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CHAPTER 29

Living on the Edge: Shifting Between Nonconscious and Conscious Goal Pursuit

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Abstract

This chapter discusses recent research exploring how shifts between conscious, controlled processing and automaticity affect goal pursuit. It begins by reviewing past approaches to nonconscious goal pursuit, including the search for both similarities between conscious and nonconscious goal pursuit and differences between the two. It then addresses the consequences of shifting between conscious and nonconscious goal striving, and the question of whether people can strategically shift from effortful, controlled goal striving to automaticity through forming implementation intentions.

Keywords: goal-directed behavior, controlled processing, automaticity, nonconcious goal pursuit, goal striving

This chapter discusses recent research exploring how shifting between conscious, controlled processing, and automaticity affect goal pursuit. First, we review past approaches to nonconscious goal pursuit, including both the search for similarities between conscious and nonconscious goal pursuit and differences between the two. We next address the consequences of shifting between conscious and nonconscious goal striving. We start by addressing the shift from nonconscious goal pursuit to conscious awareness. What is the consequence of becoming aware of a behavior driven by a nonconscious goal pursuit? We then address the question of whether people can strategically plan to shift from effortful, controlled goal striving to automaticity through forming implementation intentions. How is this achieved, and what are the consequences of this strategic shift to automatic goal striving?

Conscious Versus Nonconscious Goal Pursuit

The Origins of the Distinction Between Conscious and Nonconscious Goal Pursuit

The descriptions of successful goal pursuit have changed drastically in the history of psychology (Gollwitzer & Moskowitz, 1996; Oettingen & Gollwitzer, 2001). *Behaviorists* (e.g., Skinner, 1953) defined goal striving objectively, from the perspective of the researcher rather than from the perspective of the actor. Accordingly, they focused on the observable features of goal striving; effective goal striving was defined

as being associated with persistence (striving until the goal is reached), appropriateness (when one path to the goals is blocked, an alternative path to the same goal is taken), and searching (restlessness in the presence of good opportunities to meet the goal). Facilitating goal attainment according to this tradition involved shaping behavior related to these features by using classic and instrumental conditioning principles.

Cognitive social learning theorists (e.g., Bandura, 1977; Heckhausen, 1977; Mischel, 1973), on the other hand, focused on the internal subjective goal of the individual as the reference point for goal striving. Successful goal striving now required conscious involvement in goal pursuit, committing to proper goals, and effectively guiding their implementation. From this perspective, strong goal commitments are assumed to be formed when the given goal is both desirable and feasible (Ajzen, 1985; Chapter 5); thus, the person should first consult his or her needs and motives to determine the desirability of the potential goal (Brunstein, Schultheiss, & Graessmann, 1998) and then reflect on his or her own relevant skills, talents, and competencies, as well as facilitating or hindering external influences, to compute the likelihood that goal-related outcomes may actually be obtained. This type of reflection should require conscious processing.

Recent research shows that even the mode of thought with which these issues are approached (e.g., mentally contrasting the desired future with the obstacles of present reality versus only dreaming about a positive future or only dwelling on the negative reality) makes a difference; high-feasibility beliefs are translated into strong goal commitments most effectively when one mentally contrasts the desired future with obstacles of present reality (Oettingen, Pak, & Schnetter, 2001). Recent research also shows that it matters how the desired goal state is framed. Conceptualizing one's goals in terms of promoting positive outcomes as opposed to preventing negative outcomes (promotion versus prevention goals; Higgins, 1997), acquiring competence as opposed to demonstrating the possession of competence (learning versus performance goals; Dweck, 1999), and attaining external as opposed to internal rewards (extrinsic versus intrinsic goals; Ryan & Deci, 2000) affect goal attainment; promotion, learning, and intrinsic conceptualizations are commonly associated with better outcomes than prevention, performance, and extrinsic conceptualizations. Even the degree of precision with which the desired outcome is spelled out (e.g., the time frame and standards of quantity and quality for its completion) affects a person's chances to reach the desired goal. Goals with a proximal as compared to a more distal time frame (or deadline) are more likely achieved, and it is the goals with specific rather than "do your best" standards that lead to better performances (Locke & Latham, 2002).

But goal attainment cannot be secured solely by forming strong goal commitments and framing the goals at hand in an appropriate manner (Gollwitzer, 1990, 2006). There is the second issue of implementing a chosen goal, meaning that people need to successfully tackle a series of implementational issues. There are four problems that stand out for goal implementation: getting started with goal pursuit, staying on track, calling a halt, and not overextending oneself (Gollwitzer & Sheeran, 2006). Getting started with goal pursuit is often difficult because we are busy with other things and thus fail to detect, attend to, and remember to use good opportunities to act toward the chosen goal. Even if the presence of a good opportunity is detected, we are often too slow to seize it in time and thus fail to initiate goal-directed behaviors. Once we do get started with goal-directed actions, we face the problem of staying on track. Persevering becomes difficult when distractions mount (particularly very tempting distractions; Mischel, Shoda, & Rodriguez, 1989; Chapter 23), when forced disruptions demand the resumption of goal-directed activity (Gollwitzer & Liu, 1995; Mahler, 1933), and when increases in the difficulty of the task demand more effort expenditure (Wright, 1996). Moreover, successful goal implementation requires that we call a halt to using a chosen means or route to goal attainment if this means (or route) lacks instrumentality (Kruglanski, 1996), and it demands disengagement from goal pursuit altogether if the originally desired goal turns into something unattractive or unfeasible (Klinger, 1977). Finally, goals cannot be implemented successfully if we overextend ourselves when striving for the goal at hand. People commonly hold more than one goal, and exceeding one's limitations in the pursuit of the goal at hand can be a disadvantage with respect to the successful implementation of the other goals one is also holding (i.e., ego-depletion effect; Muraven & Baumeister, 2000). From the perspective of cognitive social learning theory, all these problems can be tackled by engaging in conscious self-regulatory thought. For instance, it has been observed that delay of gratification is enhanced when the rewards at issue are thought of in an abstract (as opposed to concrete) manner (Metcalfe & Mischel, 1999).

In most recent history, the psychology of goals has been enriched by the assertion that people's thoughts, feelings, and actions might be affected not only by conscious but also by nonconscious goal striving. In his auto-motive model, Bargh (1990) built on *automaticity* research of the 1970s and especially 1980s that demonstrated the automatic activation capability of social mental representations, such as trait concepts (e.g., honest or aggressive), attitudes, and group stereotypes (reviews by Bargh, 1989; Brewer, 1988; Wegner & Bargh, 1998; Chapter 9). This research showed that frequently used mental representations will, over time, become active when relevant information is encountered in the environment. For stereotypes, relevant cues may include easily identifiable group features, such as skin color, gender, accent, and so on. For attitudes, an environmental trigger could be the mere presence of the attitude object in the environment (Fazio, 1986). For trait concepts, features of observed social behaviors corresponding to the trait in question could activate these representations (Uleman, Newman, & Moskowitz, 1996).

The principle underlying these cases of automatic process development was that automatic associations are formed between the representations of environmental features (such as attitude objects or common situations and settings) and other representations (such as evaluations or stereotypes, respectively) to the extent that they are consistently active in memory at the same time (Hebb, 1948; Chapter 20). If one repeatedly and consistently thinks of members of a particular social group in stereotypic ways, for instance, then eventually the stereotype would become active automatically in the presence 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, goal representations should also be capable of automatic activation through contact with features of the contexts in which those goals have been pursued often and consistently in the past (Chapter 21). If, for a given individual, interaction with one's colleagues usually leads to competitive behavior, then the goal of competition should become automatically activated in the mere presence of a colleague.

