psychology of self-regulation. Commonly, effective self-regulation (Baumeister, Heatherton, & Tice, 1994) is understood in terms of strengthening the self, so that the self can meet the challenge of being a powerful executive agent. Therefore, most research on goal-directed self-regulation focuses on strengthening the self in such a way that threats and irritations become less likely, or on restoring an already threatened or irritated self. All of these maneuvers are targeted in the end on changing the self, so that the self becomes a better executive. Instead, the findings of Gollwitzer and Bayer (2000) suggest a perspective on goal-directed self-regulation that gets around changing the self by facilitating action control via linking it to situational cues.

People's goal pursuits, however, are threatened not only by detrimental self-states but also by adverse situational conditions. Many situations have negative effects on goal attainment, unbeknownst to the person who is striving for the goal. A prime example is the social loafing phenomenon, in which people show reduced effort in the face of work settings that produce a reduction of account-

ability (i.e., performance outcomes can no longer be checked at an individual level). Because people are commonly not aware of this phenomenon, they cannot form implementation intentions that specify a social loafing situation as a critical situation, thereby rendering an implementation intention that focuses on suppressing the social loafing response as an unviable self-regulatory strategy. As an alternative, people may again resort to forming implementation intentions that stipulate how the intended task is to be performed, thus effectively blocking any negative situational influences.

Supporting this contention, when Endress (2001) performed a social loafing experiment that used a brainstorming task (i.e., participants had to find as many different uses for a common knife as possible), she observed that implementation intentions ("And if I have found one solution, then I will immediately try to find a different solution!"), but not goal intentions ("I will try to find as many different solutions as possible!"), protected participants from social loafing effects. Findings reported by Trötschel and Gollwitzer (2004) also support the notion that goal pursuits planned by forming implementation intentions become invulnerable to adverse situational influences. In their experiments on the self-regulation of negotiation behavior, loss-framed negotiation settings failed to unfold their negative effects on fair and cooperative negotiation outcomes when the negotiators had in advance planned out their goal intentions to be fair and cooperative, with if-then plans. Finally, in further experiments, Gollwitzer (1998) observed that competing goal intentions activated outside of a person's awareness (by using goal-priming procedures described in the first part of this chapter) failed to affect a person's ongoing goal pursuit, if this goal pursuit was planned out in advance via implementation intentions.

It appears, then, that the self-regulatory strategy of planning out goal pursuits in advance via implementation intentions allows the person to reap the desired positive outcomes, without having to change the environment from an adverse to a facilitative one. This is very convenient, because such environmental change is often very cumbersome (e.g., it takes the costly interventions

of mediators to change the loss frames adopted by conflicting parties into gain frames), or not under the person's control. Moreover, people are often not aware of the adverse influences of the current environment (e.g., a deindividuated work setting or a loss-framed negotiation setting), or they do not know what alternative kind of environmental setting is actually facilitative (e.g., an individualized work setting or a gain-framed negotiation setting). In such performance situations, the self-regulatory strategy of specifying critical situations in the if part of an implementation intention and linking them to a coping response in the then part does not qualify as a viable alternative self-regulatory strategy. Rather, people need to resort to the strategy of planning out their goal pursuits in advance via implementation intentions, thereby protecting them from adverse situational influences.

Motivation Control

Ideally, people set themselves goals in line with their beliefs that the goal can actually be attained (i.e., goal strength reflects perceived feasibility; Oettingen, 2000; Oettingen, Pak, & Schnetter, 2001). Such beliefs may take the form of high-outcome expectations or more specific high self-efficacy expectations (i.e., beliefs that one possesses what it takes to reach the goal; Bandura, 1997). In any case, a person who has decided to strive for a certain goal on the basis of high expectations should be highly motivated to strive for the chosen goal. Still, one wonders what happens when people run into difficulties in trying to implement the goal. Will they simply adjust their outcome expectations and self-efficacy beliefs downwards, thus losing motivation to strive for the goal? As Kuhl (1984) has pointed out, people can and do push back by keeping up their motivation to pursue the goal at hand (i.e., they engage in motivation control).

