

Motivation

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It is Friday afternoon. On Monday, there is an important exam. Even though you have been aware of this deadline during the week, you did not find the time to study for the exam. So you set yourself the goal to finish this piece of work over the weekend. How do you arrive at a strong commitment to attain the goal? You may even make plans on when to get started and how you will deal with potential disruptions. How do you make effective plans for initiating goal striving and shielding it from getting derailed? In the present chapter, we will first address the question of how people may best use conscious thought to make goal pursuit effective. In the second part of the chapter, we will discuss a different route to effective goal pursuit. Think of a student who also faces the exam on Monday. Arriving at home from school on Friday afternoon, she walks by a picture of her father who had been her model to achieve well in school. Without conscious thought, she pulls out her notebook, places on her desk and gets started. In the second part of the chapter, we will discuss how the nonconscious activation of goals manages to influence people's behavior.

The Goal Concept in the Psychology of Motivation

Social psychologists use the term "motivation" to describe why a person in a given situation selects one response over another or makes a given response with great energization or frequency. Imagine a person searching for someone else in a crowd. She gets excited when she finds that person. She runs toward him. Each of those responses involves motivation, which can be cognitive (e.g., searching), affective (e.g., excitement), or behavioral (e.g., running). There are many answers to the question of what drives motivation. The history of the psychology of motivation reveals ever more sophisticated answers. This chapter will survey the field of motivation from its origins in animal studies to its

investigations into the human mind, focusing on how humans in social contexts pursue conscious and unconscious goals.

Based on learning theory advanced by early animal psychologists (Hull, 1943; 1952; Spence, 1956), the strength of the tendency to make a response was at first considered to be a function of an organism's skills (or habit strength), its needs, and the incentive value of the outcome. For example, how fast an animal runs towards a box containing food depends on its habit strength, its hunger, and the quality and quantity of food. However, with the advance of the cognitive revolution in psychology, these determinants of motivation as well as the concept of motivation itself became more elaborated.

The neo-behaviorist and cognitive learning theorist Edward Chase Tolman (1932, 1952) influenced the field through his observations of "*mus norvegicus albinus*." postulating various mental processes "which intermediate in the causal equation between environmental stimuli and overt behavior." (Tolman, 1932, p. 2). These intermediate processes entailed concepts of purpose (ends and means) as well as expectations (e.g., means-expectations, end-expectations, and means-end-expectations). The social psychologists Festinger (1942) and Atkinson (1957) drew on that work in their research on what motivates humans to select and perform tasks of different difficulty. They suggested that people weight the incentive value of the desired outcome with the expectancy that it would actually occur. Social cognitive learning theorists (e.g., Bandura, 1982) went a step further to factor in whether one could successfully perform the necessary behavior required to arrive at a desired outcome (so-called efficacy beliefs or control beliefs). They also alluded to further relevant expectancies, such as the expectancy that the situation by itself would produce the desired outcome (Heckhausen, 1977), the expectancy that performing a given behavior would lead to the

desired outcome (Bandura, 1977, 1982), the expectancy that achieving the desired outcome would be instrumental to accruing further positive consequences (Vroom, 1964), the expectancy that the desired outcome could be brought about somehow by one's actions (Oettingen, 1996), or the expectancy that the future in general would be bright (Scheier & Carver, 1987; Abramson, Seligman, & Teasdale, 1978).

Adding these expectancy-related terms helped to explicate in more detail what Hull and Spence tried to capture with the concept of habit strength, that is, the *can*-aspect (or feasibility aspect) of the motivation to make a certain response: *Can* the desired outcome be brought about? But the cognitive revolution also helped explain the *want*-aspect (or desirability aspect) of the motivation to make a certain response: Do I really want the desired outcome? This desirability issue is captured by Hull and Spence as the concept of need and the concept of incentive. With respect to need, the cognitively-inspired psychology of motivation has ventured into the concept of motive (for a summary see McClelland, 1985a), whereby motives are defined as the class of incentives that a person finds attractive (e.g., achievement, power, affiliation, intimacy). More importantly, McClelland (1985b) discovered that depending on whether this preference for certain classes of incentives was measured implicitly (as assessed by the TAT) or explicitly (as assessed by attitude questionnaires), it predicts the execution of different types of motive-related responses: actions people spontaneously engage in versus actions people decide to engage in after thoughtful deliberation. Also, it matters whether an incentive is hoped for or feared. For instance, a person with a strong achievement motive who primarily longs for the pride associated with success will choose a medium difficult task, which provides most information about achievement. To the contrary, a person who abhors the shame associated

with failure (Atkinson, 1958, 1964) will choose either a very easy or a very difficult task, which is an effective strategy to avoid shame. Finally, researchers have differentiated among incentives as well (Heckhausen, 1977). For instance, in the realm of achievement, anticipation of positive self-evaluations (e.g., “I did really well!”), positive evaluations by others (e.g., praise by the teacher), higher order positive consequences (e.g., successful professional career), and consequences that go beyond achievement (e.g., having a good time with co-workers) can all motivate people to do well on given tasks.

But the psychology of motivation has not only investigated a person’s readiness to make a certain response. It also explicated this readiness itself to predict whether one response is chosen over another, or engaged in with a high intensity or frequency. Most importantly, Ajzen and Fishbein (1969) suggested to assess this readiness in terms of a person’s intention to make the response. Mischel (1973) went a step further and argued that such intentions can be conceived of as self-imposed goals that imply standards that the person intends to meet (with respect to quality and quantity criteria). It is important to note here, that this conceptualization of the term goal is quite different from how the term goal was used by the behaviorists. According to the behaviorists (e.g., Skinner, 1953; Bindra, 1959), a goal is nothing but a powerful incentive, defined as objects and events that affect an organism’s behavior radically and reliably (e.g., food, sexual stimulation, sudden loud noise). Whether an object or event is treated as a goal, however, depends solely on the investigator’s perspective on the organism’s behavior. If the investigator selects a certain incentive as a reference point for the description of a respective behavior, this incentive becomes a goal. For example, Skinner (1953) refers to the food that is provided as incentive to explore a maze as the animal’s goal (or reason) to run through the maze. A behaviorist researcher’s statement

that food is a goal to the hungry organism means nothing more than (1) it is known that food is an incentive to the organism, and (2) the researcher has chosen to describe the behavior of the organism in relation to food rather than in relation to any other object or event. In the behaviorist tradition, the reference point for goal directed behavior is thus neither the intention nor the goal set by the organisms themselves. Behaviorists do not analyze internal goals or the processes leading to goal-setting. Skinner (1953) phrased this most cogently when he referred to goal directedness as an effective and easy-to-handle category for the description of persistent, appropriate, and searching behavior towards an incentive, resulting from some kind of learning.

To the contrary, cognitive social learning theorists (e.g., Mischel, 1973; Bandura, 1989) considered goals as internal and subjective, which had vast consequences for the study of motivation:

1. If one studies goal-directed responses in relation to subjective goals held by the individual (e.g., to get to know an attractive person), one begins to wonder how people set themselves such goals, and how they strive to achieve them. Noticing the unique nature of both of these problems, Kurt Lewin (Lewin, Dembo, Festinger, & Sears, 1944) suggested adopting a distinct theoretical perspective for goal setting versus goal striving. Present day researchers have rediscovered Kurt Lewin's approach (see e.g. the action phases model; Heckhausen & Gollwitzer, 1986; Gollwitzer, 1990). Nowadays, research on motivation explicitly targets either the determinants and processes of goal setting or the determinants and processes of goal striving and successful goal attainment.

Conceptualizing goals as internal and subjective has the additional advantage of differentiating the content of the goal from the responses that are performed in its service.

This distinction has led to research on how goals are framed and how their framing facilitates different responses. For example, it matters whether an achievement goal is framed as a learning goal or a performance goal (e.g., I want to learn from performing the task versus I want to show my abilities; Dweck, 1996).

2. Conceptualizing goals as subjective internal states also raises the question of whether the mental representation of a goal can be activated outside of a person's awareness (as suggested in the auto-motive model; Bargh, 1990). Given that goals are internal mental representations, one wonders how such mental representations relate to the representations of other goals, sub-goals, and means of attainments (Kruglanski, 1996). Such considerations were the focus of the psychology of motivation during the last ten years. New questions emerged (e.g., how does goal striving that is unconsciously activated compare to goal striving that is consciously activated? Bargh, Gollwitzer, Lee-Chai, Barndollar, & Trötschel, 2001; Oettingen, Grant, Smith, Skinner, & Gollwitzer, 2006), and new answers to old questions were found (e.g., how does striving for a goal that is linked to several different means differ from striving for a goal where the same means can serve a host of different goals? Kruglanski & Kopetz, 2008).

Research on goals is flourishing. This upsurge of the goal concept becomes evident when perusing recent relevant edited volumes (e.g., the edited volumes by Shah & Gardner, 2008; Kruglanski & Higgins, 2007; Heckhausen & Heckhausen, 2008; Morsella, Bargh, & Gollwitzer, 2008; Moskowitz & Grant, 2009) or the contents of major conference programs, in which the goal concept is now one of the most frequently appearing theoretical constructs. Therefore this chapter will discuss the recent advances in studying motivation in social psychology by focussing on goals.

The first part of the chapter will review and discuss research in the classic tradition of motivation psychology. Here, the individual or self is considered an active, conscious agent, involved in choosing and setting goals (e.g., long-term vs. short-term), committing to and overcoming obstacles when striving to attain them, and disengaging from goals when called for. The second part turns to the research literature on automatic or unconscious goal pursuit, which has shown how goals can also operate independently of conscious selection and guidance. That review will show that consciously set and unconsciously activated goals lead to goal striving with similar features. Finally, the conclusion will provide a unifying framework for conscious and unconscious goal pursuit in terms of...

Conscious Goal Pursuit

The section on conscious goal pursuit is subdivided into goal setting versus goal implementation. The discussion of goal setting will first target various determinants of goal content and goal structure. For instance, what determines whether people set themselves goals in the achievement or the affiliation domain and whether these goals are framed as learning versus performance goals? The goal setting discussion will then move on to the question of how people can strategically regulate the process of goal setting so that they arrive at particularly strong goal commitments.

Second, the section on conscious goal pursuit will switch to a discussion of the issue of goal implementation. How do content (e.g., cooperative vs. competitive) and structural features of goals (e.g., specific vs. vague standards) affect people's success in striving for their goals, and what contextual variables (e.g., affective states, competing action tendencies, power position) do also matter. The discussion will end with an analysis of the self-

regulation strategies people can use to promote goal attainment (i.e., planning and persistent acting towards the goal).

Goal Setting

What makes people set themselves goals of a certain content and structure, and how can they self-regulate their goal setting? It is important to recognize that many goals are assigned by others (e.g., employers, teachers, parents). In this case it matters who assigns what goal to whom, and how the perceived message is delivered. Locke and Latham (1990, 2006) suggest that source variables, such as legitimacy and trustworthiness, play an important role in the transformation of an assigned goal into a personal goal. For recipients of such assigned goals, perceiving the goal as desirable and feasible, redefining it as a personal goal, and integrating it with other existing goals are vital. Finally, relevant message variables include the discrepancy between the assigned goal and the recipient's respective current goal (e.g., when a very low calorie diet is suggested to a person with a moderate dieting goal), and whether fear appeals are used (e.g., information on the dramatic medical consequences of health-damaging behavior). Anyone promoting a particular goal in others should also consider the processing skills and motivation of the recipient as a moderator of the effects of source, recipient, and message variables on accepting assigned goals as personal goals. But people do not only arrive at personal goals by accepting the goals assigned by others; people also set goals for themselves even though such goal setting may still be influenced by others, for example, when goals are conjointly set (in participative decision making and employee involvement) or when goals are adopted from highly respected models (e.g., adopting standards for self-rewards). Social context cues, such as normative expectations of the social community, may also influence goal selection (Ajzen, 1985).

Goal Content

Assuming that people set themselves desirable goals (i.e., incentive valence of goal attainment is high), goal content should be influenced by people's needs, wishes, and higher order goals. Ryan, Sheldon, Kasser, and Deci (1996), for instance, report that the content of people's goals reflects their needs for autonomy, competence, and social integration (see also Hagger, Chatzisarantis, & Harris, 2006). For example, people may set goals to independently perform a certain task, to acquire the necessary skills to perform the task, or to become integrated into an admired team. Goal choice in line with these needs is more pronounced when people are confronted with reminders of mortality (Lykins, Segerstrom, Averill, Evans, & Kemeny, 2007). With respect to the translation of the power motive (i.e., influencing others is a strong incentive for a person; Winter, 1991) into respective goals, Schultheiss and Brunstein (1999) observed that an exercise of imagining others perform well on a power-related task produced more motive-congruent setting of the goal to also do well on a this task.

Markus and Nurius (1986; Oyserman, Bybee, & Terry, 2006) suggest that people conceive of themselves not only in terms of what they are (i.e., the self concept) but also what they wish to become in the future (i.e., the possible self). These possible selves should give people ideas on what kind of personal goals they might want to strive for. Once people have set themselves higher order goals such as becoming a physician, a good parent, or a moral person (Gollwitzer & Kirchhof, 1998), these higher order goals may determine the contents of lower order goals as well. The contents of such "Be" goals determine the contents of respective "Do" goals (Carver & Scheier, 1998). "Be" goals have been described by using terms such as current concerns (Klinger, 1977), self defining goals (Wicklund & Gollwitzer,

1982), identity goals (Gollwitzer & Kirchhof, 1998), personal projects (Little, 1983), personal strivings (Emmons, 1996), and life tasks (Cantor & Fleeson, 1994). The degree to which higher order “Be” goals determine the choosing of lower order “Do” goals depends on the degree of commitment to the respective higher order “Be” goals (Brunstein & Gollwitzer, 1996).

But the perceived desirability of a potential behavioral goal also depends on the attitude towards that goal. As Ajzen and Fishbein (1980; Fishbein & Ajzen, 1975) have pointed out, in theory attitude is the sum total of the possible positive and negative consequences associated with the attainment of the behavioral goal, each of these consequences weighted by its perceived likelihood of occurrence. In practice, of course, people may not go through such a comprehensive cognitive process to develop each attitude. Furthermore, these consequences do not have to be experienced; false suggestions that they might have occurred (e.g., the false suggestion of a negative childhood event) suffices to affect a person’s behavioral goals (Geraerts, Bernstein, Merckelbach, et al., 2008). Finally, as suggested early on by Bandura (1977, 1997), feasibility concerns play an important role in goal setting. It matters whether people feel that they can make the responses that produce the desired goal. Self-efficacy beliefs need to be high (or control beliefs as referred to by Ajzen, 1985, 1991, in his theory of planned behavior) for strong intentions (goal commitments) to emerge. Again, people do not need to have made such responses successfully in the past for high self-efficacy to emerge; rather, their belief in their own skills suffices (e.g., by observing similar others making similar responses; Bandura, 1977).

Recent research has focused on the question of what motivates people to reflect on the desirability and/or feasibility of a given goal choice. For instance, Cioffi and Garner

(1996) found that requiring active choices of a goal (i.e., answering affirmative items to do volunteer work) led to thinking of more reasons why such a decision could be attractive than requiring only a passive choice (i.e., skipping items that affirmed the opposite choice). Liberman and Trope (1998) report that reflecting on a potential goal that is psychologically distant (e.g., acting on the goal is required in the distant rather than near future) makes people focus on the goal's desirability, whereas a goal that is psychologically near (e.g., acting on the goal is required in the near future) triggers feasibility concerns. But considering a potential goal that is psychologically distant may not only turn the person's mind to the desirability of this goal but also increase its perceived desirability. Specifically, when Vasquez and Buehler (2007) varied near vs. distant psychological distance by having people imagine the performance of a future task from a first or third person perspective, they observed that the importance of doing well (i.e., high desirability of goal attainment) increased by taking a third person perspective. The latter perspective produced higher desirability that in turn led to a stronger goal to do well on the task at hand (for similar findings using a different psychological distance manipulation, see Fujita, Trope, Liberman, & Levin-Sagi, 2006). So it appears that near vs. distant construals of a goal do not only affect to what extent desirability or feasibility are considered; rather, psychologically distant construals can also make a goal *seem* more desirable.