In other words, a competition goal 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 asserts that once activated in this unconscious manner, the goal representation should 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, feelings, 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).

First-Generation Research on Nonconscious Goal Pursuit: Searching for Similarities to Conscious Goal Pursuit

It is often implicitly assumed that successful goal pursuit necessitates conscious involvement. Sometimes this assumption is even expressed explicitly. For instance, Dehaene and Naccache (2001) suggest that consciousness is required for three important mental operations: the maintenance of information over time (i.e., beyond the immediate perception), the planning and enactment of novel strategies, and the generation of intentional, goal-directed behaviors. This claim raises the question of whether the theoretical derivations on which the auto-motive model rests are actually unfounded. Accordingly, first-generation experimental research on the auto-motive model focused on the following questions: Can we observe effects on thoughts, feelings, and behaviors by implicitly activated (primed) goals? And is automatic goal pursuit characterized by the same features as is conscious goal pursuit?

The aim of first-generation research on nonconscious goal pursuit was to document the similarities between conscious and nonconscious goal pursuit (summaries by Chartrand, Dalton, & Cheng, 2007; Gollwitzer & Bargh, 2005). For example, based on an early study (Hamilton, Katz, & Leirer, 1980) showing that individuals with a conscious impression-formation goal recalled information in a more organized way than those with a memorization goal, Chartrand and Bargh (1996) primed participants with these processing goals through exposure to goal-related words within scrambled sentences. Again, they found that those primed with impression-formation goal-related words were more likely to organize these behaviors by categories than those primed with a memorization goal. Subsequent research has shown that nonconscious activation of other goals, including achievement goals (Bargh, Gollwitzer, Lee-Chai, Barndollar, & Trötschel, 2001, studies 1 and 2), egalitarian goals (Moskowitz, Gollwitzer, Wasel, & Schaal, 1999), interpersonal goals (Fitzsimons & Bargh, 2003), and the goals of significant others (Shah, 2003), results in the cognition and behavior expected from conscious goal pursuit.

In addition to behavioral outcomes, nonconsciously activated goals exhibit the motivational qualities traditionally considered to be characteristics of conscious goal striving (Gollwitzer, 1990; Lewin, 1951). Using paradigms designed to elucidate these classic goal characteristics, Bargh et al. (2001) found that the activation of nonconsciously activated goals increased in strength over time until acted on (study 3), produced persistence when obstacles were encountered (study 4), and brought about resumption of goal-directed behaviors following interruption (study 5). Thus, these studies suggest that nonconscious priming activates goals themselves, resulting in cognition, behavior, and goal-relevant motivational qualities in line with consciously set goals. Kawada, Oettingen, Gollwitzer, and Bargh (2004) even observed that the projection of one's own goals on others holds for conscious and nonconscious goals alike.

The activation of goals does not occur only through semantic primes in the laboratory; relevant goals can also be activated outside of awareness by objects and individuals in the environment. Significant others can activate the goals that they have for you (Shah, 2003), or they can activate the goals that you normally pursue when you encounter these individuals (Fitzsimons & Bargh, 2003). For example, Fitzsimons and Bargh (study 1) approached individuals waiting at the gate in an airport and asked them to answer a few questions about either a friend or a colleague. Activating the representation of a friend in this way activated the goals that participants normally pursue with these individuals (e.g., helping), leading to more offers to help the experimenter following the activation of a friend than a colleague. Other individuals can also nonconsciously activate goals through a process known as "goal contagion." Aarts, Gollwitzer, and Hassin (2004) demonstrated that a goal can be nonconsciously activated merely through the presence of others enacting a behavior that implies that goal (Chapter 26). However, goal contagion took place only when the goal was contextually and socially appropriate. This research illustrates that goals can be nonconsciously activated by the mere presence of others, a social trigger of a personal nonconscious goal pursuit.

In line with this approach of highlighting the similarities between conscious and nonconscious goal pursuit, Chartrand (1999) has suggested that the emotional consequences of success or failure at conscious and nonconscious goal pursuits do not differ either. Chartrand (1999, in Chartrand et al., 2007) primed participants with words related to an achievement goal (or neutral words) and then led them to either succeed or fail in a subsequent task. Those who had been primed with the goal to achieve reported being in a better mood following success than those who had not been primed with a goal, whereas those who failed following goal priming reported being in a worse mood than those who had not been primed with a goal. This work demonstrates the similarities between the emotional consequences of completed conscious and nonconscious goal pursuit, with successful versus unsuccessful completion of nonconscious goal pursuits leading to the emotional consequences expected from conscious goal pursuits.

Second-Generation Research on Nonconscious Goal Pursuit: Potential Differences From Conscious Goal Pursuit

Although there is ample evidence now that there are many similarities between conscious and nonconscious goal pursuit, recent research has begun to investigate the differences between goal striving resulting from conscious versus nonconscious goal activation (Gollwitzer et al., 2006). The relative advantages of conscious versus nonconscious goal pursuit can be inferred by looking at theoretical approaches to conscious versus nonconscious mental operations in other fields. For instance, Dijksterhuis's unconscious thought theory (Dijksterhuis, 2004; Dijksterhuis & Nordgren, 2006) distinguishes between processes associated with conscious and nonconscious thought in decision making. This theory proposes a number of principles regarding conscious and nonconscious thought; we focus on two of these principles here that are most relevant to potential differences between conscious and nonconscious goal pursuit. The first, the capacity principle, proposes that whereas conscious thought is limited by capacity (i.e., conscious decision makers must focus on a limited numbers of features), unconscious

thought may incorporate many more factors in a decision (Dijksterhuis & Nordgren, 2006).

THE CAPACITY ISSUE

The capacity principle is particularly relevant to goal striving because conscious self-regulation draws from a limited resource that can be depleted. Thus, conscious goal striving should be limited by capacity as well. Ego-depletion studies (Muraven & Baumeister, 2000) demonstrate that engaging in self-control with respect to a first task deleteriously affects performance on a subsequent task that also necessitates self-control to attain a good performance. The capacity principle therefore suggests that conscious goal striving should be hurt by being in a state of ego depletion more so than nonconscious goal striving, and striving consciously should lead to more ego depletion than striving nonconsciously. At least for the first conclusion there is some evidence. A recent study by Govorun and Payne (2006) looked at the effects of ego depletion on the automatic versus the controlled components of self-regulation. After performing an ego depletion task designed to drain self-regulatory resources, participants completed the weapon identification task, in which they had to identify whether an object was a weapon after seeing briefly presented black or white faces (Payne, 2001). Using the process dissociation procedure (Jacoby, 1991), Govorun and Payne found that ego depletion affected the controlled component of the response but did not affect automatic race bias in the subsequent weapon identification task. Although this does not directly address the hypothesis that nonconscious goal striving should be less affected by ego depletion than conscious goal striving, it does suggest that automatic self-regulatory processes are less affected by ego depletion than controlled processes. Further research could expand on these findings, examining whether nonconscious goal striving is indeed less limited by capacity than conscious goal striving and whether nonconscious goal striving produces less ego depletion than conscious goal striving.