Because overcoming the self-doubts originating from difficulties and failures is a rather complex affair for which some people may be better equipped than others (Dweck, 1999; Elliot & Thrash, 2002), Gollwitzer and Bayer (2004) wondered whether the self-regulatory strategy of forming implementation intentions could be used to facilitate such motivation control. In a first ex-

periment, high school students were asked to perform a very challenging math test composed of 10 individual problems. In the mere goal intention condition, the students had to take the test with the assigned goal of excelling on it (i.e., correctly solve a very large number of problems). In the implementation intention condition, participants had to furnish this goal intention with the following if-then plan: "And as soon as I start to work on a new problem, then I tell myself: I can do it!" Even though the mean number of problems solved was very low in the whole sample (i.e., 3.5 problems), implementation intention participants solved significantly more problems (4.3 problems) than mere goal intention participants (2.8 problems). Apparently, the simple plan of assuring themselves of their high self-efficacy when taking on a new, individual problem helped participants to perform well.

In a follow-up experiment, we asked college students to solve a series of Raven Matrices that became increasingly more difficult. We again established a mere goal intention group (i.e., correctly solve a very large number of matrices) and an implementation intention group (i.e., "As soon as I start working on a new matrix, I'll tell myself that I can do it"). In addition, there was also a group of goal intention participants who had to tell themselves right after having received the goal intention instruction that they could meet this goal (i.e., "I can do it!"). As it turned out, only the implementation intention group achieved a superior performance on the test. This finding suggests that again, implementation intentions allow for effective motivation control, and that this is achieved by linking self-assuring statements to distinct critical cues.

Switching to More Effective Means

There is a further self-regulatory problem with successfully moving toward goal attainment: switching to better means when the chosen means turn out to be unproductive (Carver & Scheier, 1999; Gollwitzer, 1990). People often fail readily to disengage from a chosen failing strategy or means because of a strong self-justification motive (Brockner, 1992). Such escalation effects should be reduced effectively, however, by the use of implementation intentions that specify exactly

when to switch to a different strategy or means, because action control is then delegated to this specified cue. The self-regulatory strategy of simply setting goals (e.g., to avoid the escalation of commitment by always pursuing the best strategy) should be comparatively less effective, because it demands effortful deliberation of the instrumentality of the chosen strategy or means *in situ* (i.e., when failure experiences are mounting), which—to make things worse—will likely be biased by self-defensiveness.

Henderson, Gollwitzer, and Oettingen (2004, Study 1) tested the hypothesis that furnishing disengagement goals with implementation intentions should help people to relinquish a failing strategy of goal pursuit more effectively. For this purpose, a classic paradigm was used that creates a strong escalation tendency (Bobocel & Meyer, 1994): Participants had to choose and subsequently justify their choice among four different strategies of performing an assigned test measuring an important aptitude (i.e., general academic knowledge). Prior to working on the test with the chosen strategy, participants in the mere goal intention condition repeated the statement, "I will always pursue the best strategy!" Participants in the implementation intention condition repeated this goal intention to themselves, along with the plan, "And if I receive disappointing feedback, then I'll switch to a different strategy!" In line with our expectations that implementation intentions facilitate switching to a different strategy, 19 out of 29 participants (66%) in the goal intention group, and 27 out of 29 participants (93%) in the implementation intention group, disengaged from their initial strategy when false failure feedback was given on participants' quality of test performance.

The Psychological Mechanisms Underlying Implementation Intention Effects

It is assumed (Gollwitzer, 1993) that implementation intentions manage to switch the conscious and effortful mode of the control of goal-directed action to the automatic mode of action control (i.e., direct control by specified internal or external cues). To empirically test such a shift, it does not suffice to show that many of the problems of

goal pursuit that are difficult to master by conscious and effortful self-regulation are more easily mastered by forming implementation intentions (as has been extensively demonstrated in the studies reported earlier). One would also like to see experiments that more directly assess whether the action control achieved by implementation intentions does indeed carry features of automaticity: immediate, efficient, and not requiring conscious intent.

*Implementation Intentions:
The Specified Situation*

Swift and efficient responding to the critical situation specified in the if part of an implementation intention implies that this situation is readily attended to and easily detected (Gollwitzer, Bayer, Steller, & Bargh, 2002). One study, using a dichotic-listening paradigm, demonstrated that words describing the anticipated critical situation were highly disruptive to focused attention in implementation intention participants compared to goal intention participants (i.e., the shadowing performance of the focused attention materials decreased). In another study using an embedded figures test (Gottschaldt, 1926), where smaller a-figures are hidden within larger b-figures, enhanced detection of the hidden a-figures was observed with participants who had specified the a-figure in the if part of an implementation intention (i.e., had made plans on how to create a traffic sign from the a-figure). Similarly, Aarts, Dijksterhuis, and Midden (1999) used a lexical decision task and found that the formation of implementation intentions led to subjects' faster lexical decisions for those words that described the critical situation.