Another mode of thought that affects a person's readiness to reflect on the desirability and/or feasibility of a goal is counterfactual thinking (Epstude & Roese, 2008; McCrea, 2008). Failing to reach a set goal (e.g., not doing well in a mid-term exam where one set out to receive an A) often triggers thoughts like these: "If only I had studied harder, I would have done better on the mid-term exam!" Such counterfactual thought in turn triggers thoughts on

the desirability and feasibility of studying harder for the class, potentially leading to the goal to study harder for this class in the future. But when it comes to adjusting one's goals to internal and external demands, counterfactual thinking is not the only form of thinking attentively, repetitively, or frequently about one's self and one's world. A summary article by Watkins (2008) points out that there are many others: Rumination (or brooding on negative stimuli), worry, mind wandering, chronic self-consciousness, mental simulation, among others. Each of these forms of thinking may produce a differential readiness to consider desirability and feasibility of potential goals. Researchers have also investigated whether a future outcome being perceived as highly desirable leads to being overly optimistic about its feasibility. The evidence is mixed, and the mechanisms that lead to such overly optimistic expectations still need further research (Krizan & Windschitl, 2007).

Not only mode of thought influences desirability and feasibility considerations and assessments; emotional states also play a role. Traditional analyses of emotion (e.g., Frijda, 1986; Russell, 2003) emphasize the potential of emotions to elicit behavior directly. For example, fear produces fight or flight, or disgust leads to rejection. Recently, Baumeister, Vohs, DeWall, and Zhang (2007) have argued that behaviors can produce emotional outcomes. For example, steeling may lead to feelings of guilt. By cognitively anticipating such outcome emotions, people can learn about the desirability of performing the respective behavior (e.g., pride may signal high desirability) and about its feasibility (e.g., surprise may signal that the outcome is more easily attained than originally expected). As a consequence, when people deliberate whether to perform a certain behavior, they may anticipate relevant outcome emotions. They give valuable feedback on whether to set the goal to perform the behavior or not.

Goal Structure

In the goal setting paragraph above, we have discussed how people arrive at goals of different content (e.g., to help a colleague or to compete), and we concluded that ultimately people set goals that they perceive as desirable and feasible. Goals with the same content may, however, have different structure. The next part addresses relevant types of goal structure and their origins.

People prefer to interpret the behavior of others as approach motivated, even when they recognize that their own identical behaviors are motivated by avoidance (Miller & Nelson, 2002). This interpretation bias implies that people frame some of their goals as avoidance. Indeed, Elliot (2008) shows that people frame their goals in terms of approach as well as avoidance. For instance, a person who wants to be a good student may frame the goal of doing well in class as either approaching good grades (earning As and Bs) or avoiding bad grades (no Cs and Ds). Whereas both of these goals should be energizing, the direction pointed to in the first case is toward positive stimuli, whereas in the second case it is away from negative stimuli. People with the trait disposition of extraversion prefer to set themselves approach goals, whereas people with the trait disposition of neuroticism prefer to set themselves avoidance goals (Larsen & Augustine, 2008). These preferences for approach versus avoidance framing also evidence for state extraversion and state neuroticism respectively (Heller, Komar, & Lee, 2008). Gray's (1990, 1994) Reinforcement Sensitivity Theory points to a further individual difference variable, that is, reward sensitivity versus punishment sensitivity (see also the BAS vs. BIS scales; Carver & White, 1994). Moreover, whether people set themselves approach versus avoidance (achievement or social) goals

depends on their motive dispositions of hope for success versus fear of failure (Elliot, 1997) as well as hope for affiliation versus fear of rejection, respectively (Gable, 2006) .

Higgins (1997; Scholer & Higgins, 2008) suggests that people may not only frame the goals themselves in terms of approach and avoidance, they may also frame *how* they pursue the goals in terms of approach versus avoidance. At the level of strategy goals (tactics for moving toward desired or undesired end-states), for instance, one can approach a desired end-state by promotion strategies (i.e., with eagerness) or prevention strategies (i.e., with vigilance). Equally, when one moves away from an undesired end-state, one can also use promotion strategies (eagerness) or prevention strategies (vigilance). The framing of strategy goals in terms of promotion versus prevention has been found to be a consequence of whether people construe their self either as an *ideal* self that they desire to be or as an *ought* self that they feel compelled to be: ideal-self individuals prefer a promotion framing, whereas ought-self individuals favor a prevention framing.

Dweck (1996) has suggested a framing distinction between performance goals versus learning goals. Goals in the achievement domain, for example, may either focus on finding out how capable one is (performance goals) or on learning from the task (learning goals). Molden and Dweck (2006) argue that implicit theories on the nature of ability determine the preference for performance versus learning goals. If people believe that ability is fixed and cannot be easily changed (i.e., hold an entity theory of ability) they prefer setting performance goals. However, if people believe that ability can be improved by learning (i.e., hold an incremental theory of ability), they prefer setting learning goals. However, people setting themselves performance or learning goals, may still differ in framing their goals as abstract or concrete.

People generally prefer to set themselves abstract goals. They adopt concrete goals predominantly when they run into problems attaining an abstract goal (Vallacher & Wegner, 1987, 1989). However, people also vary to the extent they typically think of their actions in low level terms or prefer high level identifications (Vallacher & Wegner, 1989). Importantly, this general preference for either an abstract or a concrete level of identifying actions is then also reflected in the choice of abstract versus concrete goals.

Finally, goals of any content (e.g., solving a math problem, writing a book, getting to know a stranger) can be specified at different levels of difficulty. Three lines of research identified determinants of difficulty preference. Atkinson (1957) has pointed out early on that achievement motives may be dominated by hope for success or fear of failure and that the latter distinction influences the preference for difficulty level of a given task. Individuals with the hope for success motive prefer medium levels of difficulty, whereas individuals who fear failure prefer either low or high levels of difficulty. Assuming that low difficulty tasks are associated with a high likelihood of success, and assuming that failing at difficult tasks can be attributed to the task rather than to one's lack of ability, choosing low or high difficulty tasks is the self-protective route (Weiner, 1992). Moreover, Hollenbeck, Williams, and Klein (1989) observed that commitment to difficult goals was higher when goals were made public rather than stayed private, and when locus of control was perceived as internal as compared to external. And Bandura (1997) reports that having successfully achieved an earlier goal stimulates the setting of ever more challenging goals; this is assumed to be due to a person's heightened sense of efficacy originating from just having successfully attained the prior goal.

Self-Regulation of Goal Setting

Knowing the determinants of the content and structure of the goals people set themselves does not yet answer the question of how people arrive at strong goal commitments. Perceiving a goal as desirable and feasible does not guarantee that one actually commits to and strives for this goal (i.e., becomes committed to its realization). For instance, one may wish to learn to play the violin because one loves to make music and feels capable of doing so, yet actually committing oneself to realize this wish takes a further step. It is this further step that will be addressed in the following section.

Various mental strategies further the transition from one's wishes and fantasies to goal commitments. The theory of fantasy realisation specifies respective self-regulation strategies (Oettingen, 2000): mental contrasting, indulging, and dwelling. In mental contrasting, people first imagine the fulfilment of a wish or fantasy (e.g., becoming a clinical psychologist, giving a good talk, getting up on time in the morning) and then reflect on the present reality that stands in the way of attaining the desired future (e.g., the GRE exam yet to be taken, evaluation anxiety, failing to go to bed early enough). Mental contrasting is a problem-solving strategy that makes people recognize that they have not fulfilled their wish yet, and that they need to take action in order to achieve the desired future. As a consequence, expectations of attaining the desired future become activated and determine a person's goal commitment and subsequent striving to attain the desired future. When perceived expectations of success are high, people will actively commit to realize the desired future; when expectations of success are low people will refrain from doing so, and thus they will venture on alternative wishes and desired futures. In this way, mental contrasting helps people discriminate between feasible and unfeasible goal pursuits.

The model of fantasy realization specifies two further routes to goal setting. People may engage in either indulging (solely envision the attainment of the wished for future) or in dwelling (solely reflect on the present negative reality). Both of these mental strategies do not produce a discrepancy between future and reality, and thus the individual fails to recognize that actions (making responses) are necessary to achieve the desired future. Therefore, expectations of success do not become activated, and goal setting does not reflect the perceived likelihood of reaching the desired future. Individuals who indulge and dwell show a medium level of goal commitment, even though no engagement (in the case of low expectations of success) or full engagement (in the case of high expectations of success) are the resource-efficient ways to go. For example, when it comes to task of giving a good talk, a student shows lush preparation no matter whether a successful performance is perceived as feasible or not.

Various experiments support these claims (e.g., Oettingen, 2000; Oettingen, Hönig & Gollwitzer, 2000; Oettingen, Mayer, Thorpe, Janetzke & Lorentz, 2005; Oettingen, Mayer, Sevincer et al., in press). In one study (Oettingen, Pak, & Schnetter, 2001, Study 4), freshmen enrolled in a vocational school for computer programming first indicated their expectations of excelling in mathematics. Then they named positive aspects that they associated with excelling in mathematics (e.g., feelings of pride, increasing job prospects) and negative aspects of reality, that is, potential obstacles (e.g., being distracted by peers or feeling lazy). In the mental contrasting condition, participants had to elaborate in writing two positive aspects of the future and two aspects of reality, in alternating order beginning with the positive aspect of the future. Participants in the indulging condition were asked to elaborate four positive aspects of the future only; in the dwelling condition they instead

elaborated four negative aspects of reality only. As a dependant variable, participants indicated how energized they felt with respect to excelling in math (e.g., how active, eventful, energetic). Two weeks after the experiment participants' teachers reported how much effort each student had invested in the last two weeks and provided each student with a grade for that time period. As predicted, only in the mental contrasting condition did the students feel energized, exert effort, and earn grades based upon their expectations. Those with high expectations of success felt the most energized, invested the most effort, and received the highest course grades; those with low expectations of success felt the least energized, invested the least effort, and received the lowest course grades. To the contrary, participants in both the indulging and dwelling conditions felt moderately energized, exerted medium effort, and received medium grades independent of their expectations of success.

A variety of studies pertaining to different life domains replicated this pattern of results, for example, experiments on studying abroad, acquiring a second language, getting to know an attractive stranger, finding a balance between work and family life, self-improvement, and idiosyncratic interpersonal wishes of great importance. Further, strength of goal commitment was assessed by cognitive (e.g., making plans), affective (e.g., feelings of frustration), motivational (e.g., feelings of energization), and behavioral (e.g., amount of invested effort) indicators. These indicators were measured via self-report or observations, either directly after the experiment or weeks later. All of these studies evidenced the same patterns of results: given high expectations of success, participants in the mental contrasting group showed the strongest goal commitment; given low expectations, mental contrasting participants showed least goal commitment. Participants who indulged in positive images

about the future or dwelled on negative images of reality showed medium commitment no matter whether expectations of success were high or low.

It is important to note that the outcomes of mental contrasting do not occur as a result of changes in the level of expectations (feasibility) or incentive valence (desirability) but rather as a result of the mode of self-regulatory thought (i.e., mental contrasting, indulging, dwelling), with mental contrasting aligning strength of goal commitment to expectations. Furthermore, the effects of mental contrasting depend on the person perceiving the present reality as an obstacle, that is, as standing in the way of realizing the desired future (Oettingen et al., 2001, Study 3).

Recent research shows that mental contrasting does not have to pertain to attainment of a positive future; people can also fantasize about a negative future and contrast these fantasies with reflection on positive reality. Oettingen et al. (2005) observed in xenophobic high school students that negative fantasies (i.e., fears that social conflicts would arise from foreign youth moving into their neighbourhood) contrasted with reflections on a positive reality standing in the way of the feared future coming true (i.e., youth having great soccer matches with foreigners) produced expectancy-dependent commitments to the goal of approaching the foreigners (i.e., investigating time and effort in welcoming foreigners in one's neighbourhood). Finally, Oettingen, Mayer, and Thorpe (in press) found that setting oneself the goal to stop smoking can be facilitated by mentally contrasting the feared future of negative health consequences with the current positive reality of still having a healthy body.

The mediating processes of mental contrasting pertain to energization (Oettingen, Mayer, Sevincer et al., in press). Specifically, mentally contrasting a desired future with

obstacles of present reality leads to energization, which in turn creates goal commitments strong enough to lead to effective goal striving and successful goal attainment. Mediating effects of energization on goal commitment evince for physiological indicators of energization (i.e., systolic blood pressure) as well as experiential indicators (self-report of feeling energized). Mental contrasting also spurs planning, a cognitive mediator between expectations of success and goal commitment (Oettingen et al., 2001; Oettingen et al., 2005; Oettingen & Stevens, 2008).

Mental contrasting, as it is a problem-solving strategy, implicates heightened cognitive activity. A recent experiment attesting to this idea used continuous magnetoencephalography (MEG), a brain imaging technique measuring magnetic fields produced by electrical activity in the brain (Achtziger, Fehr, Oettingen, Gollwitzer, & Rockstroh, 2008). Mental contrasting as compared to indulging or simply resting produced heightened brain activity in areas associated with working memory, episodic memory, intention maintenance, action preparation, and vivid visualization. That is, mental contrasting implies vividly imagining a desired future, anticipating hindrances to realizing this future, and making plans on how to overcome these barriers. The brain activity associated with indulging, on the other hand, did not differ from resting.

Given this latter finding, one might think that indulging in the future could potentially lead to strong goal commitments as well -- if only individuals managed to engage in highly positive fantasies about the future. But research on engaging in positive versus negative fantasies about the future speaks against this argument. Early on, Oettingen and Wadden (1991) observed that obese women who would spontaneously indulge in positive fantasies about their weight loss were less successful in achieving a lower body mass (after four

months and two years) than obese women who produced relatively more negative future fantasies. Moreover, Oettingen and Mayer (2002) observed that people who indulge in positive fantasies (valence and frequency) show comparatively weak goal commitments (as assessed by their efforts to strive for the goal) in the area of academic achievement (i.e., achieving a good grade in a psychology class), professional achievement (i.e., finding a job after graduation), interpersonal relations (i.e., finding a romantic partner), and health (i.e., recovering from hip surgery). Importantly, it did not matter whether the spontaneously produced positive fantasies pertained to the desired outcome or the ways of getting there. Also, goal commitment was assessed short-term (two weeks later) and in the long run (i.e., two years after the assessment of the spontaneously-produced positive future fantasies).

At first sight, the reported findings seem to be in contrast to research observing facilitating effects of positive affect on performance in executive function tasks (Dreisbach & Goschke, 2004; Gable & Harmon-Jones, 2008; Kazen & Kuhl, 2005). However, these facilitating effects evinced for individuals who performed these tasks while being in a positive affective state. Note that in the studies reported above, performance was assessed long after the hype produced by the positive affective state had vanished. Therefore, performance was a function of goal commitment, and a binding goal commitment cannot emerge when people indulge in their wishes and fantasies about the future.

A further strategy of goal setting is suggested by the mindset theory of action phases (Heckhausen & Gollwitzer, 1987; Gollwitzer, 1990). This theory takes a functional perspective on how people entertaining a host of wishes would differ from people who already have committed to a goal. It posits that there are multiple stages of goal pursuit, called action phases, which people need to successfully navigate to attain a goal: the

predecision, the preaction, the action, and the post action phases. Each phase is characterized by a distinct task that must be accomplished, and that engaging in each of these tasks produces a typical mindset that facilitates task completion. Goal decisions occur in the predecisional phase. Assuming that people generally entertain more wishes than they have time or means to realize, they face the task of having to decide between the wishes in order to accomplish at least some of them. Desirability and feasibility guide this decision.

Accordingly, whenever people start to deliberate their wishes, cognitive procedures become activated that allow for open-minded processing of available information (Fujita, Oettingen, & Gollwitzer, 2007), tune people towards processing information related to the desirability and feasibility of their wishes (Gollwitzer, Heckhausen, & Steller, 1990), and allow for even-handed (impartial) and objective (realistic) analysis of this information (Armor & Taylor, 2003; Bayer & Gollwitzer, 2005; Gagné & Lydon, 2001a,b; Gollwitzer & Kinney, 1989; Taylor & Gollwitzer, 1995).