THE REFLECTIVE VERSUS REFLEXIVE CONTROL ISSUE

A second principle from Dijksterhuis's unconscious thought theory, the bottom-up-versus-top-down principle (Dijksterhuis & Nordgren, 2006), also sheds light on possible differences between conscious and nonconscious goal striving. In line with Sloman (1996), Dijksterhuis argues that conscious processing is hierarchical, and conscious thought is therefore more driven by broad concepts and schemas (Chapter 5). Nonconscious processing, on the other hand, integrates information in a summative fashion. It makes sense that nonconscious goal striving (i.e., striving without awareness of a goal) would work in much the same way. Whereas conscious striving is performed in reference to the conceived goal, nonconscious striving would presumably proceed in a more stimulus-driven, bottom-up manner. Gollwitzer, Parks-Stamm, and Oettingen (2008) found evidence for this assumption. In one study, a newly developed goal conflict paradigm was used. Participants performed a very simple classification task. They were asked to indicate by pressing a right or a left button whether a flashed stimulus (i.e., a string of letters) was presented either in the dark-colored area of the computer screen or in the light-colored area (both areas were equally large but intertwined). The classification task goals of being either accurate or fast were either induced outside of conscious awareness (i.e., the letter strings functioned as masks to the subliminally presented words of either "accurate" or "fast") or consciously set (i.e., assigned by the experimenter), resulting in four initial goal conditions. After more than 100 trials, a nonconscious goal of being either accurate or fast was then activated by subliminal priming in the participants of all four conditions while they performed a second set of more than 100 classification trials.

As participants' classification responses showed hardly any errors (i.e., the classification task indeed was easy to perform), their classification response times for the second set of trials were used as the dependent variable of classification performance. When both the first and the second goal activation occurred outside of awareness, the combination of the two goals followed a straightforward additive pattern such that the accurate–accurate combination led to the slowest classification responses, followed by the two conflict conditions (i.e., accurate–fast and fast–accurate), with the fast–fast goal condition resulting in the fastest responses. However, individuals who adopted the first goal explicitly (consciously) failed to show this same summative pattern. They instead evidenced a conflict pattern in response to the second nonconsciously activated goal. The two conflicting combinations (accurate–fast and fast–accurate) resulted in the slowest reaction times, and the two matching combinations (accurate–accurate and fast–fast) resulted in the fastest reaction times.

These findings illustrate that activating goals consciously versus nonconsciously can have a differential impact on subsequent cognitive processing. These findings suggest that conscious and nonconscious goal striving have different processing characteristics, with conscious goal striving resulting in reflective thought guided by the conscious awareness of the goal (or goals) at hand, leading to attempts to integrate conflicting behavioral tendencies, and nonconscious goal striving resulting in more bottom-up reflexive processing that deals with conflicting behavioral tendencies in a summative manner.

Because conscious goal pursuit seems to be driven by top-down processes, with goal striving achieved with reference to the activated goal, Gollwitzer et al. (2008) also hypothesized and tested in a further study that awareness of one's goal should be beneficial to participants when flexibility is needed in terms of switching to a more appropriate means to the goal. Participants were first given a conscious or nonconscious goal to perform well (or no goal at all). They were then confronted with a series of "water jar" problems, a classic task to assess flexibility in problem solving (Luchins, 1942; Luchins & Luchins, 1994). These problems each involved three water jars labeled with volumes (jars A, B, and C); participants were asked to add or subtract the volume of each jar to come up with a given outcome volume (with the volumes changing for each trial). The first eight trials had the same solution (B − A − 2C), the next two trials (i.e., trials 9 and 10) could be solved either by the original formula or by a more simple solution (i.e., A − C or A + C, respectively), and the 11th trial could be solved only by the solution of A − C.

The findings indicated that in the first eight trials, participants in both the conscious and the nonconscious achievement goal conditions were faster to find the correct solution than the control group. Thus, both conscious and nonconscious goals were successful in improving task performance. In trial 9, where an easier solution was also possible (A − C), no differences between groups were observed, as only 8% of the participants discovered this new solution. However, when the results of trial 10 were analyzed, a significantly higher percentage of participants in the conscious goal condition discovered the possible easier

solution (35%) as compared to the nonconscious goal condition (9%) and the control condition (9%). Finally, with respect to trial 11, where only the easier new solution was possible (A – C), all participants discovered this solution. Importantly, when we looked at how fast participants found this correct solution, those in the conscious goal group were significantly faster than both participants in the nonconscious goal group and those in the no-goal control group. These findings strongly suggest that being consciously aware of a goal is beneficial for switching means to attain the goal, either when easier means become available or when the old means no longer promote goal attainment. We argue that being consciously aware of the goal to perform well instigated a more intensive and/or effective search for alternative means as compared to being unaware of the high-performance goal.

DOES PERSONALITY MODERATE PERFORMANCE RESULTING FROM NONCONSCIOUS VERSUS CONSCIOUS GOAL STRIVING?

Whether conscious versus nonconscious goal striving facilitates performance may also depend on attributes of the individual. Parks-Stamm, Gollwitzer, and Oettingen (2008) looked at individual differences related to choking under pressure (i.e., test anxiety and reinvestment) in individuals pursuing performance goals activated consciously or nonconsciously. We hypothesized that these individual differences would predict costs for consciously adopted achievement goals, but not nonconsciously activated achievement goals. In a first study, for individuals high in test anxiety, conscious awareness of the goal to perform well was damaging to their performance in a memory test, whereas for those low in test anxiety, it was beneficial to performance (study 1). This finding suggests that it may be more beneficial for those high in test anxiety to nonconsciously strive for performance goals, whereas those low in test anxiety may benefit from consciously adopting achievement goals.

In a second study, we tested the idea that *reinvestment,* an individual difference associated with the tendency to exert conscious control over skilled behaviors (Masters, Polman, & Hammond, 1993), would predict costs in typing speed when accuracy goals where consciously adopted but not when nonconsciously activated. The results obtained suggested that trait reinvestment was associated with costs in typing speed only when the accuracy goal was consciously adopted but not when nonconsciously activated. These two studies reported by Parks-Stamm, Gollwitzer, and Oettingen (2008) illustrate that person factors must be taken into account in order to make valid predictions about whether conscious or nonconscious goal striving is more effective for goal attainment.

Shifting Between Conscious and Nonconscious Goal Pursuit

The nature of the experimental designs used in research on nonconscious goal pursuit (i.e., nonconsciously priming goal constructs versus consciously adopting goals) has led researchers to examine these two forms of goal pursuit in isolation from or in opposition to each other. In reality, however, during goal pursuit individuals shift back and forth seamlessly between conscious and nonconscious processing. Dehaene and Naccache (2001) review evidence from functional magnetic resonance imaging research demonstrating that neural structures associated with conscious control engage and disengage from processing as they are (or are not) needed. For example, Raichle et al. (1994) found that prefrontal cortex and anterior cingulate activity (often present when conscious guidance is needed) "is present during initial task performance, vanishes after the task has become automatized, but immediately recovers when novel items are presented" (Dehaene & Naccache, 2001, p. 24). In addition, it seems that even if task (or goal) performance has not yet been habitualized, simply distracting a person with an unrelated activity after they have started to work on the focal goal (e.g., trying to select a car from a set of four cars that differ in attractiveness; Dijksterhuis, 2004; Dijksterhuis, Bos, Nordgren, & van Baaren, 2006) may lead goal-directed cognitions to depart from consciousness to return at a later point in time (e.g., when new information is discovered on the choice objects or one's own relevant values or competencies are considered). Given the possibility of shifting from nonconscious goal pursuit to conscious goal pursuit and the other way around, we discuss research on the consequences of these two shifts for goal pursuit—starting with the return of consciousness to nonconscious goal pursuit and then turning to the departure of consciousness from conscious goal pursuit.