*Implementation Intentions:
The Specified Goal-Directed Behavior*

The postulated automation of action initiation has also been supported by the results of various experiments that tested immediacy, efficiency, and the presence-absence of conscious intent. Gollwitzer and Brandstätter (1997, Study 3) demonstrated the immediacy of action initiation in a study in which participants had been induced to form implementation intentions that speci-

fied viable opportunities for presenting counterarguments to a series of racist remarks made by a confederate. Participants with implementation intentions initiated counterarguments sooner than did participants who had formed the mere goal intention to counterargue.

The efficiency of action initiation was further explored in two experiments using a go-no-go task embedded as a secondary task in a dual-task paradigm (Brandstätter, Lengfelder, & Gollwitzer, 2001, Studies 3 and 4). Participants formed the goal intention to press a button as fast as possible if numbers appeared on the computer screen, but not if letters were presented. Participants in the implementation intention condition additionally made the plan to press the response button particularly fast if the number three was presented. Implementation intention participants showed a substantial increase in speed of responding to the number three compared to the control group, regardless of whether the simultaneously demanded primary task (a memorization task in Study 3 and a tracking task in Study 4) was either easy or difficult to perform. Apparently, the immediacy of responding induced by implementation intentions is also efficient, in the sense that it does not require much in the way of cognitive resources (i.e., can be performed even when demanding dual tasks have to be performed at the same time).

Two experiments by Bayer, Moskowitz, and Gollwitzer (2002) tested whether implementation intentions lead to action initiation even in the absence of conscious intent. In these experiments, the critical situation was presented subliminally, and immediacy of initiation of the goal-directed response was assessed. Results indicated that subliminal presentation of the critical situation led to a speed-up in responding in implementation participants but not in goal intention participants. These effects suggest that, when planned via implementation intentions, the initiation of goal-directed behavior becomes triggered by the presence of the critical situational cue, without the need for further conscious intent.

Additional process mechanisms underlying the effects of implementation intentions on action control have been explored. For instance, furnishing goals with implementa-

tion intentions might produce an increase in goal commitment, which in turn cause heightened goal attainment. However, this hypothesis has not received any empirical support. For instance, when Brandstätter et al. (2001, Study 1) analyzed whether heroin addicts suffering from withdrawal would benefit from forming implementation intentions to submit a newly composed curriculum vitae before the end of the day, they also measured participants' commitment to do so. While the majority of the implementation intention participants succeeded in handing in the curriculum vitae in time, none of the goal intention participants succeeded in this task. These two groups, however, did not differ in terms of their goal commitment ("I feel committed to compose a curriculum vitae" and "I have to complete this task") measured after the goal intention and implementation intention instructions had been administered. This finding was replicated with young adults who participated in a professional development workshop (Oettingen et al., 2000, Study 2), and analogous results were reported in research on the effects of implementation intentions on meeting health promotion and disease prevention goals (e.g., Orbell et al., 1997).

Potential Costs of Action Control via Implementation Intentions

Given the many benefits of forming implementation intentions, a question of any possible costs arises. Two issues have been analyzed empirically so far: First, forming implementation intentions may be a very costly self-regulatory strategy if it produces a high degree of ego depletion and consequently handicaps needed self-regulatory resources. Second, even though implementation intentions can successfully suppress unwanted thoughts, feelings, and actions in a given context, these very thoughts, feelings, and actions may rebound in a temporally subsequent, different context.

The assumption that implementation intentions subject behavior to the direct control of situational cues (Gollwitzer, 1993) implies that the self is not implicated when behavior is controlled via implementation intentions. As a consequence, the self should not become depleted when task performance is regulated by implementation intentions.

Indeed, using different ego-depletion paradigms, research participants who used implementation intentions to self-regulate in one task did not show reduced self-regulatory capacity in a subsequent task. Whether the initial self-regulation task was controlling emotions while watching a humorous movie (Gollwitzer & Bayer, 2000) or performing a Stroop task (Webb & Sheeran, 2003, Study 1), implementation intentions successfully preserved self-regulatory resources, as demonstrated by greater persistence on subsequent difficult or unsolvable tasks.