Mindset theory assumes that the transition from the predecisional phase to the preaction phase takes the form of a resolution that leads to a determination to act. Through this resolution the desired end state specified by the wish becomes an outcome the individual feels committed to achieve. This transition from entertaining a mere wish to being determined to realize the wish is like crossing the Rubicon. But what are the preliminaries of crossing the Rubicon? According to mindset theory, the desirability and feasibility of a wish needs to be fully and completely deliberated before people can decide to “cross the Rubicon” (that is, move from indecisiveness to decisiveness). Accordingly, when people feel that they have deliberated enough, they should be able to justify to themselves that they can now make such a move. Indeed, Gollwitzer, Heckhausen, and Ratajczak (1989) observed that as-yet-

undecided people were more likely to make a decision after they had been asked to list likely positive and negative, short-term and long-term consequences of goal attainment, and to judge the likelihood of goal attainment. Importantly, another strategy also helped people to decide among wishes. When undecided people were lured into planning the implementation of the wish by pretending that a resolution to act on the wish had already occurred, they also became more likely to make and commit themselves to a decision.

Goal Striving

Once people have set themselves goals, it cannot be assumed that attaining the goal is inevitable; rather, this is just a first step. People need to move on and engage in goal striving. Whether a desired goal is ultimately attained depends on how well goal striving is executed. Successful goal striving depends first of all on what kind of goals people have set for themselves; again, the relevant variables are goal content and how this content is structured (framed). In addition, however, goal striving depends on coping effectively with a few typical problems: getting started with the initiation of goal-directed actions, persisting in the face of difficulties, shielding the goal from distractions, disengaging from ineffective means, and not overextending oneself. This self-regulation issue of what people can do to make their goal striving more effective in the face of these problems (i.e., the effective self-regulation of goal striving) will be discussed after goal content and goal framing.

Goal Content

Goal content strongly affects the chances of implementing a goal successfully. Ryan et al. (1996) have argued that goals of autonomy, competence, and social integration favor creativity, cognitive flexibility, deep processing of information, and effective coping with failure. These effects are assumed to be mediated by an intrinsic self-regulation (see the self-

concordance model by Sheldon & Elliot, 1999), as the needs of autonomy, competence, and social integration are associated with intrinsic goal striving (i.e., in line with a person's interests or core values) rather than extrinsic goal striving (i.e., in line with environmental pressures or internal sanctions). Intrinsic goal striving is preferred by individuals with positive self-regard (Judge, Bono, Erez, & Locke, 2005), and it can be facilitated from outside by teachers who provide autonomy support (Sheldon & Krieger, 2007). Moreover, intrinsic goal striving not only fosters the attainment of behavioral goals, but also the attainment of goals that pertain to cognitive and affective responses (e.g., the goal to evaluate others in a fair, non-prejudicial manner as assessed by implicit and explicit measures of prejudice; Legault, Green-Demers, Grant, & Chung, 2007). And the positive effects of intrinsic goal striving extend beyond the individual to the person's close relationships (Gore & Gross, 2006).

Goal striving based on autonomy, competence, and social integration needs has also been analyzed with respect to its relation to subjective well-being (Deci & Ryan, 2000). Such goals are observed to be positively associated with high well-being and life satisfaction, whereas goals of making money, becoming famous, and acquiring high status are negatively related. The latter is particularly true for individuals who feel highly efficacious, implying that people who successfully attain materialistic goals are particularly at risk for low well-being (Kasser & Ryan, 1993). More recent research on the link between goal striving and well-being found that when it comes to striving for goals that satisfy autonomy, competence, and social integration needs, the balance of meeting these goals is also important (Sheldon & Niemiec, 2006). People who experience balanced need satisfaction report higher well-being than those with the same sum score but high variability in need satisfaction. Also, recent

research suggests that the two different intrinsic reasons for striving for academic success, that is, having joy and fun during striving versus feeling it to be important to strive for academic success, have differential effects on well-being (Burton, Lydon, D'Allessandro, and Koestner, 2006). Whereas striving for fun leads to high well-being independent of the performance level achieved, striving because it is personally important (also referred to as identified striving) leads to well-being that is contingent on the achieved performance level.

Brunstein, Schultheiss, and Grässmann (1998) have shown that the relation between a person's progress toward a personal goal and well-being is moderated by the fit between the content of the goal and a person's motive disposition. For instance, people with strong achievement and power needs (measured as implicit motives by the TAT; McClelland, 1985), and goals of the same theme, report higher emotional well-being when progressing toward their goals than those whose needs and goals do not match. The same is true of people with strong affiliation and intimacy needs, and goals of the same theme. The consequences of successful goal striving on well-being also relate to friendship goals based on compassion or on promoting a positive self-image. Whereas the former type of goal striving produced feelings of closeness and connectedness, the latter type led to loneliness and feelings of anxiety (Crocker & Canevello, 2008). Finally, a recent meta-analysis on the relative consequences of striving for cooperative, competitive, and individualistic goals for achievement in adolescents suggests that higher achievement and more positive peer relationships are associated with cooperative rather than competitive or individualistic goal striving (Roseth, Johnson, & Johnson, 2008).

Goal Structure

Next to goal content structural features of set goals also affect whether goal striving is successful or not. For example, goal striving depends on the strength of goals (intentions) (Ajzen, 1985, 1991; Ajzen & Fishbein, 1980). But most tests of this goal-behavior relation solely involve correlational studies that preclude causal inferences. A recent meta-analysis by Webb and Sheeran (2006) took a closer look at this assumption by selecting studies where the strength of the goal was manipulated relative to a control group, and differences in subsequent goal-directed behavior were observed. They found 47 experimental tests of the intention (goal) - behavior relation that actually used an experimental manipulation of the strength of the goal (intention). The meta-analysis showed that the medium-to-large change in strength of intention ($d = 0.66$) led to a small-to-medium change in respective behavior ($d = 0.36$).

But success in goal striving doesn't only depend on the strength of the goal; it also depends on what kind of aspiration or standard is specified in the goal (i.e., whether the person wants to achieve a lot or only a little). Locke and Latham (2002, 2006) report that participants are more likely to attain challenging goals spelled out in specific terms than moderately specific goals or challenging but vague (i.e., "do your best") goals. This effect has a number of prerequisites: frequent performance feedback, strong goal commitment, non-complex goals, and goal attainment needs to be possible (i.e., necessary skills and means are available). What does not seem to matter is whether goal setting is determined from outside (assigned goals), freely chosen by individuals (self-set goals), or chosen in interaction with others (participative goals). As potential mediators of the goal-specificity effect, Locke and Latham point to heightened persistence, attention to the execution of goal-directed behaviors, a greater readiness to plan the goal pursuit, and to feedback and self-monitoring advantages.

Goal implementation is also affected by the structural features of time perspective (proximal versus distal) and orientation (i.e., approach vs. avoidance orientation, promotion vs. prevention, learning versus performance orientation, low versus high psychological distance, and low versus high identity-relation). Note that the discussion of goal setting above pertained to what determines that a person sets goals of a certain structure. Now follows a discussion of what kind of consequences one or the other structural feature has for successful goal attainment.

Bandura and Schunk (1981) divide the time frame of a set goal into temporal proximal and distal goals. Proximal goals are related to what the individual wants to do in the present and near future, while distal goals point far into the future. Children who were weak and uninterested in mathematics pursued a program of self-directed learning (a total of 42 pages of instructions) under conditions involving either a distal goal only (42 pages in seven sessions), or the distal goal plus proximal subgoals (six pages per session for seven sessions). Additional proximal goals improved the children's arithmetic scores by providing more performance feedback, thus making it easier to monitor progress in goal pursuit. However, this feedback advantage may turn into a disadvantage when the goals require inhibition (e.g., goals to refrain from chatting in class) are concerned, as people more readily discover failures which may cause them to give up prematurely. Indeed, Cochran and Tesser (1996) observed that the goal proximity effect reverses for goals framed in terms of preventing failures.

The framing of social goals in terms of approach and avoidance clearly affects their attainment. For instance, striving for the goal of making new friends vs. striving for the goal of not being lonely produces quite different outcomes. With respect to the outcome variable

of satisfaction with one's social bonds versus loneliness, the latter leads to less favourable results than the former (Elliot, Gable, & Mapes, 2006; Strachman & Gable, 2006). Recent research suggests that these differences are mediated by differential attention and memory processes, differential interpretation and weighting of available information, and differential evaluation of the progress made toward goal attainment.

Higgins (2000; Shah, Higgins, & Friedman, 1998; Förster, Higgins, & Idson, 1998) reports that approach goals benefit more from goal striving that makes use of eagerness-related approach strategies (such as pulling things towards oneself) than vigilance-related avoidance strategies (such as pushing things away from oneself), whereas the reverse is true for avoidance goals. The assumed reason for this is "value from fit." Higgins (2000, 2006) argues that people engage more in goal striving when the strategies used match the goal orientation (i.e., eagerness strategies/positive outcome focus; vigilance strategies/negative outcome focus) than when there is a mismatch (i.e., vigilance strategies/positive outcome focus; eagerness strategies/ negative outcome focus). This heightened engagement in turn leads to higher perceived value and strength of attraction to this outcome.

Finally, learning goals and performance goals have different effects on achievement (Dweck, 1996). Learning goals lead to better achievement than performance goals because the former allow for a more effective coping with negative feedback than the latter. For people with performance goals, negative feedback signals failure and lack of ability and thus causes them to give up prematurely. People with learning goals, on the other hand, view negative feedback as set-backs and as valuable cues on how to focus on new strategies, ultimately furthering goal attainment. Elliot and Church (1997) observed that performance goals are less detrimental when they are framed as approach goals (e.g., I want to get good

grades) rather than avoidance goals (e.g., I do not want to get bad grades). Recent studies by Darnon, Harackiewicz, Butera, Mugny, and Quiamzade (2007), however, show that this is only true when the achievement context does not allow for the emergence of fear of failure (i.e., the task is easy; the feedback on one's achievement is unambiguously positive). Also, the effort that people put into performing a task (El-Alayli, 2006) depends on whether the framing of the task goal is in line with their naïve theories of whether the implicated personal attribute is malleable (incremental theory) or fixed (entity theory). This finding is in line with observations by Plaks and Stecher (2007), indicating that violations of both implicit theories lead to comparatively more anxiety and impaired subsequent task performance.

Recent research on the framing of achievement goals in terms of learning versus performance also investigates its influence on interactions in social achievement situations (Poortvliet, Janssen, Van Yperen, & Van de Vliert, 2007). People with learning goals are more oriented reciprocally, giving information openly and receiving it selectively from others (i.e., only those pieces of information that fit well and add value to their own chosen task strategy). On the other hand, people with performance goals are oriented exploitatively, giving little information. They provide information reluctantly, with a suspicious attitude that leads them to focus on detecting and disregarding low-quality information that might hurt their own task performance.

Psychological distance is another important structural feature. Liberman, Trope, McCreary, and Sherman (2007) had research participants indicate either why or how another person would perform an activity (e.g., open a bank account) and then ask them to guess when this person would enact the activity. As it turned out, why-construals of the activity revealed longer time estimates than how-construals. Interestingly, this effect also applied to a

person's own behavioral goals. Again, why-construals led to longer time delays than how-construals. This effect was replicated even when induced by other means than why-construal versus how-construal (e.g., by having participants think about implicated traits versus means, describing the activity in concrete, low-level terms like "checking a paper for spelling and typing errors" versus abstract, high-level terms like "proofread a paper"). Most importantly, McCrea, Liberman, Trope, and Sherman (2009) assessed actual enactment times of intended activities that are framed in terms of high versus low psychological distance. Even though psychological distance was again manipulated by a variety of different methods, low psychological distance led to earlier enactment of the intended activity than high psychological distance. It appears then that framing a goal in terms of high versus low psychological distance engenders the risk of procrastinating on the goal.

Finally, it matters whether a person frames a given task goal in terms of its identity-relatedness. For instance, the task of solving a certain arithmetic problem can be approached with the goal of solving it effectively or the goal of identifying oneself as a mathematician. The latter goal has been referred to as a self-defining goal or identity goal, as it specifies an identity as a desired end-state. Self-completion theory (Wicklund & Gollwitzer, 1982) proposes that people who are committed to identity goals can undertake a variety of activities to claim identity-goal attainment, as many different behaviors indicate the possession of such identities. For a scientist, for instance, such self-symbolizing activities include engaging in professional duties (e.g., giving lectures), making positive self-descriptions (e.g., "I discovered a new principle!"), exerting identity-relevant social influence (e.g., advising students), or acquiring respective skills, tools, and material symbols (e.g., programming skills, fast computers, large office). Failing to perform an identity-relevant activity or lacking

an identity symbol produces a state of incompleteness; to restore completeness, people engage in self-symbolizing efforts (summary by Gollwitzer & Kirchhoff, 1998). They point to the possession of alternative symbols or set out to acquire new identity symbols (e.g., engaging in identity-relevant activities, Brunstein & Gollwitzer, 1996; describing oneself as having the required personality attributes, Gollwitzer & Wicklund, 1985; showing off relevant status symbols, Harmon-Jones, Schmeichel, & Harmon-Jones, 2009). Affirming one's general self-integrity or bolstering one's self-esteem are not sufficient to offset incompleteness regarding an identity goal; rather, one must acquire specific identity symbols (Ledgerwood, Liviatan, & Carnevale, 2007).

Research on self-completion theory has discovered that a higher level of completeness is reached when a social audience notices the individual's self-symbolizing activities (Gollwitzer, 1986). In addition, incomplete individuals are more concerned with finding an audience for their identity strivings than complete individuals (Brunstein & Gollwitzer, 1996). This self-symbolizing, however, has costs. Self-symbolizing individuals see others only in terms of the potential to notice their compensatory efforts; thus they lack social sensitivity (Gollwitzer & Wicklund, 1985). Most interestingly, when people make public their intention to acquire a certain self-definitional indicator (e.g., when a person who wants to become a great student publicly utters the behavioral intention to enroll in an inspiring course), actual efforts turn out to be reduced (Gollwitzer, Sheeran, Michalski, & Seifert, in press). Apparently, when others take notice of a stated identity-relevant behavioral intention, the superordinate goal of claiming the identity is already reached, and thus performing the intended behavior becomes less necessary. This finding is in line with results of earlier self-completion studies; public, positive self-descriptions claiming the possession

of an identity symbol produced the same sense of self-definitional completeness as actual identity-relevant achievements (Gollwitzer, Wicklund, & Hilton, 1982; Brunstein & Gollwitzer, 1996).

Context Variables

Striving for a given goal does not only depend on the content of the goal and its structural features. It also depends on the context in which the person is situated. Though context variables have not yet been analyzed with respect to goal setting, research on context variables in goal striving differentiates internal or external context variables. Internal context variables relate to the person's affective state and the array of competing action tendencies, while the external variables focus on the power position of the goal striver.

Affective state. Tice, Bratislavsky, and Baumeister (2001) focused on negative affect and observed that feeling emotionally distraught (i.e., having been asked to imagine that one has caused a traffic accident that killed a child) makes it difficult to follow through with goals of not eating unhealthy food or delaying gratification to attain better long-term rewards. Moreover, this emotionally negative state also turned out to intensify procrastination: for example, people did not use provided time to study for an upcoming test. In all of these studies it appeared that the reason people did not act on their goals was simple; they felt that inaction would alleviate their negative emotional states.