Shifting From Nonconscious to Conscious Goal Pursuit: When Consciousness Returns

Under what circumstances does consciousness return to control nonconscious goal striving? Numerous explanations have been given to explain why consciousness returns to a previously unmonitored goal pursuit. The German psychologist Theodor Lipps (1851–1914) addressed this issue in his "Gesetz der psychischen Stauung" (Law of Psychological Blockage). He characterized goal striving as a stream of water that flows unaided until it encounters an obstacle (a *Stau,* or dam). When habitual and unmonitored behavior is blocked by the obstacle, consciousness emerges to interpret the behavior in order to overcome the obstacle (for a summary, see Arievitch & Van der Veer, 2004). Thus, in this model, consciousness returns to interpret nonconscious goal-directed behavior when an obstacle is encountered; indeed, Lipps suggests that "it is only then that the person becomes consciously aware of what he or she is doing and can start to consciously pursue a goal" (Arievitch & Van der Veer, 2004, p. 158). That consciousness is summoned by obstacles to nonconscious goal striving makes sense given Gollwitzer et al.'s (2008) findings that conscious awareness of a goal seems to improve one's ability to switch to a more suitable means in goal pursuit (see above). Similarly, Bongers and Dijksterhuis (Chapter 28) argue that we become aware of our goals consciously when we experience failure in our goal striving. They report a number of studies in which failure causes conscious awareness of nonconsciously pursued goals. In addition, consciousness may return to goal pursuit when goals conflict, and higher-level processes are therefore needed to solve this conflict (Morsella, 2005; Chapter 30). Thus, consciousness appears to return when nonconscious goal striving is disrupted and consciousness is needed to overcome an obstacle or failure.

Consciousness can also return to nonconscious goal pursuit when one is consciously questioned about the purpose of goal-directed behaviors. Gazzaniga (2000) has demonstrated that consciousness returns to a goal pursuit initiated outside of awareness when an actor is questioned about what he or she is trying to accomplish, thereby engaging conscious interpretation through conscious questioning. We suggest this interpretation may be simple when the goal driving that behavior was originally adopted consciously (i.e., when a conscious goal pursuit recedes into nonconsciousness through automation). However, when the goal driving one's behavior

is outside of awareness, this interpretation can be more difficult.

THE INTERPRETATION OF NONCONSCIOUS GOAL PURSUIT

We propose that consciousness may return to an ongoing nonconscious goal pursuit when an obstacle is encountered, disrupting automaticity and requiring an interpretation of one's behavior. When the goal is adopted consciously, the interpretation of one's goal-directed behavior is easily achieved. Individuals only have to remember their earlier conscious setting of the goal at hand; the interpretation of one's actions should be possible even if individuals have been distracted while acting on the goal (e.g., by the occurrence of irrelevant internal or external events). In their Rubicon model of action phases, Heckhausen and Gollwitzer (1987; Gollwitzer, 1990) have described interpretative efforts after goal striving as characteristic of the postactional evaluative phase of goal pursuit.

However, when goals have been activated nonconsciously, interpretation of one's goal-directed behavior should be more difficult. Interpretation does often occur even when the cause is not consciously accessible. It is widely accepted that many cognitive processes are outside of conscious awareness, and therefore individuals often cannot report accurately on higher mental processes in trying to explain their behavior (Nisbett & Wilson, 1977). Indeed, the dissonance literature is based on the idea that individuals are motivated to interpret their behavior and that they often erroneously assign internal attributions as the cause of their externally affected behavior, as they underestimate the power of the experimenter's influence on their behavior (for a discussion of how easily people are tricked into assuming free choice, see Wicklund & Brehm, 1976). Nisbett and Wilson (1977) report a number of studies where dissonance researchers asked their participants why they acted the way they did; participants gave false explanations for their behavior (e.g., when unable to sleep after taking what was said to be a relaxation pill, participants responded that they "usually found it easier to get to sleep later in the day"; p. 238). Thus, there is evidence that individuals form ad hoc causal theories to explain their behavior when the cause is not obvious. One fruitful source of such explanations is social norms.

Because social norms often provide a default explanation for behavior, acting in a way that violates social norms demands an explanation for one's behavior. When an explanation for one's behavior cannot be found, this triggers negative emotion and guilt. This response has been demonstrated by research on emotional responses to accidental harmdoing. When one causes harm accidentally, one is faced with an abrupt norm violation that has no salient explanation. For such an accidental act, justification as a guilt-reduction technique is not possible (McGraw, 1987), and thus the common consequence is the experience of negative affect. Relating this line of research to nonconscious goal pursuit, it follows that negative emotions should be more likely to result from norm-violating behaviors that are based on nonconsciously activated goals rather than conscious goals. With nonconscious goals, the actor faces a lack of reasons for his or her norm-violating actions, as they have occurred without conscious intent.

Accordingly, Oettingen, Grant, Smith, Skinner, and Gollwitzer (2006) have argued that when goals are not consciously adopted (i.e., are nonconsciously activated) and not explained by the situational context (i.e., are norm violating), actors will find themselves in an "explanatory vacuum" when attempting to interpret their own behavior, which in turn will lead to the experience of negative affect. In their study, participants had to work with a "fellow student" on interpreting pictures from the Thematic Apperception Test. Participants were asked to give feedback on the story offered by their presumed partner, which gave an unusual interpretation of a picture of a boy looking at a violin (i.e., "he's training to be a magician"). Before starting on this task, they were either consciously or nonconsciously compelled to form the goal to cooperate (a norm-conforming goal) or compete (a norm-violating goal). Following this goal-setting procedure, participants responded to the partner's unusual interpretation. Regardless of whether the goal to compete was consciously adopted or nonconsciously activated, the feedback given by participants with a norm-violating goal was rated as more combative.

Oettingen et al. (2006) then asked participants to report on their current emotions. When the activated goal was norm conforming (i.e., to be accommodating in the collaborative task), awareness of the goal did not affect participants' emotional response to their own behavior. Presumably, those with the nonconscious goal explained their behavior by taking cues from the environment and interpreting their behavior in line with the norms of the situation. However, participants pursuing the goal that caused them to act in a norm-violating way (i.e., to be confrontational in the collaborative task) reported more negative affect when the goal was activated nonconsciously than when it was set consciously. These participants whose norm-violating goal had been activated nonconsciously found themselves in an explanatory vacuum, unable either to link their behavior to a consciously set goal (because they were unaware of this goal activation) or to explain it by the norms of the situation. As suggested by McGraw (1987), those who were unable to justify their behavior based on either their conscious goal or social norms felt more negative affect.