To test whether suppression-oriented implementation intentions create rebound effects, Gollwitzer, Trötschel, and Sumner (2004) ran two experiments using research paradigms developed by Macrae, Bodenhausen, and Jetten (1994). In both studies, participants first had to suppress the expression of stereotypes in a first-impression formation task that focused on a particular member of a stereotyped group (i.e., homeless people). Rebound was measured in terms of either subsequent expression of stereotypes in a task that demanded the evaluation of the group of homeless people in general (Study 1), or a lexical decision task that assessed the accessibility of homeless stereotypes (Study 2). Participants who had been assigned the mere goal of controlling stereotypical thoughts while forming an impression of the given homeless person were more stereotypical in their judgments of homeless people in general (Study 1) and showed a higher accessibility of homeless stereotypes (Study 2) than participants who had been asked to furnish this lofty goal with relevant if-then plans. Rather than causing rebound effects, implementation intentions appear to be effective in preventing them.

Although implementation intentions seem to achieve their effects without much cost, this does not mean that the regulation of goal pursuit via implementation intentions is foolproof. In everyday life, people may not succeed in forming effective implementation intentions for various reasons. For instance, in the if part of an implementation intention, a person may specify an opportunity that hardly ever arises. Or in the then part of an implementation intention, people may falsely specify behaviors that have zero instrumentality with respect to reaching the

goal, or behaviors that turn out to be outside of people's control.

There is also the question of how concretely people should specify the if and then parts in their implementation intentions. If the goal is to perform well on a given task goal, one can form an implementation intention that holds either this very behavior in the then part or a more concrete operationalization of it. The latter seems appropriate whenever a whole array of specific operationalizations is possible, because planning in advance which type of goal-directed behavior is to be executed, once the situation specified in the if part of the implementation intention is encountered, prevents disruptive deliberation *in situ* (with respect to choosing one behavioral strategy over another). An analogous argument applies to the specification of situations in the if part of an implementation intention. People should specify the situation in the if part to such a degree that a given situation will no longer raise the question of whether it qualifies as the critical situation. Finally, simply concretizing a goal intention by putting more context-related information into the description of the desired behavior (e.g., "I will solve math problems at my desk each Wednesday at 10 P.M.!") will not achieve the same beneficial action control effects as a goal intention ("I will solve math problems!") that is furnished with a implementation intention ("And if it is 10 P.M. on Wednesday, then I will sit down at my desk!"; Oettingen et al., Study 3).

Summary of Research on Automating Goal Pursuit by Forming Implementation Intentions

The benefits of the self-regulation strategy of forming implementation intentions is evident in the numerous studies documenting the effects of implementation intentions in helping people overcome the various problems of goal pursuit. Whether getting started, staying on track in the face of interferences, holding up motivation, or switching to more effective means, research participants who formed implementation intentions were better in solving these problems than research participants who operated on the basis of mere goal intentions. This research also indicates that people may

want to adjust the type of implementation intention formed to the self-regulation problem at hand. For instance, while suppression-oriented implementation intentions are viable when certain distractions, temptations, and unwanted responses are anticipated, plans that bolster the ongoing goal pursuit are needed in situations in which goal pursuit is threatened by detrimental self-states and adverse situational influences of which the individual is not aware.

Research on the potential costs of using implementation intentions indicates that they do not drain self-regulatory resources (i.e., produce ego depletion), and suppression-oriented implementation intentions are not associated with rebound. Thus, forming implementation intentions suggests itself as an effective and quite cost-free self-regulatory strategy of goal pursuit; people can achieve strong effects by making simple plans.

CONCLUSIONS

The idea of unconscious motivation has a long intellectual history but has only recently become integrated into mainstream psychological science. Theoretical advances in cognitive psychology over the past quarter-century have made the notion of unconscious motivation much more plausible than before, enabling researchers to generate models of unconscious motivational influences that are in harmony with basic cognitive principles. By thinking about goals as another form of mental representation, subject to the same rules and principles as are known to hold for other mental representations, researchers have established the effects of unconsciously operating information-processing, achievement, and interpersonal goals. And by testing the effects of making if-then plans (i.e., forming implementation intentions that specify an anticipated critical situation and link it to an instrumental goal-directed response) on overcoming classic problems of goal pursuit, researchers have discovered that people may strategically (i.e., by a conscious act of will) automate their goal pursuits by setting up action plans in advance.

All of this implies that competent performances may come about not only by con-

scious goal setting and conscious guidance of the respective goal pursuits but also by relying on the automatic activation and pursuit of goals one has been striving for in the past. And if people cannot fall back on such positive past experiences, there is still the option of automating goal pursuit strategically by preparing it ahead of time in the form of making if-then plans.

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