Positive affect, on the other hand, has been observed to facilitate goal striving. In early childhood (2 to 4 years of age), positive emotionality in children's interactions with their mothers facilitates the difficult self-regulation required for tasks like slowing down, lowering one's voice, or delaying the unwrapping of a received gift. Research with adults has focused on how positive affect achieves this positive effect. Kazen and Kuhl (2005; Kuhl &

Kazen, 1999) argue that even though decreases in positive affect make it easier to maintain an intention in working memory, it takes an increase in positive affect to facilitate the successful behavioral implementation of difficult intentions (e.g., to do well on the Stroop task). Tamir and Robinson (2007) report data suggesting that positive moods (measured and induced) are associated with selective attention to reward stimuli. Gable and Harmon-Jones (2008) observed that positive affect induced by imagining rewards (such as tasty desserts) produce reduced attentional breadth which facilitates focusing on specific action tendencies and thus tenacious goal striving. Apparently, positive affect makes people focus on rewarding stimuli that in turn produce a reduced breadth of attention that makes it easy to strive for the goal at hand. Dreisbach and Goschke (2004) support this view with findings on the effects of positive affect (induced by the presentation of pleasant pictures) on cognitive control as assessed in a task-switching paradigm. Even though positive affect facilitated task switching, participants were more distracted when the stimuli of the prior task appeared in the subsequent task.

However, even though positive affect seems to foster goal striving on well-structured tasks (e.g., Stroop and task-switching paradigms), this does not imply that positive affect is beneficial to striving for all kinds of tasks. Complex and ill-defined tasks require that people anticipate potential obstacles and hindrances. This is easier when people experience negative affect. Not surprisingly then, for complex and ill-defined tasks positive affect was found to be a hindrance rather than a facilitator of goal attainment (Markman, Lindberg, Kray, & Galinsky, 2007; Oettingen & Mayer, 2002; Taylor, Pham, Rivkin, & Armor, 1998). Indeed, people often prefer to be in negative emotional states if those states better facilitate goal

pursuit: soldiers entering battle or football players during a game prefer an angry, aggressive mood rather than a relaxed, positive mood (Tamir, in press).

Competing action tendencies. The success of goal striving depends on whether it stays undisturbed by competing action tendencies. Kuhl's action control theory (Kuhl & Beckmann, 1994) postulates that for an ordered action sequence to occur, the striving for a current guiding goal must stay shielded from other competing responses (e.g., the goal of making a phone call must not be derailed by the competing response to tidy one's desk). In such shielding, Kuhl's action control theory differentiates a number of control mechanisms, such as attention control, emotion control, and environment control. High environment control, for example, occurs when the situation in which the focal goal is to be enacted lacks distractions. Whether and how effectively these control mechanisms operate depends on the current control mode of the individual: action-orientation is seen as beneficial whereas state-orientation is seen as a handicap. The former is characterized by a concentration on planning and initiating goal-directed actions as well as responding flexibly to situational demands; the latter is associated with failing to disengage from unattainable goals, dwelling on setbacks, or thinking unrealistically about future successes. An individual's orientation may be influenced by situational variables (e.g., surprising events, persistent failures), but it is based on personal disposition. Interestingly, state-oriented individuals readily misperceive assigned goals as self-generated (Kazen, Baumann, & Kuhl, 2003), which has given rise to a new theoretical perspective called personality systems interaction theory (Kuhl, 2000). This theory sees the control of goal-directed action as a result of the interaction of various mental subsystems (i.e., intention memory, extension memory, intuitive behavior control, and object recognition), under conditions of change from low to high positive affect vs. change from

low to high negative affect. From this perspective, action versus state orientation is understood as a parameter that modulates the cooperation between these systems, thus leading to different kinds of action control with different outcomes.

Researchers have also investigated various determinants of effective goal shielding and the implicated cognitive processes. Shah, Friedman, and Kruglanski (2002) observed that high commitment to the focal goal facilitates goal shielding (measured in terms of reduced accessibility of a competing goal), whereas feeling anxious and sad hinders it. Moreover, when people consider the progress they have made toward the goal there is less goal shielding, as people open up to competing goals; this effect even occurs when people are only induced to plan to make progress in the future (Fishbach & Dhar, 2005). However, this negative effect should only be expected if the goal-directed action is interpreted by the individual as completing the goal; if the action is instead interpreted as a strong commitment to the focal goal, then goal-striving should intensify goal shielding (Fishbach, Dhar, & Zhang, 2006; Koo & Fishbach, 2008). In line with this reasoning, Louro, Pieters, and Zeelenberg (2007) report on the basis of diary and experimental studies that the effects of perceived proximity to the goal are moderated by the experience of positive or negative goal-related emotions. That is, when the attainment of the focal goal is remote, positive emotions promote goal shielding whereas negative emotions hinder it; in this case, positive emotions apparently indicate a feeling of high goal commitment. Close to the goal, positive emotions decrease shielding of the focal goal whereas negative emotions prompt increased goal shielding; here, positive emotions apparently indicate a feeling of high goal attainment.

Finally, from a cognitive, executive-functions perspective, goal shielding in the service of a focal goal must strike a balance between two antagonistic challenges: on the one

hand, the focal goal must be shielded from interferences, and thus distracting information should be inhibited; on the other hand, however, the environment must be monitored for potentially significant information that may necessitate a goal switch (background monitoring). The benefits of goal shielding (i.e., preventing interferences) incur costs in terms of overlooking significant information occurring in the background; the benefits of background monitoring (i.e., noticing task-irrelevant but potentially significant stimuli) incur costs in terms of increased susceptibility to interference. How does the human brain handle this dilemma? Using a prospective memory task paradigm, Goschke and Dreisbach (2008) report that this conflict enhances goal shielding and attenuates background monitoring. In other words, goal shielding is intensified at the cost of background monitoring when the former is most needed (i.e., when goal striving is at risk of being derailed), and background monitoring is reinstated when goal striving runs smoothly (i.e., goal shielding is no longer needed).

Goal systems theory provides a further cognitive perspective on goal shielding (Kruglanski et al., 2002). There are three major tenets of the theory: First, any given goal can be connected to any sensible number of means. If a goal is connected to six means, for instance, then the goal can be attained through any of these means or any combination of them. Said differently, there may be many means to a given goal (equifinality configuration), and there may be many goals linked to a single means (multifinality configuration). Second, it is always the active (focal) goal that captures the means for its accomplishment. Given that cognitive resources are limited, investing attention and effort into a focal goal implies removal of resources from a competing goal (allocational property). Attainment of the focal goal becomes more likely and attainment of the competing goal becomes less likely. Third,

not all means of a given goal are equally substitutable (contextual dependence property). Only contextually available means can be considered for selection, and among these available means the most salient, vivid, and accessible will win out. Moreover, context also matters as some contexts render certain means more desirable than others. Based on these considerations, recent research shows that when a given means for goal striving is perceived as serving multiple goals, it is less likely to be selected or valued than when it is perceived as serving only one goal (Zhang, Fishbach, & Kruglanski, 2007). Accordingly, goal striving should be less vulnerable to disruptions (i.e., should be associated with enhanced goal shielding) when it is based on using unifinal means.

Power position. Recently, researchers have been particularly interested in the external context variable of being in a position of power versus being powerless. Power is manipulated experimentally in several ways: participants remember an incident in which they had power over someone or someone had power over them, they imagine or actually act in a powerful (manager, evaluator) or a powerless role (subordinate, worker), and they are asked to form sentences using words related to having power (authority, dominate) or lacking power (e.g., subordinate, obey). It was observed that powerful (as compared to powerless) participants do not only relate differently to people by treating them as a means to the attainment of their goals (i.e., objectivation; Gruenfeld, Inesi, Magee, & Galinsky, 2008); they also differ in the ways in which they strive for goals. Guinote (2007) observed that people in power procrastinate less in pursuing their goals, they persist longer in the face of difficulties, they show more willingness to try out different strategies to attain the goal, and they more readily seize good opportunities to make goal-directed responses. In addition, they more readily recognize whether a given situation can be used to serve their goals and then

allow suitable situations to guide their behavior (Guinote, 2008). All of this is facilitated by a change in executive functioning. Smith, Jostmann, Galinsky, and van Dijk (2008) report that powerful individuals are better than powerless ones at updating goal-relevant information (i.e., new information is monitored for goal-relevance, and relevant information replaces old, irrelevant information in working memory). They are also better in inhibiting responses that may interfere with the present goal, and in planning by continuously switching between the main goal and respective subgoals. Finally, they show less goal neglect (i.e., forgetting to strive for the goal; Kane & Engle, 2003) by actively maintaining the goal in working memory. Future research needs to find out to what extent these effects are mediated by heightened efficacy beliefs or control beliefs stimulated by the power manipulations.

Self-Regulation of Goal Striving

The discussion above considered goal content and structural features as well contextual variables as determinants of successful goal striving and attainment. The self-regulation approach to goal striving, on the other hand, focuses on how the individual can master the problems of goal pursuit. To attain the set goal, the individual needs to seize opportunities to act, ward off distractions, flexibly step up efforts in the face of difficulties, by-pass barriers, and compensate for failures and shortcomings. Various theories address how the individual effectively solves these problems of goal striving.

Planning goal implementation. The model of action phases (Heckhausen & Gollwitzer, 1987; Gollwitzer, 1990) conceives of goal pursuit as solving a series of consecutive tasks. One of these tasks is getting started with goal-directed responses and bringing goal striving to a successful end. The model assumes that getting intensively involved with this task activates a functional mindset: the implemental mind set. This mind

set is characterized by a number of functional cognitive features (summary by Gollwitzer & Bayer, 1999). Participants become close-minded (no longer distracted by irrelevant information) while processing information related to goal implementation very effectively (e.g., information on the sequencing of actions; Gollwitzer, Heckhausen, & Steller, 1990). Moreover, the desirability of the set goal is enhanced by favoring pros over cons, and its feasibility is enhanced by favoring illusory optimism. This optimism extends to an illusion of control over uncontrolled outcomes (Gollwitzer & Kinney, 1989), and even holds for depressed individuals. Self-perception of important personal attributes (e.g., cheerfulness, smartness, social sensitivity) is strengthened, while perceived vulnerability to both controllable and uncontrollable risks is lowered (e.g., developing an addiction to prescription drugs or losing a partner to an early death, respectively; Taylor & Gollwitzer, 1995). These cognitive features of the implemental mindset mediate the positive effects that getting involved with planning goal implementation has on the rate of goal attainment (Armor & Taylor, 2003). Implemental mindsets also attenuate classic problems of goal striving, such as doubting the attractiveness of the pursued goal (Gagné & Lydon, 2001 a/b) and showing too much or too little persistence (Brandstätter & Frank, 2002). These effects are facilitated by the fact that people in an implemental mindset feel less ambivalent about the attitudes they hold towards issues (objects, persons, ideas) of daily life (Henderson, de Liver, & Gollwitzer, 2008); they show heightened attitude strength that even extends to more effectively translating attitudes into behavior.

Planning can also be used to add implementation intentions to one's set goals (or goal intentions). Set goals only commit an individual to attaining the specified, desired outcome, they do not commit the individual to when, where, and how she will act towards the goal.

Such additional commitments can be added by forming implementation intentions with the format of “If I encounter situation x , then I will perform the goal-directed behavior y !” Thus, an implementation intention that serves the goal intention to “get an A in Introductory Psychology” would follow the form “**if** Situation Y arises (e.g., my roommates ask me to go out tonight), **then** I will perform Behavior Z (e.g., I will say that I will join them next week when my exam is over).” Note that this type of planning commits the individual to acting in a specific goal-directed way (then-component of the plan) whenever the critical cue selected in the if-component is encountered. In contrast, the more reflective way of planning referred to as *process simulation* by Taylor et al. (1998) only explores possible ways to achieve a goal; it does not yet commit the person to one preferred way of implementing one’s goal as with implementation intentions (Faude-Koivisto, Würz, & Gollwitzer, 2008).

Implementation intentions provide benefits over and above goal intentions: a meta-analysis by Gollwitzer and Sheeran (2006) involving over 8,000 participants in 94 independent studies reported an effect size of $d = .65$. This medium-to-large effect size (Cohen, 1992) represents the additional facilitation of goal achievement by implementation intentions compared to goal intentions alone. As goal intentions by themselves already have a facilitating effect on behavior enactment (Webb & Sheeran, 2006), the size of this effect is remarkable. But how do these implementation intention effects on goal attainment come about? Gollwitzer (1993, 1999) suggests that the mental links created by implementation intentions facilitate goal attainment on the basis of psychological processes that relate to both the anticipated situation (the if-part of the plan) and the intended behavior (the then-part of the plan). Because forming an implementation intention implies the selection of a critical future situation, the mental representation of this situation becomes highly activated, and

hence more accessible (Gollwitzer, 1999). This heightened accessibility of the if-part of the plan was observed in several studies (e.g., Parks-Stamm, Gollwitzer, & Oettingen, 2007; Webb & Sheeran, in press, 2007; Wieber & Sassenberg, 2006) and means that people are in a good position to identify and take notice of the critical situation when they subsequently encounter it (e.g., Webb & Sheeran, 2004). For instance, participants who formed implementation intentions to collect a coupon were faster to recognize words related to the location of the coupon (e.g., corridor, red door) compared to participants who only formed the goal intention to collect the coupon; and implementation-intention participants also were more likely to collect the coupon subsequently (Aarts, Dijksterhuis, & Midden, 1999).

Implementation intentions also forge a strong association between the specified opportunity and the specified response (Webb & Sheeran, in press, 2007). These strong links then automate the initiation of the goal-directed response specified in the if-then plan; that is, action initiation exhibits features of automaticity, including immediacy, efficiency, and redundancy of conscious intent. Thus, people do not have to deliberate anymore about when and how they should act when they have formed an implementation intention—unlike people who have formed mere goal intentions. Evidence shows that if-then planners act quickly (Gollwitzer & Brandstätter, 1997, Experiment 3), deal effectively with cognitive demands (Brandstätter, Lengfelder, & Gollwitzer, 2001), and do not need to consciously intend to act at the critical moment (Sheeran, Webb, & Gollwitzer, 2005, Study 2; Bayer, Achtziger, Gollwitzer, & Moskowitz, in press).

These component processes of implementation intentions (enhanced cue accessibility, automatization of responding) mean that if-then planning enables people to seize good opportunities to move towards their goals. Strategically forming if-then plans thus automates

goal striving (Gollwitzer & Schaal, 1998) because people delegate control of goal-directed behaviors to pre-selected situational cues with the explicit purpose of reaching their goals, that is, a conscious act of will (if-then planning) results in automatic action initiation.

Given these special features of implementation intentions, researchers explored whether people benefit from forming implementation intentions when they are confronted with the most challenging problems of goal implementation: getting started, staying on track, calling a halt, and not overextending oneself. Numerous studies suggest that the problems of *getting started* on one's goals can be solved effectively by forming implementation intentions. For instance, Gollwitzer and Brandstätter (1997, Study 2) analyzed a goal intention (i.e., writing a report about how the participants spent Christmas Eve) that had to be performed at a time (i.e., during the subsequent two Christmas holidays) when people are commonly busy with other things. Still, research participants who had furnished their goal intention with an implementation intention that specified when, where, and how they wanted to get started on this project were about three times as likely to actually write the report than mere goal intention participants. Similarly, Oettingen et al. (2000, Study 3) observed that implementation intentions helped 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 four weeks). Other studies have examined the ability of implementation intentions to initiate goal striving where there is an initial reluctance because the activities involved are somewhat unpleasant. For instance, implementation intentions improved the success rates for the goals of performing regular breast examinations (Orbell, Hodgkins, & Sheeran, 1997) or cervical cancer screenings (Sheeran & Orbell, 2000), resuming functional activity after joint replacement surgery (Orbell & Sheeran, 2000), eating a low-fat diet (Armitage, 2004),

recycling (Holland, Aarts, & Langendam, 2006), and engaging in physical exercise (Milne, Orbell, & Sheeran, 2002). Moreover, implementation intentions were found to help attainment of goal intentions where it is easy to forget to act (e.g., regular intake of vitamin pills, Sheeran & Orbell, 1999; the signing of work sheets with the elderly; Chasteen, Park, & Schwarz, 2001).