Further research has examined this explanatory vacuum notion. How can a goal-directed behavior be interpreted when the actual goal of that behavior is outside of conscious awareness, as in the case of nonconscious goal pursuit? In line with evidence from brain-damaged patients illustrating the reflex-like automatic interpretation of behavior, Parks-Stamm, Oettingen, and Gollwitzer (2008) hypothesized that providing participants with an unrelated (but reasonable) explanation for norm-violating behavior would eliminate the negative emotions associated with an explanatory vacuum. We created an experimental paradigm where participants completed two tasks. In the first task, participants were explicitly given the goal to be either fast or accurate. This goal to be fast or accurate (i.e., slow) was borne out in the completion of the first task. In the second task, participants were given the conscious or nonconscious goal to compete or cooperate in a task where competing required acting faster (i.e., a "compete" goal was achieved by scoring points more quickly) and cooperating required acting slower (i.e., a "cooperate" goal was achieved by sharing the points by acting more slowly). Thus, individuals who had a nonconscious goal to compete (i.e., the "explanatory vacuum" condition) had consciously adopted an earlier goal that either could explain this behavior (i.e., was applicable) or could not (i.e., was inapplicable).

Parks-Stamm, Oettingen, and Gollwitzer (2008) found that the negative affect associated with an explanatory vacuum was observed only for those who had a first conscious goal to be accurate (i.e., the first goal did not explain their fast, norm-violating behavior in the second task). Those whose competitive (norm-violating) behavior could be attributed to their earlier conscious goal to be

fast felt as positive as those with either a conscious or a nonconscious norm-conforming goal. These findings suggest that when automatically activated behavior creates an explanatory need, other goals with congruent behavioral effects can reduce the explanatory vacuum and its associated negative affect.

In a further study on this issue, we examined whether conscious reflection about one's norm-violating behavior was necessary for participants to explain their behavior via this earlier applicable goal. Using just the explanatory vacuum condition (i.e., when a competitive goal was activated nonconsciously), we varied both whether the first goal explained the norm-deviant behavior (again using an earlier conscious goal to be either fast or accurate on a separate task) and whether participants were given time to reflect on the cause of their norm-violating behavior (driven by a nonconscious goal to compete in the second task). In the reflection condition, participants were asked a number of questions about their performance (e.g., What were you thinking about during the task? What were you trying to accomplish? Why?) before completing the self-report measures regarding their emotions. The no reflection participants immediately reported on their emotions at the completion of the second task. We found that providing a time for reflection had no effect on the reduction of the explanatory vacuum found when an earlier goal could explain the norm-violating behavior; whether participants were asked to reflect on their behavior or not, an earlier conscious goal to be fast effectively reduced the negative affect associated with an explanatory vacuum. This suggests that the attempt to reduce an explanatory vacuum when acting in a norm-violating way in response to a nonconsciously activated goal is automatic and reflex-like.

In a third study, Parks-Stamm et al. (2008) examined the behavioral consequences of successfully or unsuccessfully interpreting goal striving in an explanatory vacuum by examining lottery tickets shared with a partner, as well as the impact of individual differences on interpretation and tickets shared. Based on the findings of an earlier study suggesting that conscious reflection was not necessary for interpretation (see above), we expected Need for Cognition (NFC, Cacioppo, Petty, & Kao, 1984) would not interact with the applicability of the earlier goal to predict tickets shared. However, we expected the Preference for Consistency scale (PFC; Cialdini, Trost, & Newsom, 1995) would interact with the applicability of the earlier goal to predict interpretation (and tickets shared). In line with these predictions, we found that PFC was associated with greater sharing when participants first had an accuracy goal (as they were motivated to reduce the negative affect associated with an explanatory vacuum with an inapplicable earlier goal). We also found that PFC was associated with sharing less tickets when participants first had a speed goal, which could be used to explain their competitive behavior and thereby eliminated the motivation to help one's partner. NFC, on the other hand, did not interact with the first goal. These findings suggest that there are both individual differences associated with the interpretation of nonconsciously-activated goal-directed behavior and behavioral consequences of interpretation in an explanatory vacuum.

SUMMARY

Early work (e.g., Chartrand, 1999) suggested that the emotional consequences of conscious and nonconscious goal pursuit would not differ, and this is certainly true when it comes to emotions that are linked to goal attainment, such as feelings of pride after success and feelings of shame after failure. However, when goal-directed behavior that is triggered by nonconscious goal activation breaks norms, this creates an explanatory vacuum. This explanatory vacuum is associated with negative affect for those individuals who are unable to unearth a plausible explanation for their behavior. Thus, norm-breaking nonconscious goal pursuit can produce negative affect when conscious understanding of the resultant behavior is stymied by lack of goal awareness, particularly when an alternative explanation cannot be found. The presented explanatory vacuum research explores the return of consciousness to nonconscious goal pursuit. The departure of consciousness from conscious goal pursuit is the other shift that we are concerned with and that we turn to in the next section.

Shifting From Conscious to Nonconscious Goal Pursuit: The Departure of Consciousness

In principle, there are three types of shifts from conscious to nonconscious goal pursuit. The first is explicated in Dijksterhuis's experiments on nonconscious thought (Dijksterhuis, 2004; Dijksterhuis et al., 2006). The person who has consciously adopted a goal and started to act on it becomes distracted with an irrelevant activity and thus loses conscious sight of the goal and the ongoing striving for it. This shift has the positive consequence that complex information becomes more easily digested, and in turn the quality of complex decisions is improved.

The second type of shift from conscious to nonconscious goal pursuit is more effortful. William James (1842–1940) states, "If an act require for its execution a chain, *A, B, C, D, E, F, G,* etc . . . then in the first performances of the action the conscious will must choose each of these events from a number of wrong alternatives that tend to present themselves; but habit soon brings it about that each event calls up its own appropriate successor without any alternative offering itself, and without any references to the conscious will, until at last the whole chain . . . rattles itself off as soon as A occurs" (James, 1890, p. 114). James saw the value of shifting from conscious to nonconscious acting in saving mental energy: "the more of the details of our daily life we can hand over to the effortless custody of automatism, the more our higher powers of mind will be set free for their own proper work" (p. 122). James's view that consciousness plays a role early in the process and then becomes less necessary has received a lot of theoretical and empirical attention by subsequent researchers. Bargh's (1990) automotive theory follows the logic of James's chain of successive events that eventually "rattle off" as soon as the first is encountered.

A third type of shift from conscious to nonconscious goal pursuit has been described by Gollwitzer (1993, 1999). He proposes that by making if–then plans (i.e., implementation intentions) that specify a critical situational cue (e.g., a good opportunity) in the "if" part and an instrumental goal-directed response (e.g., getting started on the goal) in the "then" part, a person can switch the conscious control of goal striving from a top-down (by the subjective goal) to a bottom-up (by situational stimuli) mode. Given that strong if–then links are formed in the person's mind, the execution of the goal-directed behavior is expected to acquire features of automaticity (i.e., immediacy, efficiency, and redundancy of conscious intent once the critical situation is encountered). Therefore, forming implementation intentions has been referred to as creating instant habits and the automaticity of action control by implementation intentions has been referred to as strategic automaticity. But what is the experimental evidence for these assumptions?

IF–THEN PLANS: IMMEDIACY AND EFFICIENCY OF ACTION CONTROL

Gollwitzer and Brandstätter (1997, study 3) demonstrated the immediacy of action initiation in a study where participants had been induced to form implementation intentions that specified viable opportunities for presenting counterarguments to a series of racist remarks made by a confederate. It was found that participants with implementation intentions initiated their counterargument more quickly than the participants who had formed the mere goal intention to counterargue. In further experiments (Brandstätter, Lengfelder, & Gollwitzer, 2001, studies 3 and 4), the efficiency of action initiation was explored. All 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 (go/no-go task). Participants in the implementation intention condition also made the plan to press the response button particularly fast if the number 3 was presented. This go/no-go task was then embedded as a secondary task in a dual-task paradigm. Implementation intention participants showed a substantial increase in speed of responding to the number 3 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. This suggests that 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 dual tasks have to be performed at the same time). The following additional observations further support this claim: Response times to noncritical numbers in the implementation intention condition were the same as in the goal condition, response times to noncritical numbers in the implementation intention condition did not differ between practice and test trials (after the implementation intention had been formed), and performance on the load task (a memory test in study 3 and tracking performance in study 4) was the same in the goal-only and the implementation intention conditions. A more recent study by Parks-Stamm, Gollwitzer, and Oettingen (2007) also demonstrated efficiency of action control by implementation intentions.

Parks-Stamm et al. (2007, study 2) examined the efficiency of implementation intentions by creating a task with both planned and unplanned means to a desired goal. In this task, participants' goal was to identify words starting with a D in an auditorily presented story and to type the number of letters of that word into the computer as quickly as possible. Thus, this was a task where executing the behavior specified in the "then" component of the implementation intention was particularly difficult. All participants were given the two most common words ("Danny" and "dragon"), and the number of letters in each word (five and six, respectively). However, only half the participants formed an implementation intention with this information (i.e., "If I hear the word 'Danny,' then I will immediately press the 5; if I hear the word 'dragon,' then I will immediately press the 6."), whereas the others only memorized the critical words and responses. We predicted that if implementation intentions were efficient, enacting the response specified in the "then" component of the implementation intention at a higher rate would require little cognitive capacity. The efficiency of the planned response would be shown if implementation intentions allowed participants to enact the planned response more than those with only a goal, but without a cost in the number of alternative means used to reach the goal (relative to the goal-only condition). This hypothesis was supported (see Figure 29.1). Implementation intentions effectively facilitated the planned response but did not hamper the initiation of alternative, unplanned responses. This suggests that implementation intentions efficiently facilitate planned routes to the goal (i.e., without burdening cognitive resources) so that alternative goal-directed responses are not impaired.

But the immediacy and efficiency of action control by implementation intentions can be also tested by using a quite different angle. By (a) assuming that action control by implementation intentions is immediate and efficient and (b) adopting a simple racehorse model of action control, people can be expected to be in a position to break habitualized responses by forming implementation intentions (i.e., if–then plans that spell out a response that is contrary to the habitualized response to the critical situation). Such studies have been conducted successfully in the field (Holland, Aarts, & Langendam, 2006) but also in the laboratory (Cohen, Bayer, Jaudas, & Gollwitzer, 2008).

Holland et al. (2006) addressed whether implementation intentions could help break unwanted habits (and replace them with new wanted behaviors) in a field experiment in an institution. The goal of the researchers was to increase the use of recycling bins for plastic cups and paper and to reduce the bad habit of throwing out these recyclable items in personal wastebaskets. Participants were randomly assigned to one of six conditions: a no-treatment control condition, a control condition with a behavior report questionnaire, a facility condition where each participant received his or her own recycle bin, a combined facility and questionnaire condition, and two implementation intention conditions—one with a personal facility and one without. Recycling behavior was substantially improved in the facility as well as in the implementation intentions conditions in week 1 and week 2 and still 2 months after the manipulation. In addition, the correlation between past and future behavior was strong in the control conditions, whereas these correlations were nonsignificant and close to zero in the implementation intention conditions. Apparently, implementation intentions effectively broke old habits by facilitating new recycling behavior. This shows that even strongly habitualized behaviors can be replaced by new planned goal-directed behaviors via implementation intentions.

Cohen et al. (2008, study 2) explored the suppression of habits in a more controlled laboratory experiment using the

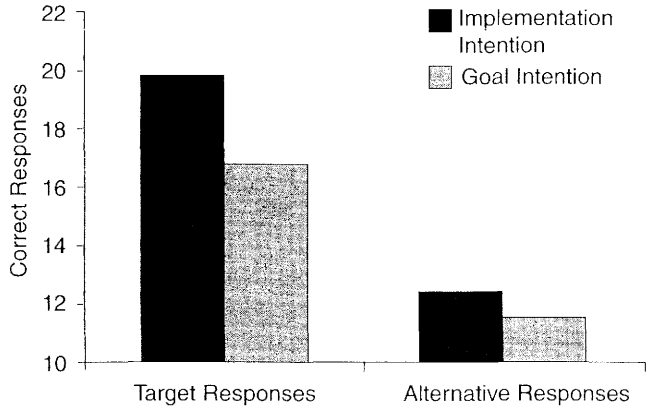

Fig. 29.1 Mean correct target and alternative responses by goal condition when letter counting is required for response initiation, based on Parks-Stamm, Gollwitzer, & Oettingen (2007, study 2).

Simon task. In this paradigm, participants are asked to respond to a nonspatial aspect of a stimulus (e.g., whether a tone is high or low) by pressing a left or right key and to ignore the location of the stimulus (e.g., if it is presented on the left or on the right side). The difficulty of this task is in ignoring the spatial location (left or right) of the tone in one's response (Simon & Berbaum, 1990). The cost in reaction time is seen when the location of the tone (e.g., right) and required key press (e.g., left) are incongruent. Cohen et al. (2008) found that implementation intentions eliminated the Simon effect for the stimulus that was specified in the implementation intention. Reaction times for the critical (planned) stimulus did not differ between the congruent and incongruent trials.

Automatic biases and stereotyping represent another habitualized pattern of thought and behavior that can be in opposition to one's goals. Although one may have the goal to be egalitarian, automatic stereotyping happens quickly and unintentionally; some attempts to control automatic stereotyping has even resulted in backfire effects (e.g., Payne, Lambert, & Jacoby, 2002). Extending earlier work by Gollwitzer and Schaal (1998), Stewart and Payne (in press) examined whether implementation intentions designed to counter automatic stereotypes (e.g., "when I see a black face, I will then think 'safe'") could reduce stereotyping toward a category of individuals (versus a single exemplar). They used the process dissociation procedure (Jacoby, 1991) to estimate whether the reduction in automatic stereotyping came about by reducing automatic stereotyping, increasing control, or a combination of these two processes. It was found that implementation intentions reduced stereotyping in a weapon identification task (studies 1 and 2) and an Implicit Association Test (IAT) (study 3) by reducing automatic effects of the stereotype (without increasing conscious control). This reduction in automatic race bias held for even new members of the category (study 2). These studies suggest that implementation intentions are an efficient way to overcome automatic stereotyping.