Many goals cannot be accomplished by simple, discrete, one-shot actions but require that people maintain their efforts over an extended period of time. Staying on track may get 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 interference that could potentially derail the ongoing goal. Implementation intentions facilitate the shielding of such goal striving from outside interference by suppressing it. For instance, imagine someone has the goal of being supportive to her friends. When the friend surprises the person with an outrageous request, she could prevent the unwanted unfriendly response by forming suppression-oriented implementation intentions. Such suppression-oriented implementation intentions may take various forms: “And if my friend approaches me with an outrageous request, then I will not respond in an unfriendly manner!” or “..., then I will respond in a friendly manner!” or “..., then I’ll ignore it!” Experimental research on this issue by Gollwitzer and Schaal (1998) and Mischel and Patterson (1978) indicates that in general the ignore-plans seem to work the best of the three possible suppression plans.

Suppression-oriented implementation intentions have also been found to effectively shield ongoing goal striving from disruptive inner states. Achtziger, Gollwitzer, and Sheeran (2008, Study 1) report a field experiment concerned with dieting (Study 1) in which goal

shielding was supported by suppression implementation intentions geared at controlling potentially interfering inner states (i.e., cravings for junk food). In addition, forming implementation intentions geared at stabilizing the ongoing goal striving can protect it from getting derailed by adverse inner states (e.g., inappropriate moods, ego-depletion, irritation)(Gollwitzer, Bayer, & McCulloch, 2005). Using again the example of a person who is approached by her friend with an outrageous request, let's assume that this person is also tired or irritated and thus particularly likely to 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 as planned, and being tired or irritated should fail to hurt the interaction with her friend.

Implementation intentions do not only help people move smoothly and effectively towards a goal; they can also be used to redirect misplaced goal striving. To justify themselves and their choices, people often fail to readily relinquish chosen means and goals that turn out to be faulty (Brockner, 1992). Such escalation phenomena (also referred to as “throwing good money after bad”) can be controlled, however, by the use of implementation intentions that specify when and how to consider a switch to a different means or a different goal. For instance, Henderson, Gollwitzer, and Oettingen (2007) asked participants who had chosen a certain strategy for a given task goal to form an implementation intention that specified a simple action response (“If I receive disappointing feedback, then I’ll switch my strategy!”), or merely set the goal to always use the best strategy available. Henderson et al. observed that action implementation intentions facilitated disengagement as a response to experienced failure. Interestingly, there was a third condition in which participants specified a complex reflection response in their implementation intention (“If I receive disappointing

feedback, then I'll think about how things have been going with my strategy so far!"). In contrast to participants who had specified the simple implementation intention (then I'll switch my strategy), those with the complex ones integrated information about recent improvement in forming their relinquishment decision (i.e., they were less willing to relinquish their strategy when things were picking up). This study shows that implementation intentions can be used to curb the escalation of behavioral commitment commonly observed when people experience failure with a chosen strategy of goal striving. Using reflection implementation intentions (as compared to action implementation intentions) even accounts for recent positive feedback in one's decision to switch (or not) to a different goal striving strategy.

Finally, implementation intentions assume that situational cues have more control over relevant behavior than the self (Gollwitzer, 1993, 1999). As a consequence, when task performance is regulated by implementation intentions, it should be easier not to over-extend oneself. Indeed, student participants who had used implementation intentions to perform a first difficult task did not show reduced performance on a second difficult task. Whether the initial task was controlling emotions while watching a humorous movie (Gollwitzer, Bayer, & McCulloch, 2005), 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 tasks (i.e., solving difficult anagrams).

Implementation intentions have been shown to help people solve the major problems of goal striving (i.e., getting started, staying on track, calling a halt, and not overextending oneself). But do these benefits persist when goal striving is limited by conditions that seem quite resistant to change by self-regulatory strategies? Bayer and Gollwitzer (2007) found

that implementation intentions geared towards high self-efficacy facilitated higher scores on math and intelligence tests, even though such performances are known to be limited by a person's respective capabilities. Implementation intentions also helped people succeed in sports competitions (i.e., if-then plans pertaining to effective coping with critical internal and external situations; Achtziger, Gollwitzer, & Sheeran, 2008, Study 2) and negotiate limited resources (i.e., if-then plans to make fair and cooperative counteroffers; Troetschel & Gollwitzer, 2007), even though in such competitive situations a person's goal striving is quite limited by the opponents' behavior.

Implementation intentions were found to help people's goal striving even in cases where effective goal striving is threatened by competing habitual responses; this seems to be true no matter whether these automatic competing responses are behavioral (e.g., habitual classification responses in a Simon task, Cohen, Bayer, Jaudas, & Gollwitzer, 2008; habitual littering, Holland et al. 2006; habitual coping with relationship threats, Lydon, Menzies-Toman, Burton, & Bell, 2008), cognitive (e.g., habitual stereotypical and prejudicial responses, Gollwitzer & Schaal, 1998; Stewart & Payne, 2008), or affective (e.g., habitual disgust and fear responses, Schweiger Gallo, Keil, McCulloch, Rockstroh, & Gollwitzer, 2009) in nature. The latter findings suggest that forming implementation intentions turns top-down control by a person's goals into bottom-up control by the situational cues specified in the if-component of an implementation intention.

Apparently, forming implementation intentions can strategically switch the top-down control of one's actions by set goals to bottom-up control through specified situational cues, as is typical of habitual or automatic behavior. In a recent fMRI study conducted by Gilbert, Gollwitzer, Cohen, Oettingen, and Burgess (in press), brain activity in the lateral area 10 was

observed to move towards the medial area 10 when participants switched from performing an executive-functions task by the guidance of a goal intention to performing the very same type of task by the guidance of an implementation intention; on the basis of an extensive meta-analysis on various executive-function tasks it is known that lateral and medial area 10 are implicated in top-down and bottom-up action control, respectively (Burgess, Simons, Dumontheil, & Gilbert, 2005).

This switch in action control from top-down to bottom-up also explains why special populations that are known to suffer from ineffective control of their thoughts, feelings, and actions (e.g., heroin addicts during withdrawal and schizophrenic patients, Brandstätter, Lengfelder, & Gollwitzer, 2001, Studies 1 & 2; frontal lobe patients, Lengfelder & Gollwitzer, 2001; children with ADHD, Gawrilow & Gollwitzer, 2008; Paul, Gawrilow, Zech, et al., 2007) benefit greatly from forming implementation intentions when initiating goal-directed actions or inhibiting unwanted habitual actions.

There are various moderators of the effects of implementation intentions on goal attainment that pertain to characteristics of the superordinate goal and the individual. One goal characteristic that moderates the success of implementation intentions is the extent to which it reflects the individual's actual interests and values. Koestner et al. (2002) show that the positive effects of implementation intentions on goal attainment partially depend on whether they are formed in the service of intrinsic (high autonomy) versus extrinsic (low autonomy) goals. Implementation intentions that advance intrinsic goals are more effective than those that advance extrinsic goals.

Another characteristic of the goal that moderates the effectiveness of implementation intentions is its difficulty. Implementation intentions typically benefit difficult rather than

easy goals (Gollwitzer & Brandstätter, 1997), as easy goals do not need the assistance of implementation intentions. Moreover, as implementation intentions are subordinate to goal intentions, the strength of implementation intention effects is positively related to the strength of the goal's commitment and activation state (Sheeran, Webb, & Gollwitzer, 2005). The fact that implementation intentions respect the status of the superordinate goal (strength, activation) guarantees that the goal striving produced by implementation intentions is both tenacious and flexible. Recent research shows that forming implementation intentions to use a certain opportunity for goal-directed action does not imply that other suitable opportunities to move towards the goal are wasted; the effective seizing of the specified opportunity does not come at a cost to seizing alternative good opportunities to act toward the goal (Gollwitzer, Parks-Stamm, Jaudas, & Sheeran, 2008).

Researchers have recently raised the question of how one can teach people the goal striving strategy of forming implementation intentions. To answer this question, it is important to recognize that forming implementation intentions is a self-regulation strategy for goal striving only. An effective self-regulation strategy that helps people meet their goals would have to address goal setting and goal striving in concert. One such self-regulation strategy, called Mental Contrasting with Implementation Intentions (MCII), has recently been developed and tested. In order to unfold their beneficial effects, implementation intentions require that strong goal commitments are in place (Sheeran, Webb, & Gollwitzer, 2005, Study 1), and mental contrasting creates such strong commitments (Oettingen et al., 2001, 2005, in press). Additionally, mental contrasting guarantees the identification of obstacles that hinder goal striving. These same obstacles can then be addressed with "if-then" plans by specifying them as critical situations in the if-component that are linked to instrumental goal-

directed responses in the then-component. As mental contrasting increases a person's readiness to make "if-then" plans (Oettingen et al. 2001, 2005) people should follow through with making such plans. Accordingly, the MC-part of the MCII self-regulation strategy prepares people motivationally and cognitively to form implementation intentions so that they should find it easy to perform the II-part.

Indeed, in a recent intervention study with middle-aged women (Stadler, Oettingen, & Gollwitzer, 2009), all participants first were informed about the types of exercise appropriate for middle aged women and the multiple health benefits that accrue from regular exercise. In the MCII group (as compared to the information-only control group), participants in addition learned about the mental contrasting technique with respect to the goal of exercising regularly (e.g., going for a run three times per week); the interventions then taught them to form three implementation intentions regarding the central personal obstacle discovered during mental contrasting (e.g., feeling too tired in the evening to go for a run) in the form of "if-then" statements: one to overcome the obstacle generated by mental contrasting (e.g., if I feel exhausted when I get home from work tonight, then I will put on my running shoes and go for a jog in the neighborhood), one to prevent this obstacle (e.g., if I hear the clock chime five o'clock, then I will pack my things and leave the office to go for a run), and one identifying a good opportunity to act (e.g., if the sun is shining, then I will go for a 30 minute jog in the park). Participants were then told to apply this MCII procedure to the wish of exercising more by themselves whenever possible; participants were free to choose whatever form of exercising they wished, and they were encouraged to anticipate those obstacles that were personally most relevant. As dependent measures, participants maintained daily behavioral diaries to keep track of the amount of time they exercised every day. Overall, the

MCII technique enhanced exercise more than the information-only group; this effect showed up immediately after the intervention and it stayed stable until the study was ended (16 weeks after the intervention). More specifically, participants in the MCII group exercised nearly twice as much: one hour more per week more than participants in the information-only control group.

Persistent striving for the goal. Next to planning, persistence is another powerful way to assure goal attainment. There are various issues that make persisting toward a goal difficult, however. Often people have to accept short-term costs, they have to escape alluring temptations that disrupt continued goal pursuit, they have to cope with negative feedback, they need to interpret where they stand on the way to the goal, and they cannot exhaust their self-regulation resources; there might also be some chronic beliefs or self-evaluations that make persistent striving for the goal more difficult. The next paragraphs will discuss these issues in turn.

With respect to the issue of accepting short-term costs, Mischel's (1974) research on delay of gratification is prominent. His research uses a standardized task paradigm. A person is presented with a desired treat (e.g., tiny pretzel sticks, or little marshmallows). Then a dilemma is posed: if the person waits until the experimenter returns, she gets two of the desired treats; if the person rings a bell, the experimenter returns immediately but she gets only one treat. There are various effective strategies to delay gratification, such as reducing attention to the treats (e.g., hiding them, playing with distracting toys, engaging in fun thoughts), and mentally reconstructing the treats as objects instead of consumables (e.g., pretending that the rewards are just pictures by putting a frame around them). Mischel and Ayduk (2004) argue that people have a better chance of delaying gratification for the ultimate

goal (i.e., getting the double treat) by dealing with the treats through the cool “know” system of information processing rather than the hot “go” system.

Trope and Fishbach (2000) also addressed the short-term costs of striving for a rewarding but long-term goal. They observed that simply anticipating such costs (e.g., the pain that is associated with the goal to undergo a certain preventive medical procedure) makes people more persistent in their goal-striving by instigating self-control strategies such as applying self-imposed penalties for failure to move forward on the goal or bolstering the value of persisting with the goal, which in turn facilitates goal attainment (Trope & Fishbach, 2000). A follow-up series of studies showed that such self-control strategies compensate for a lack of external control over the goal activity (Fishbach & Trope, 2004); in other words, externally-imposed control and self-control are interchangeable when it comes to striving for goals that have long-term benefits but short-term costs.

In recent years researchers have developed new insights into how people deal effectively with alluring temptations that threaten their goals. Certainly, people can always make plans to suppress alluring temptations (Gollwitzer & Schaal, 1998; Mischel & Patterson, 1978). But this strategy implies that people can and are willing to anticipate what kind of temptation might disrupt their goal striving so that they can target their if-then plans towards them (e.g., by using mental contrasting or process simulations; Oettingen et al., 2001; Taylor et al., 1998). Are there any more general temptation suppressing strategies than if-then plans or implementation intentions? Recent research hints at such strategies. For instance, Fishbach, Friedman, and Kruglanski (2003) report that exposure to goal-related stimuli makes people less aware of temptation-related stimuli, and exposure to temptation-related stimuli activates their goals. The more people are committed to their goals, the more

pronounced the activation effects; and the strength of these activation/deactivation effects mediates people's intensity of striving for the goal. Fishbach and Shah (2006) observed that whenever the conflict between persisting on a goal and giving in to temptation is very high (when the attraction to temptations is very high and people are strongly committed to the goal, e.g., partying and studying for college students), individuals start to offset the influence of temptations by automatically avoiding temptation-relevant stimuli and by approaching stimuli related to the focal goal (assessed in terms of faster pushing and pulling responses to such stimuli, respectively). Fishbach and Zhang (2008) suggest another successful strategy in dealing with temptations: keeping goal objects and objects related to temptations spatially apart from each other (e.g., for a person who has the goal of studying hard this may be textbooks versus entertaining CDs). Fishbach and Zhang observed that the combined presence of goal and temptation objects leads to a positive evaluation and preference for temptation objects, whereas separating them facilitates positive evaluation and preference for goal objects.

One of the most intractable problems in attaining goals is how to persist in the face of negative feedback. What are the strategies people can use to achieve such persistence? First, people can step up efforts whenever difficulties are encountered, thus warding off failures. The energization theory of motivation (Brehm & Self 1989; Wright, 1996) proposes that the readiness to exert additional effort is directly determined by the perceived difficulty of a task; as perceived difficulty increases, so does effort expenditure unless a task is perceived as unsolvable. Most importantly, there is a second limit to the increase of effort in response to heightened test difficulty: potential motivation. Potential motivation is fed by need-related variables (i.e., strength of the related need or higher order goal, the incentive value of the

task, and the instrumentality of task completion for need satisfaction or goal attainment). If potential motivation is low, people do not find it worthwhile to expend more effort when an easy task becomes more difficult. The upper limit of effort expenditure is low and quickly reached. If potential motivation is high, however, an increase in difficulty is matched by investment of effort up to very high levels of difficulty.

Empirical tests of the theory have varied potential motivation by offering high or low rewards for task completion, making high rewards more or less likely, or by describing the task as diagnostic of an important scholastic skill or not (Gendolla & Richter, 2006). Effort mobilization is usually assessed by cardiovascular responses (i.e., heart rate and systolic blood pressure). In general, low potential motivation curbs the linear relationship between task difficulty and effort (i.e., participants with low motivation give up striving when task difficulty moves from medium to high). Energization theory has been used to understand the differences between men and women in effort on sex-typed tasks, and to explore the effects of private versus public performance conditions on effort (Wright, Tunstall, Williams, Goodwin, & Harmon-Jones, 1995; Wright, Murray, Storey, & Williams, 1997). The message of these findings is that people can facilitate energization in the face of difficulties by increasing potential motivation (e.g., self-rewards); in turn, the achieved energization will help to prevent failures from occurring.

There are other theories on persistence in the face of negative feedback. According to Bandura (1997; Bandura & Locke, 2003), goals have no motivational consequences per se. They only specify the conditions (standards) that allow a positive or negative self-evaluation. Meeting the standard, leads to positive self-evaluation, whereas not meeting the standard leads to negative self-evaluation. The individual is pushed by the negative self-evaluation

associated with the discrepancy, and pulled by the anticipated positive self-evaluation linked to closing the gap between the status quo and the standard. Accordingly, goals stimulate effortful action only when people recognize that there is still a discrepancy between the status quo and the standard (e.g., when people encounter difficulties that need to be overcome). Bandura thus proposes obtaining frequent feedback as a powerful measure to stimulate goal pursuit. However, this works only when people feel self-efficacious with respect to goal-directed actions; thus they need to improve relevant skills and competences as well.