REDUNDANCY OF CONSCIOUS INTENT

Research by Bayer, Achtziger, Gollwitzer, and Moskowitz (in press) has tested the hypothesis that—once the critical cue specified in the "if" part of an implementation intention is encountered—a conscious intention to perform the response specified in the "then" component of an if–then plan is not necessary to facilitate response initiation. This was done by presenting the critical cue specified in the "if" part subliminally and assessing whether such subliminal presentation still managed to facilitate response initiation. Study 1 showed that the subliminal presentation of a cue (in this case, the experimenter) increased the accessibility of words needed for the execution of their planned goal-directed behavior toward the experimenter (i.e., expressing a complaint about unfriendly behavior). In study 2, Bayer et al. investigated whether the subliminal presentation of the specified cue facilitated the actual performance of the planned action. Participants were asked to categorize geometrical target figures as either angular (e.g., triangles and squares) or round (e.g., circles and ovals). Participants in the implementation intention condition memorized the if–then plan: "If I see a triangle, then I will press the right key particularly fast!" Goal-intention participants were familiarized with the triangle shape by drawing it three times on a piece of paper. Then either the triangle or a neutral shape (i.e., the percent sign) was subliminally presented as a prime before the target figures (to be classified). The speed with which the target figures were categorized was the dependent variable of the study. It was found that the subliminal presentation of the triangle (i.e., the critical cue specified in the implementation intention) resulted in faster classification responses to congruent trials (i.e., the classification of the triangle and other angular figures) among the implementation-intention participants only. This suggests that the response specified in the implementation intention is initiated automatically on contact with the situational cue, even if one has not consciously processed this cue.

IMPLEMENTATION INTENTIONS IN THE BRAIN

In their gateway hypothesis of rostral prefrontal cortex (area 10) function, Burgess, Simons, Dumontheil, and Gilbert (2007; see also Burgess, Dumontheil, et al., 2007) suggest a distinction between action control that is primarily triggered by low-level stimulus input and action control that is guided primarily by higher-level goal representations. In a host of studies using different kinds of executive function tasks, they observed in a meta-analysis that stimulus-driven, bottom-up action control is associated with medial area 10 activity, whereas goal-driven, top-down action control is associated with lateral area 10 activity. Accordingly, Gilbert, Gollwitzer, Cohen, Oettingen, and Burgess (2008) postulated that action control by implementation intentions should by characterized by medial area 10 activity, whereas action control by mere goals should be associated with lateral area 10 activity.

To test this hypothesis, we used a prospective memory (PM) paradigm. Such PM tasks require participants to perform an ongoing task (e.g., a lexical decision task or a classification task) but remember to also perform an additional response (i.e., the PM response, e.g., pressing the space bar) whenever a particular stimulus is presented within the ongoing task (e.g., a particular word or a particular constellation of the stimuli to be classified). In the Gilbert et al. (2007) study, each participant had to perform two different prospective memory tasks, one with a goal intention to perform the PM responses and the other with an implementation intention to perform these responses. As it turned out (see Figure 29.2), implementation intentions facilitated the performance of PM responses as compared to mere goal intentions, and this gain in performance did not lead to any additional costs in performing the ongoing task. Even more important, PM performance based on a goal intention was accompanied by greater lateral area 10 activity, whereas PM performances based on implementation intentions were associated with greater activity in the medial area 10. Moreover, the difference in brain activity associated with correctly responding to PM targets under goal versus implementation intentions correlated strongly and significantly with the behavioral difference as a consequence of acting on the basis of goal versus implementation intentions. The fact that acting on implementation intentions is associated with medial area 10 activity whereas acting on goal intentions is associated with lateral area 10 activity adds further support to our theory that by forming implementation intentions, people can switch from goal striving that is guided by conscious top-down control to direct, stimulus-triggered goal striving.

SUMMARY

There are at least three ways in which consciousness may depart from goal pursuit: distraction, habituation, and if–then planning. We have focused on this third approach and described research on the consequences of if–then planning. This research

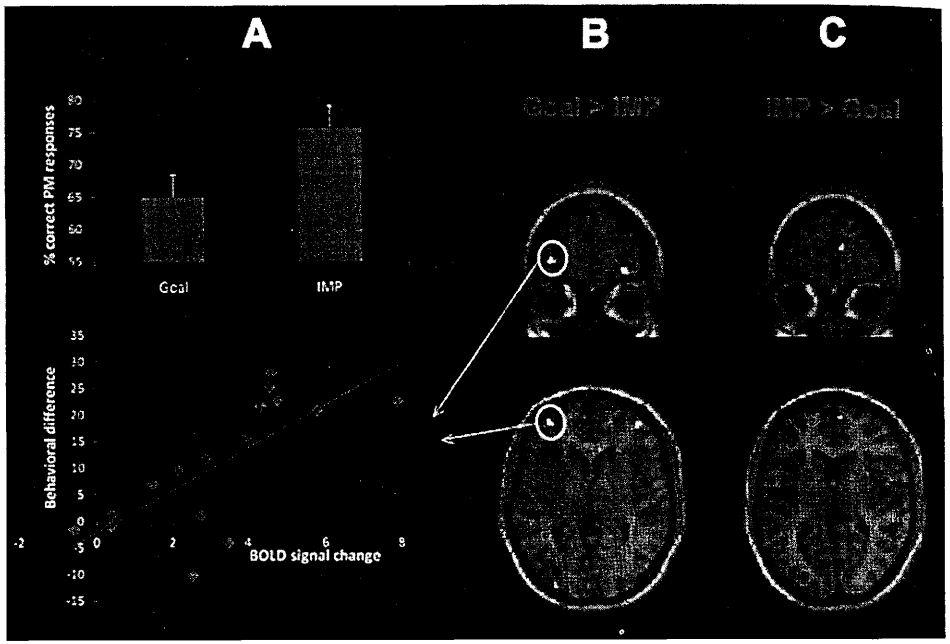

Fig. 29.2 Comparisons between the goal-intention ("Goal") and implementation-intention ("IMP") conditions. Panel A, top: Percentage of correctly detected prospective memory (PM) targets in the two conditions. Panel A, bottom: Correlation between the difference in BOLD signal in left lateral BA 10 elicited by correctly detected PM targets in the two conditions (horizontal axis) and the behavioral difference between the two conditions (vertical axis). Panel B: Brain regions showing greater target-related activity in the goal-intention condition compared with the implementation-intention condition, plotted on coronal ($y = 56$) and axial ($z = 2$) slices of a normalized T1-weighted scan. Panel C: Brain regions showing greater target-related activity during the implementation-intention condition compared with the goal-intention condition (plotted at $y = 60$ and $z = 10$).

shows that if–then plans that specify critical anticipated situations in the "if" part and instrumental goal-directed responses in the "then" part automate goal striving. The subjective goal and its respective top-down processes no longer control one's goal striving; rather, goal-directed action becomes immediate, efficient, and redundant of conscious intent (i.e., shows features of automaticity). That forming implementation intentions can indeed be used to switch from top-down to bottom-up control of goal-directed action is also supported by the observed changes in brain activity in the area 10 (i.e., from lateral area 10 activity to medial area 10 activity). This is not to say, however, that implementation intentions may not also be used to facilitate switching from reflexive to more reflective forms of action control. In a recent study on escalation of commitment, Henderson, Gollwitzer, and Oettingen (2007) showed that implementation intentions that specify a reflection response in their "then" part achieve the necessary switch from impulsive escalation of commitment (i.e., failing to disengage from a lost course of action) to taking a more reflective stance that prevents sunk cost behavior.

Conclusion

In this chapter, we have arrived at the view that conscious and nonconscious goal pursuit are two collaborative partners taking turns in working toward goal attainment. Whereas historically research has focused on conscious and nonconscious goal striving in comparison to each other—how are they alike? how are they different?—we have investigated when and with what consequences conscious and nonconscious goal pursuit come to the forefront. People are "living on the edge," shifting between conscious and nonconscious processes in their quest to effectively and efficiently reach their goals. We discussed shifting in both directions: when conscious awareness returns to automatic striving, and when automaticity replaces conscious, controlled striving. The shift from automatic goal striving to conscious awareness has intrigued psychologists for more than a century. In 1906, Lipps described consciousness returning to aid nonconscious goal pursuit when the flow (like a river) collided with an obstacle. In this chapter, we focused on our research examining the explanatory vacuum that emerges when consciousness cannot easily explain nonconsciously triggered goal pursuit by referring to relevant norms. Finally, we examined the planned shift to automaticity achieved through implementation intentions. By forming if–then plans that automate a goal-directed response to an anticipated cue, individuals may willingly shift from effortful, controlled processing to nonconscious goal striving.

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CHAPTER 30

The Primary Function of Consciousness: Why Skeletal Muscles Are "Voluntary" Muscles

Ezequiel Morsella, Stephen C. Krieger, *and* John A. Bargh

Abstract

This chapter attempts to illuminate what consciousness *is* by examining why one is aware of some nervous system events (e.g., pain and the urge to breath or eat) but not others (e.g., intersensory interactions, peristalsis, and the pupillary reflex). It is argued that conscious states serve a basic and specific, nuts-and-boltsy function in the nervous system, one that is intimately related to the actions of, specifically, skeletal muscle.

Keywords: conscious state, skeletal muscle, awareness, nervous system

Although there is usually a sharp, intuitively obvious distinction between unconscious action and actions that are consciously intended, drawing a principled distinction between the two kinds of processes is less than straightforward. On close examination, unconscious processes prove to be no less complex, flexible, deliberative, controlling, or action-like than their conscious counterparts (see review in Bargh & Morsella, 2008). For example, as repeatedly illustrated in the chapters in this book, action plans can be activated, selected, and, in some cases, expressed without conscious mediation. Given what the nervous system can achieve without recourse to consciousness (reviewed here), what, if anything, does the state of "being aware" contribute to human action? Would actions be limited in some way without it?

Answering this question depends on identifying the primary function of conscious states—those elusive phenomena falling under the rubrics of "phenomenal states," "qualia," "awareness," "sentience," or "subjective experience." These real, physical, but somewhat intangible phenomena have proven to be difficult to pin down. Faced with them, a scientist is comforted by Karl Popper's adage that *defining* something is the end product and not the beginning of scientific inquiry. For now, the best working definition has been put forth by the philosopher Thomas Nagel (1974), who proposed that an organism has conscious states if there is *something it is like* to be that organism—something it is like, for example, to be human and experience pain, breathlessness, or yellow afterimages.

Many regard the functional role of conscious states to be an unexplained, fundamental aspect of the human experience (Banks, 1995; Crick & Koch, 2003; Donald, 2001; Sherrington, 1906; Sperry, 1952):

> The problem of consciousness occupies an analogous position for cognitive psychology as the problem of language behavior does for behaviorism, namely, an unsolved

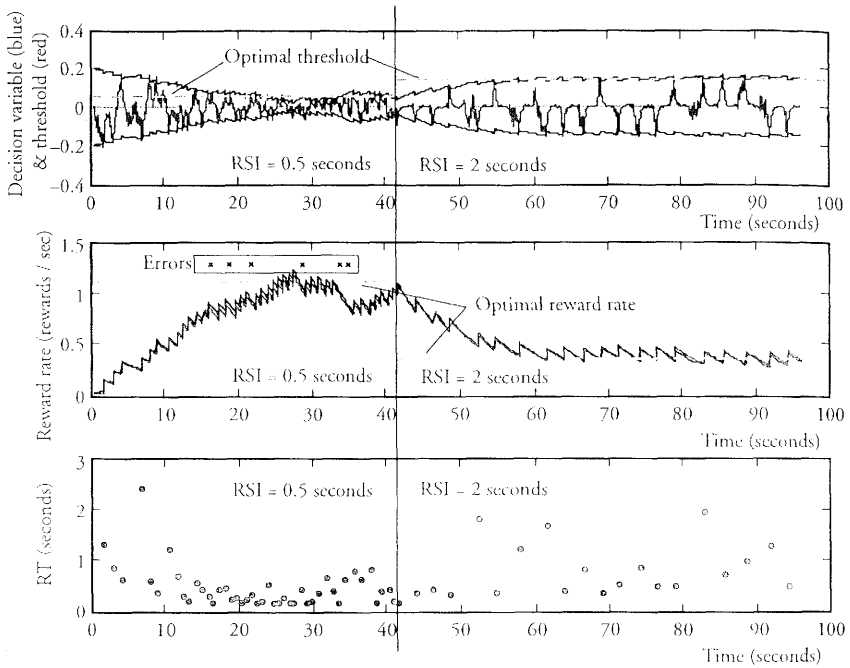

Fig. 25.7 Numerical simulations of the continuous time computational model of Equations22 to 28. Panels from top to bottom, respectively, show thresholds as envelopes with DD solutions inside and optimal thresholds dashed; running reward rate estimate with errors indicated by x's and optimal reward rates dashed; and reaction times. Parameter values are noted in text.

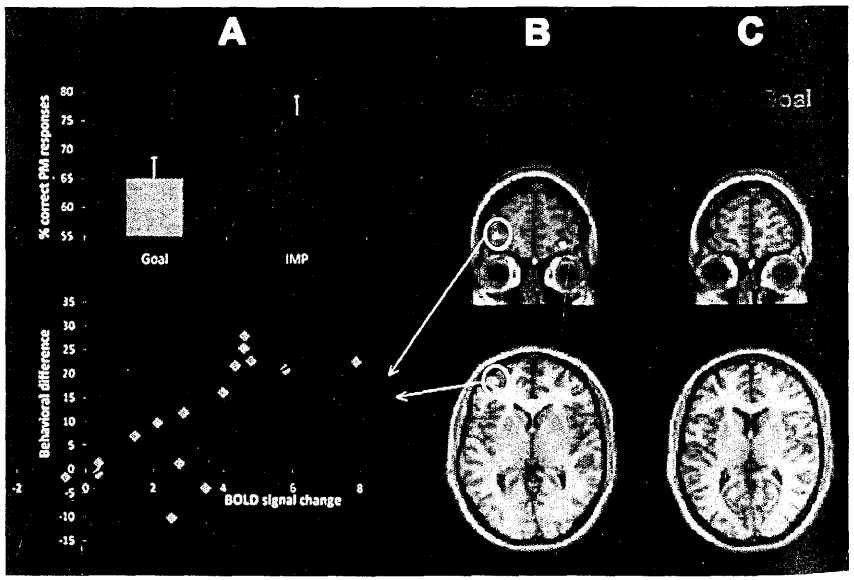

Fig. 29.2 Comparisons between the goal-intention ("Goal") and implementation-intention ("IMP") conditions. Panel A, top: Percentage of correctly detected prospective memory (PM) targets in the two conditions. Panel A, bottom: Correlation between the difference in BOLD signal in left lateral BA 10 elicited by correctly detected PM targets in the two conditions (horizontal axis) and the behavioral difference between the two conditions (vertical axis). Panel B: Brain regions showing greater target-related activity in the goal-intention condition compared with the implementation-intention condition, plotted on coronal (y = 56) and axial (z = 2) slices of a normalized T1-weighted scan. Panel C: Brain regions showing greater target-related activity during the implementation-intention condition compared with the goal-intention condition (plotted at y = 60 and z = 10).

PART

Affect, Goals, and Motivation

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