Carver and Scheier (1998) propose a different model for reducing discrepancies in goal striving. Based on cybernetic control theory, the central component of the analysis is the negative feedback loop. Carver and Scheier highlight goal pursuits' hierarchical structure and assume cascading loops. Goal-directed behavior is regulated at the middle level ("Do-goals") with actions at higher levels ("Be-goals") suspended until the individual becomes self-aware. Discovery of discrepancies on the "Be-level" or "Do-level" triggers lower level goals or behaviors aimed at reducing discrepancies in those levels, respectively. An individual tries to close discrepancies only when outcome expectations are high. However, attaining a goal doesn't necessarily lead to a positive affective response, nor does detecting a discrepancy necessarily cause a negative affect. Rather, the source of positive or negative feelings in goal pursuit is the speed of progress. The intensity of these feelings is regulated again in a negative feedback loop. If the speed meets a set criterion, positive feelings result; if it doesn't, then negative feelings result. Recent extensions of this control theory perspective on goal striving consider a potential moderator variable: the effect of individual differences in behavioral approach/withdrawal systems. One person may be very sensitive for positive

stimuli and not sensitive for negative stimuli (Carver, 2004), whereas for another person the reverse may be true.

It is important to note that both of these models for reducing discrepancies to standards (i.e., Bandura's as well as Carver and Scheier's) construe goals as cold "mental representations" of performance standards with no links to needs or incentives. This conceptualization of goals makes it difficult to explain why motivation (see Brehm & Wright's notion of potential motivation) moderates the relation between task difficulty and effort. Moreover, according to discrepancy theory an increase in task difficulty should reduce efforts at task completion, because an increase in task difficulty should lead to reduced self-efficacy and less positive outcome expectations. As Brehm and Wright have repeatedly demonstrated, however, high potential motivation makes it worthwhile for people to mobilize additional effort whenever heightened task difficulty threatens task completion. Finally, Carver and Scheier's theory assumes that positive discrepancies (i.e., moving towards a goal too fast) are reduced as readily as negative discrepancies (i.e., moving towards a goal too slowly). However, from the perspective that goals represent a desired outcome, a person should be less motivated to reduce positive discrepancies than negative discrepancies (Gollwitzer & Rohloff, 1999).

Zhang, Fishbach, and Dhar (2008; see also Koo & Fishbach, 2008) have recently discovered that looking back on one's past striving for the goal can affect persistence in goal striving quite differently, depending on how past goal-directed activities are interpreted. When people are highly committed to their goals, interpreting their past activities in terms of lack of progress leads to better goal striving than when they interpret their past activities in terms of having made good progress. However, when people are only weakly committed to

their goals, interpreting their past activities in terms of lack of progress discourages goal striving, whereas interpretations in terms of having made good progress encourages it. Apparently, for noncommitted people the latter interpretation leads to stronger goal commitments, which in turn intensifies persistence.

Mental contrasting (i.e., contrasting fantasies about a desired future with reflections on negative reality) also facilitates effective coping with negative feedback. In a series of studies, Oettingen and Kappes (2009) asked participants to use mental contrasting regarding a feasible and desirable future prior to working on tasks testing interpersonal or academic competencies. They observed that goal-relevant negative feedback was more thoroughly encoded. Moreover, despite strong and normative negative feedback participants kept a positive self-view regarding relevant competencies and skills, and found optimistic causal attributions for their set-backs. Findings by Houser-Marko and Sheldon (2008) suggest that this pattern of dealing with negative feedback (open-mindedness on the low level but self-protectiveness on the high level) should facilitate persistent goal striving. Indeed, Oettingen and Kappes (2009) observed in a final study that participants who were induced to mentally contrast a feasible desired future in the interpersonal domain were most successful in solving a subsequent analytical reasoning task (Raven test).

After negative feedback, the next potential threat to effective goal striving is exhausting one's self-regulatory resources. Baumeister, Muraven, and Tice (2000) have argued that the effortful and deliberate self-regulation of one's thoughts, feelings, and actions uses up self-regulation resources. Like the conventional notions of willpower and character, these resources seem to strengthen and weaken like muscles. Accordingly, it is predicted and found that people's self-regulation performance is relatively weak when self-regulation has

recently been exerted, even in a wholly different context (e.g., Schmeichel, 2007; Inzlicht & Gutsell, 2007; Fischer, Greitemeyer, & Frey, 2008). Second, like athletes conserving their strength after exercise, people who have just exerted self-regulation hold back on exerting self-regulation when they anticipate further demands (DeWall, Baumeister, & Vohs, 2008). Third, just as regular exercise gradually improves physical stamina, self-regulation exercises can gradually make people able to sustain self-regulation exertions better (e.g., Gailliot, Plant, Butz, & Baumeister, 2007). If persisting in goal striving is an act of self-regulation, this research offers specific guidance to people who want to achieve their goals. First, they should try to conserve self-regulation resources when difficulties in persistent striving for a given goal are anticipated. This is true for any prior goal striving as well as striving for the goal at hand (Webb & Sheeran, 2003). Second, people should practice persistent striving wherever possible to improve their stamina for it.

Finally, a number of individual difference variables affect persistent goal striving. Research on self-handicapping has found again and again that men create more handicaps (e.g., reduction of effort) for themselves than women when it comes to striving for goals such as making good grades in an exam. The most important mediator of this gender effect turns out to be the relative value placed on effort: women evaluate the reduction of effort much more negatively than men (McCrea, Hirt, & Milner, 2008). Another individual difference relevant to the exertion of effort is action orientation (a tendency toward decisiveness and initiative) versus state orientation (a tendency towards indecisiveness and hesitation; Kuhl & Beckmann, 1994). Jostmann and Koole (2007) observed no difference in performance between action- and state-oriented individuals on easy executive-functions tasks; however, the action-oriented individuals outperformed state-oriented individuals when task demands

increased, as high task demands lead to a much more reduced cognitive functioning in state-oriented individuals. Finally, Park, Crocker, and Kiefer (2007) report that success or failure on academic task goals depends on the level of academically contingent self-esteem; low levels of contingent self-esteem lead to giving up on these goals, whereas high levels of contingent self-esteem lead to fighting back; the latter is accompanied by an increase in state self-esteem and a strengthened desire to be perceived as academically competent.

Unconscious Goal Pursuit

Traditional models of human motivation have assumed an agentic, conscious self at the controls, making decisions about courses of action to take, and then guiding behavior along those lines (e.g., Ajzen & Fishbein, 1980; Bandura, 1977, 1986; Locke & Latham, 1990, 2002; Mischel, 1973; Mischel et al., 1996). In line with the action phase model of goal pursuit (Heckhausen & Gollwitzer, 1987; Gollwitzer, 1990), Bandura (2006) distinguishes four aspects of conscious human agency: People form intentions that include action plans and strategies for realizing them (intentionality), people anticipate likely outcomes of prospective actions to guide and motivate their actions (forethought), people are not only intenders and forethinkers but also self-regulators in the sense of controlling the effective execution of the courses of action taken (self-reactiveness), and finally, people are self-examiners of their own functioning in the sense of evaluating their pursuits (self-reflectiveness). Self-theorists as well have emphasized the agentic (ego, volition) functions of the (conscious) self: making choices and decisions, initiating and inhibiting behavior, forming plans of action and carrying them out. Through carrying out these functions, theorists hold that “the self exerts control over itself and over the external world” (Baumeister, Bratslavsky, Muraven, & Tice, 1998, p. 1252).

All of this paints a picture in which human goal pursuits are internally generated and put into motion by a central executive or “self”, guided to completion by processes accessible to conscious awareness, followed by a conscious self-evaluation stage (see especially Bandura, 1986). This section of the chapter focuses on an alternative route to human goal pursuit, one that does not require instigation and guidance by an agentic self, and which can operate outside of conscious intention and awareness. This alternative path, one that emphasizes an unconscious mode of goal pursuit, has two important historical wellsprings within social psychology. First and foremost was research demonstrating the power of external situational variables in determining behavior, often shown to be more powerful than internal causes such as attitudes, personality, or values (e.g., Bem, 1972; Darley & Latane, 1968; Milgram, 1963; Mischel, 1973; Ross & Nisbett, 1990). This research had historical continuity (see especially Bem, 1967) with the radical neobehaviorist tradition in which situational variables were considered the *exclusive* causes of behavior (Bargh & Ferguson, 2000). The second important wellspring was the introduction of ‘dual process’ models (e.g., Posner & Snyder, 1975; Shiffrin & Schneider, 1977) in which conscious mental processes were contrasted with ‘automatic’, implicit, or unconscious ones. Research within this dual-process framework amassed evidence of a second route to the selection and guidance of higher mental processes such as are involved in social judgment and behavior, a route triggered directly by relevant environmental stimuli and which bypassed the consciousness bottleneck (see reviews in Bargh, 2007; Chaiken & Trope, 1999).

Much of this evidence has come from studies using priming techniques. “Priming” refers to the passive, subtle, and unobtrusive activation of relevant mental representations by external, environmental stimuli, such that people are not and usually do not become aware of

the influence exerted by those stimuli (Bargh & Chartrand, 2000; Higgins, 1996). This research has shown that one important reason for the observed power of the situation in determining behavior is that the mere, passive perception of environmental events directly triggers higher mental processes in the absence of any involvement by conscious, intentional processes (see reviews in Bargh & Ferguson, 2000; Dijksterhuis, Aarts, & Chartrand, 2007; Higgins, 1996). In other words, much of the power of situational and contextual stimuli comes from the direct, automatic, and unconscious effect they have over social behavior, an effect relatively independent from that of their dual-process partner, conscious processes.

This emerging evidence that conscious, agentic-self control is not necessary for the production and guidance of purposive human behavior (and other higher mental processes) raises a new, important issue for motivation research: what exactly then *is* in charge when the conscious self is not? To address this question, an important new line of research has focused on the *mechanics of motivation*, in an effort to specify the underlying cognitive, affective, and actional systems that together generate and guide complex social behavior (Aarts, Custers, & Marien, 2008; Bargh, 1990; Higgins, 1997, 2000; Kruglanski, Shah, Fishbach, Friedman, Chun, & Sleeth-Keppler, 2002). Much progress has been made on this front through the reconceptualization of motivations and goals in terms of cognitive structures, and then applying what is already known about how such structures become active – that is, from the perception of external stimuli relevant to the goal (Bargh, 1990), or from internal activation spreading along associative networks (Kruglanski, 1996). Accordingly, this research has been able to take advantage of concurrent advances in knowledge regarding conceptual priming (Bargh, 2006; Higgins, 1996) and accessibility or likelihood of concept

activation (Bruner, 1957; Higgins, 1996), applying that set of logic and principles to the case of goal representations.

This approach has been successful in illuminating (1) how motivational structures can operate without need of explicit activation and guidance by an agentic conscious self (see Bargh, 2005); (2) the internal operating dynamics of active goal structures (i.e., means-ends relations, Fishbach, Dhar, & Zhang, 2006; Shah, Friedman, & Kruglanski, 2002; McCulloch, Ferguson, Kawada, & Bargh, 2008); and (3) the dynamic relations between competing and complementary goal structures (Fishbach, Friedman, & Kruglanski, 2003; McCulloch, Aarts, Fujita, & Bargh, 2008). Perhaps as importantly, the new cognitive approach was built upon the theoretical legacy of Kurt Lewin (e.g., 1926, 1935), affording a continuity with the rich empirical base of classic motivational theory.

For example, the dynamics of goal pursuit first identified by Lewin and his students Zeigarnik and Ovsiankina such as perseverance towards the goal, resumption of incomplete goals, and the “turn-off” effect of completed goals have all been replicated by the modern research and these dynamic effects recouched in knowledge-accessibility terms (see Bargh, Gollwitzer, Lee-Chai, Barndollar, & Troetschel, 2001; Foerster, Liberman, & Higgins, 2005; Liberman, Foerster, & Higgins, 2007). And the general approach to the underlying cognitive, affective, and neural mechanics of motivation is very much in the Lewinian spirit, as Lewin himself (1935, 1951) strove to describe motivational dynamics in terms of the physical science of his day (e.g., “fields of forces”, vectors and graph theory) – it is just that today the underlying science to which these motivational concepts are pinned is not 19th century physics but 21st century cognitive science and neuroscience.

The remainder of this chapter comes to grips with the emerging fact that the conscious, agentic self plays less of a role in the production of human behavior and the guidance of the other higher mental processes than traditional models have assumed. It accounts for and explains recent findings showing that the same outcomes are attained when goals operate entirely unconsciously as when they are pursued consciously, and with the same phenomenal qualities during operation as originally noted by Lewin – findings that are blatantly inconsistent with models which place the agentic, conscious self exclusively at the helm.

There are several other lines of new findings that appear to run counter to the notion of an agentic self in control, and these may be better accounted for by the present approach. Often the effect of an active goal on behavior and judgment is shown to produce effects that are unwanted or undesirable at the level of the individual person. How can this be, if it is the agentic self, with its associated values and beliefs, which is in control? Based on evolutionary considerations as well as from the recent cognitive-motivation research evidence alluded to above, it seems that the level of proximal control over behavior and higher mental processes may not be the self, but rather the currently active goal itself.

This new approach can also help account for emerging evidence of the remarkable transformational power of currently active goals over the rest of the cognitive and affective machinery of the mind. That is, the findings suggest the dominance of motivational processes – the currently active goal – over even presumably hard-wired, chronic, “automatic” processes. The active goal is not only in charge, it is so much in charge that it is capable of temporarily ‘rewiring’ the cognitive apparatus to better achieve its ends. Chronic, automatic processes are found to be inhibited and shut down if they conflict with the currently active

goal – and are found to be created where they did not previously exist, if this automaticity helps to attain the goal (e.g., by increasing the efficiency, speed, or reliability of the process). Such findings cause us to rethink the assumed ‘wired-in’ nature of automatic processes, long assumed in classic models of skill acquisition to develop only gradually over time through frequency and consistency of use (see Bargh & Chartrand, 1999; Shiffrin & Schneider, 1977); they point instead to a highly plastic cognitive architecture that can flexibly adapt to best serve the attainment of the currently active goal (see especially Hassin, 2005). By revealing such heretofore unknown features of the human motivational system, the new social-cognitive approach to motivation is shown to be not merely a redescription of past motivational theory and variables in the language of cognitive psychology – it is causing us to rethink the fundamental nature of cognitive and affective processes.

The primacy of the unconscious

The primacy of conscious thought in the ways people historically have thought about the mind is illustrated today in the words we use to describe other kinds of processes – are all modifications or qualifications of the starting point, “conscious” (i.e., unconscious, preconscious, subconscious, unconscious). When considering the causal forces underlying one’s mental life and overt behavior, one’s introspections naturally focus exclusively on those influences of which one is consciously aware, and these serve as a first-pass or starting point for theoretical assumptions about the phenomenon in question (see Bargh, 1997). This natural tendency characterized the assumptions of many of the influential scientists and philosophers of the past (most notably Descartes and John Locke, but with important exceptions such as Aristotle, Spinoza, and Schopenhauer; see Arendt, 1978; Gottlieb, 2000) just as it operates in us today.

However, scientific psychology learned a century ago to be skeptical of the relatively superficial answers provided by introspection (e.g., Watson, 1912; also Nisbett & Wilson, 1977). Therefore it does not appear to be solely a fondness for tradition or historical inertia that accounts for the continued assumption of largely conscious control over the higher mental processes. Accordingly, there seem to be additional reasons for the continuing presumption of conscious primacy, and that one of the more important of these is the rather narrow and restricted view of unconscious processes held by mainstream contemporary cognitive science.

In cognitive psychology, unconscious information processing has been equated with subliminal information processing – to wit, how good is the mind at extracting meaning from stimuli the presence of which one is not consciously aware (e.g., Greenwald, Klinger, & Schuh, 1995)? Not all that long ago, a special issue of the *American Psychologist* (Loftus & Klinger, 1992) posed the question, “Is the unconscious smart or dumb?” Because subliminal-strength stimuli are by definition relatively weak and of low intensity, the mental processes they drive are necessarily minimal and unsophisticated – associationist only with minimal flexibility. No surprise then that the consensus reached by the contributors and issue editors was that the unconscious was rather dumb, capable only of highly routinized activities and of doing little without the aid of consciousness (Loftus & Klinger, 1992).

From the cognitive psychology perspective that unconscious = responses to subliminal stimuli it is understandable that one might find it difficult to accept that such a dumb system could be responsible for the production of so much in the way of complex, sophisticated judgmental and behavioral phenomena. But this ‘subliminal’ definition is historically inaccurate at best and potentially misleading at worst. The pioneering work of

Heinz Werner (1956) on perceptual microgenesis revealed that within the set of subliminally presented stimuli there could be variations in the extent and sophistication of the mental responses obtained, as a function of the duration or intensity of the stimulus presentation. More recently, Ruys and Stapel (2008) reintroduced this concept of microgenesis as an approach to the topic of “unconscious emotion”. They showed that “superquick” subliminal presentations of emotion-relevant (anger, disgust) stimuli produced only global mood and valence effects on responses, but that “quick” (still subliminal, but longer duration than “superquick”) presentations produced emotion-specific responses (anger or disgust instead of global “bad”). In other words, dramatically different conclusions about the sophistication of unconscious emotion processes would have been drawn from their subliminal versus their “even more subliminal” presentation conditions, even though both were “subliminal.”

The study by Ruys and Stapel (2008) provides a dramatic empirical confirmation that the reason the unconscious appears “dumb” (when defined in terms of responses to subliminal stimuli) is that subliminal stimuli are weak by definition and thus have only weak effects – increasing their intensity while still keeping them subliminal increases the strength and sophistication of their effects. The reason for the apparent ‘dumbness’ of the unconscious revealed by subliminal stimulation studies is therefore *not* the actual information processing powers of the unconscious itself, but the weakness of the stimuli used to discover those powers. Secondly, dividing stimuli into dichotomous classes of subliminal versus supraliminal is too simplistic an approach even to how subliminal stimuli are processed, because different outcomes are produced for more versus less intense stimulus presentations within the set of subliminal stimuli. This means it is not possible to draw unambiguous conclusions regarding the capabilities of unconscious information processing from studies

that merely compare “subliminal” stimuli to those of which the participant is consciously aware.

Moreover, the definition of the unconscious in terms of processing subliminal-strength stimuli was not the original, historic one. In the *Origin of Species*, Darwin (1859) used the term to refer to “unconscious selection” processes in nature, contrasting them with the intentional and deliberate selection long engaged in by farmers and animal breeders to develop better strains of corn, fatter cows and woollier sheep. Freud as well (see Brill, 1938; Goldsmith, 1934) used the term to refer to behavior and ideation that was not consciously intended or caused – for example, “Freudian slips” and nearly all the examples Freud gives in *The psychopathology of everyday life* (1901/1914) involve unintended behavior, the source or cause of which was unknown to the individual. For both Darwin and Freud, then, the term “unconscious” referred to the *unintentional* nature of the behavior or process, and the concomitant lack of awareness was not of the stimuli that provoked the behavior, but of the influence or consequences of those stimuli (see also Bargh, 1992).

This expanded and enhanced view of the unconscious is also more compatible with theory and evidence in the field of evolutionary biology than is the “subliminal-only” view of cognitive psychology. As did Darwin and Freud, evolutionary biologists also think of the unconscious much more in terms of its unintentional rather than its unaware quality. In his seminal *The Selfish Gene*, Dawkins (1976) noted the awe-inspiring and intelligent designs in nature that arose merely through “blind” natural selection processes. He called nature the “blind watchmaker, the unconscious watchmaker” because there was no conscious intentional guiding hand in producing these intelligent designs (Dennett, 1991, 1995).

It is this original, “unintentional” definition that has guided contemporary social psychological research on unconscious phenomena over the past 30 years, with the focus on the effects of mental processes of which the individual is unaware, not on the effects of stimuli of which one is unaware. The seminal paper of Nisbett and Wilson (1977) first posed the question “To what extent are people aware of and able to report on the true causes of their behavior?” Since then there has been much research on the extent to which people are unaware of the important influences on their judgments and decisions and of actual causal reasons underlying their behavior. This research effort has produced widespread agreement that higher mental processes such as are involved in social judgment, social behavior, and goal pursuit are driven by unconscious as well as conscious processes. For example, the 1999 collection of dual process models in social psychology by Chaiken and Trope includes 28 different models, applying the dual-process notion to a wide range of empirical phenomena.

What a difference this change in operational definition makes! If one shifts the operational definition of the unconscious from the processing of stimuli of which one is not aware, to the influences or effects of stimulus processing of which one is not aware, suddenly the true power and scope of the unconscious in daily life become apparent. Defining the unconscious in terms of the first leads directly to the conclusion that it is dumb as dirt (Loftus & Klinger, 1992); defining it in terms of the second instead reveals it to be highly intelligent and adaptive.

Moreover, just as had Freud in *Psychopathology*, theorists are finding the concept of unconscious motivation useful in explaining why people behave in ways that seem to run against their self-interest and self-values. Jost, Pietrzak, Liviatan, Mandisodza, and Napier

(2008) did so recently in the case of system justification effects, in which the current status quo regarding political power and division of resources is perceived as fair and legitimate, even among those who are low status and for whom the system operates against their self-interests (see also Thomas Frank's [2004] *What's wrong with Kansas?*). Jost et al. (2008) appeal to the operation of an unconscious system justification motive to help account for these "relatively puzzling cases of conservatism, right-wing allegiance, and out-group favoritism among members of low-status groups", which become more understandable if people are "not even aware of the extent to which they are privileging the status quo and resisting change" (p. 596).

Jost et al. (2008) also note how operation of this unconscious system justification motive may often produce effects that violate social norms, such as stereotypical beliefs and discrimination against minority and low-status groups, "and thus may interfere with social desirability concerns at a conscious level" (p. 596). In other words, the unconscious system justification motive is posited to produce outcomes that are negative and unwanted at the level of the individual person -- an analysis entirely consistent with the position advanced here, that the locus of control over behavior and judgment is not the conscious self but the currently active goal.

Indeed, one of the original clues to the existence of unconsciously motivated social behavior were highly publicized cases of political corruption (examples in Bargh & Raymond, 1995) and U.S. Supreme Court cases of sexual harassment (discussed in Fitzgerald, 1993) in which the perception of potential conflict of interest or of misuse of power was very strong in the media and public, but not to the perpetrators themselves, who

seemed genuinely unable to appreciate what all the fuss was about (in many cases detection could easily have been avoided, yet the behavior was conducted in full public view).

Certainly, such claims of innocence should be taken with a large dose of salt, but the blatant nature of many of these cases combined with the strong protestations of innocence – or, more to the present point, of a seeming lack of awareness of having done anything wrong – led to the prediction that at least some of the harassment or corrupt behavior was driven by unconscious motives (for sex, wealth, etc.), activated by the situation of having personal power, and then operating without the person’s conscious awareness. Bargh, Raymond, Pryor, and Strack (1995) then showed empirically, through priming techniques, that power did automatically trigger the sex motive in those participants most likely to possess sexual harassment tendencies. Attraction towards a female confederate was significantly higher for these participants when power had been primed, compared to when it had not been, and they were unaware of the influence of power over their attraction. Here, as in the case of system justification effects, the unconscious operation of motives (triggered by the power-related features of the situation) produced behavioral outcomes that were presumably unwanted and undesired at the level of the individual self-concept.

If a goal is capable of operating independently of any conscious intention or awareness of its operation, then active goals and conscious intentions cannot be the same things (Bargh, 1990). This is most obvious in the case of addictions, in which there is a very strong goal (need state) to smoke the cigarette, down the drink, or take the pill, even when the individual knows doing so is against his or her long term interests, and no longer wants (at the level of the self) to engage in this behavior any more (e.g., Baker, Piper, McCarthy, Majeskie, & Fiore, 2004; Loewenstein, 1996). Other examples include encapsulated bodily

systems such as breathing that will insist on operation even when doing so, as when underwater, is fatal to the individual (see Morsella, 2005, for further examples).

Although they are dramatic and extreme, these cases illustrate the general principle that the individual person or self is comprised of many different, often conflicting motives and goals – for example, self-interest versus empathic concern for others, short-term pleasure versus long-term health and happiness, and competition versus cooperation with others (Elster, 1978; Miller, 1999; Sen, 1978; see Mansbridge, 1990). As a consequence, it is often the case that the operation of one goal in pursuit of its own agenda will produce outcomes unwanted by other aspects of the self-system. The important point here is that there is no coherent “self” guiding operations here -- the coherence and control are one step down in the hierarchy, at the level of the currently active goal.

That the active goal is ultimately in charge (of selective attention, evaluation, and behavior), not the “agentic” or conscious self, is most obvious in the case of unconscious goal pursuit, in which goals are shown to operate independently of conscious awareness. Cognitive neuroscience research has supported the structural dissociation that is strongly implied by the unconscious goal pursuit evidence, finding that the operation of a goal program and one’s awareness of its operation are located in distinct, separate anatomical structures within the frontal cortex. Conscious intentions appear to be represented in the prefrontal and premotor cortex, but it is the parietal cortex that houses the representation used to guide action (Frith, Blakemore, & Wolpert, 2000) – making it structurally possible to have one (e.g., goal operation) in the absence of the other (e.g., awareness of pursuing that goal). Behaviorally, the phenomenon of “environmental dependency syndrome” (Lhermitte, 1983, 1986) is further evidence of the same dissociation. In this disorder, the behavior of patients

with lesions in the same region of the frontal lobes is found to be almost entirely at the mercy of situational cues – gardening in a public park (for hours) upon sight of a rake, giving medical examinations to others in a doctor’s office – with the patients oblivious to the unusual nature of their behavior.

The natural unconscious of evolutionary biology. The preceding analysis suggests that it may be beneficial to depart from the traditional model of motivational science, with its agentic, autonomous and conscious self said to be in control of executive processes and goal pursuits. In the rest of the natural sciences, especially neurobiology, the assumption of conscious primacy is not nearly as prevalent as in psychology. Complex and intelligent design in living things is not assumed to be driven by conscious processes on the part of the plant or animal, but instead by “blindly” adaptive processes that accrued through natural selection (Dennett, 1995).

This is not to say that human consciousness plays no important causal or moderating role over the operation of the higher mental processes, or is not ‘special’ in certain respects in its powers to transform, manipulate, and convey information, relative to the human unconscious as well as the mental powers of other animals. It is rather that this conscious capacity is not necessary to achieve the sophisticated, adaptive, and intelligent behavioral guidance demonstrated in the emerging literature on unconscious processes. As Dawkins (1976) contended, unconscious processes are smart and adaptive throughout the living world, and since his writing social cognition research has shown that this principle extends to humans as well, producing a stream of findings regarding complex human judgmental, motivational, and behavioral phenomena that operate outside of awareness.

Because these findings did not make sense given the “dumb unconscious” perspective of the cognitive science mainstream (i.e., how could a processing system so ‘dumb’ accomplish so much in the way of adaptive self-regulation?), one had to look outside of psychology to understand them and their implications for the human mind. As it turns out, when placed in the broader context of the natural sciences, especially evolutionary biology, the widespread discoveries of sophisticated unconscious higher mental processes not only become sensible, they turn out to have been predicted on a priori grounds (Dawkins, 1976; Dennett, 1991, 1995).

First, consciousness, or the conscious mode of thought, was a late development in hominid evolution (Corballis, 2007; Deacon, 1997; Dennett, 1991; Donald, 1991). Among the evidence supporting this conclusion is anthropological data on skull (brain) sizes and evidence of tool use. Brain size remained constant after the hominid divergence from the chimpanzee genetic line, but suddenly began to expand, and at the same time evidence for tool use and primitive forms of speech and communication appeared for the first time. Hence, there were millions of years of hominid development prior to the advent of consciousness, which means that some other (i.e., unconscious) system must have guided hominid behavioral responses over those eons of time.

According to this logic, one should be able to find evidence in humans of these original unconscious mechanisms underlying, and guiding, even the higher mental processes of judgment, social behavior, and goal pursuit. And evidence of these unconscious mechanisms has indeed accrued over the past quarter century: automatic evaluations and preferences, automatic influences of the perceived environment on behavioral responses, and an automatic mode of goal pursuit (see reviews in Bargh & Ferguson, 2000; Bargh, 2007).

This evidence supports the present evolutionary approach to motivation, in which unconscious processes are considered primary (see also Dijksterhuis, this volume; Neuberg et al., this volume).

Unconscious behavioral guidance systems. A second prediction from the above evolutionary considerations is that each of the varieties of automatic or unconscious processes discovered by recent research should be found to be directly connected to overt actional response tendencies; that is, to produce behavioral output entirely through unconscious means. This prediction follows from the principle that the forces of natural selection can only operate on overt behavior, not internal states such as thoughts or feelings (Mayr, 1976). If it turned out that these automatic processes were found not to be directly connected to behavioral responses, this would falsify the argument that the varieties of automatic processes discovered by social cognition research are manifestations of an unconscious behavioral guidance system which existed prior to the advent of consciousness. Once again, however, the evidence (reviewed below) has come in on the side of unconscious primacy. Each of the main forms of automatic processing relevant to social psychology – on evaluation, perception and categorization, social behavior, and goal pursuit – have been shown to directly (i.e., without need of conscious involvement) produce behavioral response tendencies (Bargh, 1997; Bargh & Morsella, in press).

Preferences. First, evolutionary forces have shaped our tendencies to approach or avoid certain aspects of our environment. Such approach and withdrawal responses are found throughout the animal kingdom; even single-celled paramecia have them (Schneirla, 1959). Cacioppo, Gardner, and Berntson (1997) concluded that in humans, there is a general default tendency to approach rather than withdraw from stimuli, which encourages exploratory

behavior and thus gain of useful information about the environment. However, this has the downside of putting the individual in the vicinity of negative stimuli and thus at risk. The adaptive solution achieved by our species is that negative stimuli when present elicit a stronger, withdrawal response, dominating and inhibiting approach tendencies. Thus, “with both a positivity offset and a negativity bias [humans] enjoy the benefits of exploratory behavior as well as the self-preservative benefits of a predisposition to avoid or withdraw from threatening events” (Cacioppo et al., 1997).

Evolutionary forces have helped to shape a person’s specific preferences as well. People are often guided by our “feelings,” “intuitions,” and “gut reactions,” which prioritize what is important to do or attend to (Damasio, 1996; Schwarz & Clore, 1996). These “guides” do not arise out of thin air, however, as our modern preferences are derived from those which served adaptive ends in the past. For example, our strong human preference for sweet and fatty foods evolved because of their high energy value during those eons of time in which they were in relatively short supply, yet we find it hard to resist them today even though they are available now in relatively ample quantities and we are now aware of the long-term costs associated with eating too much of them (e.g., Brownell, 2003; Rozin & Geier, 2007).

In general, default preferences as to what is good and what is bad in our environment represent hard-earned knowledge gained during our long-term evolutionary past. These evolved preferences are fed upwards as a starting point, appearing as a priori knowledge, the source of which we are unaware (Dennett, 1995). Donald Campbell (1974), a champion of the evolutionary approach to epistemology, called these “shortcut processes” because they

spare us from having to figure out, each of us individually from scratch, which are the good and helpful things and which are the dangerous.

Recent evidence has supported the assertion that conscious preferences are based on prior unconscious preferences. In a study of voters whose explicit, self-reported preference in the 2008 U.S. presidential election was “undecided”, Galdi, Arcuri, and Gawronski (2008) showed that the eventual conscious preference of these undecided voters could be predicted from measures of their automatic or unconscious attitudes towards the candidates. That is, for undecided but not already decided voters, the favorability of automatic associations to the candidate at Time 1 predicted subsequent conscious attitudes at Time 2. For decided voters (who had already made up their minds), only consciously expressed attitudes at Time 1 predicted conscious attitudes at Time 2 (nearly perfectly); automatic associations to the candidate at Time 1 were unrelated to consciously expressed attitudes at Time 1.

In another demonstration of this phenomenon, Duckworth, Bargh, Garcia, and Chaiken (2002) found that the automatic preferences towards novel attitude objects measured in one group predicted the explicit self-reported preferences towards those same stimuli in another group, despite the fact that in the unconscious condition the objects were presented for only 250 milliseconds, and participants in the conscious condition took on average about 8 seconds to give their preference.

Consistent with the hypothesis that these preferences are part of an unconscious behavioral guidance system, attitudes towards a wide variety of objects and events were found to become automatically activated by the mere presence of the attitude object in the environment (see reviews in Fazio, 2001; Ferguson, 2006). These automatic preferences are activated immediately and do not require the conscious intention to evaluate stimuli (Bargh,

Chaiken, Govender, & Pratto, 1992), and occur even for novel stimuli such as nonrepresentational (i.e., abstract) art and spoken nonsense words (Duckworth et al., 2002). From the accumulating evidence then, it appears that all incoming stimuli elicit an initial positive or negative evaluation, even those stimuli with which one has no prior conscious experience.

Under the present argument that the unconscious evolved as a behavioral guidance system, a source of adaptive and appropriate actional impulses, these unconsciously activated preferences should be found to be directly connected to behavioral mechanisms. Several studies have now established this connection: immediate and unintended evaluation processes are directly linked to approach and avoidance behavioral predispositions. Chen and Bargh (1999; see also Kawakami, Dovidio, Moll, Hermsen, & Russin, 2000; Neumann, Förster, & Strack, 2003) showed that participants are faster to make approach movements of the arm (pulling a lever towards oneself) when responding to positive attitude objects, and faster to make avoidance movements (pushing the lever away) when responding to negative attitude objects. This was true even though their conscious task in the experiment was not to evaluate the objects at all, merely to “knock off the screen” the names of these objects as soon as they appeared.

Thus humans automatically evaluate environmental stimuli as either good or bad, and further possess corresponding muscular, behavioral tendencies to approach or to withdraw from those stimuli, without the involvement of conscious awareness or intent. This is compelling evidence in support of the hypothesis that automatic forms of social cognition arose through natural selection processes to afford humans adaptive, unconscious guidance of behavioral responses to the environment (Bargh & Morsella, in press). Again, the discovery

of automatic attitude activation as well as its automatic connection to behavioral tendencies – both of which were unheard of 30 years ago – was surprising from the perspective that actions and behavior are always a function of conscious intent and guidance (e.g., Bandura, 1986; Locke & Latham, 2002), but is unsurprising from the unconscious-first perspective of evolutionary biology (Bargh & Morsella, 2008; Dawkins, 1976).

Social perception. Theorists have long noted that what other people are doing within a situation is important information as to what we should be doing, especially when there is ambiguity or uncertainty as to norms and appropriate responses (e.g., Asch, 1960; Meltzoff, 2002; Tomasello et al., 2005). Asch (1960) for instance argued that much conformity behavior was driven by the cueing or informational value of the perceived behavior of others. As a default option or starting point for your own behavior, “blindly” or unconsciously adopting what others around you are doing makes good adaptive sense, especially in new situations and with strangers.

There are many species in which the perception of the behavior of conspecifics (fellow members of the same species) automatically causes the animal to behave in the same way, producing precise coordination of movement within the group, as in schools of fish or herds of antelope (see Dijksterhuis & Bargh, 2001). Humans possess this same tendency, with the behavior of others automatically creating behavioral impulses or tendencies to act in the same way. Developmental researchers have highlighted this perception-behavior link as an important, innate basis of imitation and mimicry, and thus of vicarious learning of appropriate behavioral responses to events by merely witnessing the behavior of one’s adult caretakers and older children (Meltzoff, 2002; Tomasello et al., 2005). And cognitive neuroscience research has confirmed the existence of a direct anatomical connection between

perceptual and behavioral representations of the same actions with the discovery of “mirror neurons” in the premotor cortex, which become active both when one perceives a given type of action by another person as well as when one engages in that action oneself (Frith & Wolpert, 2004).

Thus what other people are doing in the current situation and environment is another important input to the unconscious behavior guidance system, with the perceived behavior of others directly and unconsciously creating tendencies to act in that same way ourselves. We naturally take on the physical postures and gestures of others without realizing it (Chartrand & Bargh, 1999), but the perception-behavior link extends further to include as well the content of more complex, abstract representations – such as trait concepts and social stereotypes – that are automatically activated during perceptual activity (see reviews in Chartrand, Maddux, & Lakin, 2005; Dijksterhuis & Bargh, 2001; Dijksterhuis, Aarts, & Chartrand, 2007). For example, priming the concept of “elderly” causes college students to both move more slowly while leaving the experimental session (Bargh, Chen, & Burrows, 1996) and to have poorer memory for the features of a room they’d just left (Dijksterhuis, Bargh, & Miedema, 2000) – both effects predicted from the content of the elderly stereotype activated through perceptual activity (i.e., priming).

The evolved, innate basis of these ubiquitous perceptual priming effects on one’s own behavior is revealed by the fact that they are present soon after birth, underpinning the infant’s imitative abilities. In a review of 25 years of infant imitation research, Meltzoff (2002) concluded that young children learn much about how to behave by mere passive imitation of fellow children and also their adult caretakers: infants in particular are wide open to such imitative tendencies, having not yet developed cognitive control structures to

suppress or inhibit them. Further evidence of the adaptive nature of these tendencies comes from the work on automatic mimicry tendencies in humans by Chartrand and colleagues (e.g., Chartrand et al., 2005); those studies have found that not only do people tend to adopt the physical behavior (posture, facial gestures, arm and hand movements) of strangers with whom they interact, without intending to or being aware they are doing so, this unconscious imitation also tends to increase liking and bonding between the individuals—serving as a kind of natural “social glue” for new acquaintances and group members.

Baillargeon (2004) has argued that priming is itself an adaptation, as it helps cue the very young child to selectively attend to the currently important features and dimensions of the world (see Higgins & Bargh, 1987, for a similar functional argument regarding priming in the case of adults). Her research has shown that even 8 month old infants show priming effects: according to Piaget (e.g., 1955), this is much too young to possess the concept of object-permanence, and indeed in a control condition, 8-month-olds do not act surprised when a doll is placed in a box and a different color version of the same doll then emerges from that box. However, if one first shows these infants a collection of different-colored dolls, thus cuing (priming) ‘color’ as a relevant doll dimension for the moment, they suddenly seem to possess object-permanence, as in this condition they are now surprised when a doll of different color emerges from the same box (thus showing object permanence).

Ambady, Shih, Kim, and Pittinsky (2001) have shown stereotype-priming effects on the behavior of children as young as 5 years. The cultural stereotype of Asian-Americans is that they are superior to other social groups in mathematical ability, but the cultural stereotype of girls and women is that they are inferior to men in this regard. Ambady et al. (2001) first primed Asian-American preschool children with drawings emphasizing either

their Asian identity or their gender, and then gave them an age-appropriate math test to work on. When their Asian-American identity had been primed, Asian-American girls outperformed the other children on the test, but when their female identity had been primed, they underperformed relative to the other children (thus showing evidence of ‘stereotype threat’ on their math performance). That such cultural-stereotype priming effects are obtained in children as young as 5 years of age is further evidence of the innate, evolved nature of contextual priming influences on behavior (as well as the rapidity and thoroughness with which young children absorb the attitudes and beliefs of their culture).

Goals and motivations. The third component of the unconscious behavior guidance system is purposive and motivational in nature. Purposive behavior and goal pursuits are widespread in the world of living things (e.g., Mayr, 1976); thus, in evolutionary biology, goal pursuit is not considered to require human consciousness or its equivalent; for the vast majority of organisms, goal-directed behavior is achieved entirely through unconscious means (Dawkins, 1976). Theory and research in the field of evolutionary psychology has held that evolutionarily-relevant goals are of unconscious origin, because reproduction and survival were paramount concerns to hominids for eons of time prior to the development of consciousness (Barrett & Kurzban, 2006; Buss & Schmitt, 1993; Donald, 2001).

While theorists differ somewhat as to the set of evolved goals they posit, general consensus exists that self-protection (including avoidance of disease and contamination) and mating are fundamental human motives, along with a need to understand or comprehend environmental events, and to belong to social groups and have supportive social relationships (e.g., Baumeister & Leary, 1995; Fiske, 2004; Haidt, 2001; Kenrick et al., 2002; Neuberg et al., 2004). Moreover, an emerging domain of research has shown that these evolved goals

can become active (i.e., primed) and then operate entirely unconsciously, outside of conscious awareness or intention, to influence selective attention, judgment, and social behavior in present-day contexts (e.g., Haidt, 2001; Huang & Bargh, 2008; Neuberg, Kenrick, Maner, & Schaller, 2004; Schaller, Park, & Faulkner, 2003).

The goal-priming literature (for review see Dijksterhuis et al., 2007) has shown that goals can be activated without the individual knowing about or intending it – either through subliminal presentation of goal relevant stimuli, or through subtle and unobtrusive supraliminal presentation. A wide variety of environmental triggers have been demonstrated: not only verbal stimuli semantically related to the goal (as in many studies), but also material objects such as backpacks and briefcases (Kay, Wheeler, Bargh, & Ross, 2004), scents such as cleaning fluids (Holland, Henriks, & Aarts, 2005), power-related features of a situation such as a professor's desk chair (Chen, Lee-Chai, & Bargh, 2002), and the names of one's significant others (Fitzsimons & Bargh, 2003; Shah, 2003).

Moreover, a wide variety of goals have been studied and shown capable of unconscious operation: information processing goals such as impression formation (Chartrand & Bargh, 1996; McCulloch et al., 2008), achievement and task performance goals (Bargh et al., 2001; Hassin, 2005), as well as interpersonal goals such as helping and cooperation (Bargh et al., 2001; Fitzsimons & Bargh, 2003). These studies have shown further that once activated outside the person's knowledge, these goals operate autonomously, without any conscious guidance, to direct cognition and behavior towards the desired end-state (see reviews in Bargh, 2005; Bargh & Ferguson, 2000; Chartrand & Bargh, 2002; Dijksterhuis et al., 2007; Ferguson, Hassin, & Bargh, 2008; Fitzsimons & Bargh, 2004).

Similarity of conscious and unconscious goal pursuits

From the assumption of the historical primacy of unconscious motivational structures, a further prediction can be made. Evolution is an incremental process; new processes and abilities are not created *de novo* but are cobbled onto and make use of existing processes to the extent possible (see Allman, 2000; Bargh & Morsella, 2008). Thus it is likely that when conscious processing capabilities evolved, they made use of relevant existing unconscious mental structures; in the case of goal pursuit, the assumption would be that conscious forms of goal pursuit make use of pre-existing unconscious motivational processes and brain structures. This leads to the prediction that there should be obtained a high degree of similarity in not only the outcomes of conscious and unconscious pursuit of the same goal, but also the two modes should share phenomenal qualities of the goal pursuit process -- such qualities as persistence in the face of obstacles, resumption and completion of interrupted goal pursuits, self-evaluation following the goal pursuit attempt, and temporary inhibition of the goal following the attempt (see Atkinson & Birch, 1970; Heckhausen, 1991; Lewin, 1935) – and also be found to utilize the same underlying brain regions.

Regarding the prediction of similar *outcomes* of goal pursuit, recent studies have shown that unconscious goal pursuit produces the same outcomes as when that goal is pursued consciously (reviews in Dijksterhuis et al., 2007; Fitzsimons & Bargh, 2004). The goal concept, once activated without the participant's awareness, operates over extended time periods (also without the person's conscious intent or monitoring) to guide thought or behavior towards the goal. For instance, primed, unconscious goals to form an impression of a target person operate without the participant's knowledge, and compute the evaluation in

the same way as if the person consciously and intentionally had the goal to form an impression (Chartrand & Bargh, 1996).

Goals for types of interpersonal behavior, as well as information processing goals, are capable of unconscious operation. In one study, unobtrusive priming of the goal of cooperation caused participants playing the role of a fishing company to put more fish back into a lake in order to replenish the fish population (compared to a non-primed control condition), the same effect as when, in the same study, another group of participants were explicitly instructed to cooperate (Bargh et al., 2001). Yet although the goal-priming manipulation produced the same effect on behavior as did conscious (explicitly instructed) pursuit of the same goal, only in the latter case were participants aware of having the goal to cooperate. Post-experimental reports of how cooperative they had just been on the task were significantly correlated with actual degree of cooperation in the conscious goal pursuit condition, but were uncorrelated with actual behavior in the unconscious goal pursuit condition. The goal-primed participants thus gave every appearance of pursuing the cooperation goal without knowing they were doing so.

Secondly, regarding the prediction of similar *underlying processes*, not only do unconsciously operating goals produce the same outcome as when consciously pursued, they do so following the same processing stages as well. McCulloch et al. (2008) has shown in the case of the impression formation goal, do so following the same processing stages as well. Compared to a non-primed control group, priming the impression formation goal caused participants to be (a) faster to encode behaviors in trait-categorical terms, (b) more likely to form associations between behaviors, and (c) notice and remember impression-inconsistent behaviors, all known sub-processes of conscious impression formation (e.g.,

Hamilton, Katz, & Leirer, 1980; Srull & Wyer, 1989). Priming a goal, therefore, puts the means to attain the goal (i.e., component sub-goals) into active operation as well (see Shah & Kruglanski, 2003, for the reverse, means-to-goal priming effect).

Once active, the goal directs one's attention towards some (i.e., goal-relevant) stimuli and away from others; the world is filtered through the goal's 'eyes'. The active goal's effect on selective attention has long been known in the case of consciously pursued goals (Anderson & Pichert, 1978; Bruner, 1957; Hastie & Park, 1986), but recent research shows this effect occurs in unconscious goal pursuit as well (Chartrand & Bargh, 1996, Study 2; Maner et al., 2005; McCulloch et al., 2008; Neuberg et al., 2004). For example, a unconscious impression formation goal causes greater selective attention to behavioral information inconsistent with the target's general pattern of behavior (Chartrand & Bargh, 1996, Study 2; McCulloch et al., 2008), and a unconscious mating goal drives greater selective attention to the potential romantic partners shown on a videotape (Maner et al., 2005; Neuberg et al., 2004).

Thirdly, regarding the prediction that the same *phenomenal qualities* should occur during goal pursuit, whether it be unconscious or conscious, research has supported this prediction as well. Unconscious goal pursuit is shown to possess the same phenomenal qualities previously demonstrated and ascribed to conscious, deliberate goal pursuit (Bandura, 1977, 1986; Gollwitzer & Moskowitz, 1996; Heckhausen, 1991; Lewin, 1926). These include persistence in the face of obstacles, resumption of interrupted goal pursuits in the face of intrinsically more attractive activities, and evaluative and motivational consequences of the goal pursuit attempt (see reviews in Chartrand & Bargh, 2002; Ferguson et al., in press). Kawada, Oettingen, Gollwitzer, and Bargh (2004) have demonstrated another

similarity: Both conscious and unconscious goals, when active, are “projected onto” (i.e., attributed to) other people in the course of impression formation.

The affective (mood) and motivational consequences of conscious and unconscious goal pursuit are also the same. The consequences of conscious goal attempts for affective experience (mood) and the future strength of that goal have long been established (e.g., Bandura, 1977; Carver & Scheier, 1981; Heckhausen, 1991). Success at the attempt produces positive mood and increased tendencies to pursue that goal in the future; failure produces the opposite consequences. Research on unconscious goal pursuit has shown that the same consequences accrue for goal attempts the individual is not even aware of making (Bongers, Dijksterhuis, & Spears, 2008; Chartrand & Bargh, 2002). In the Chartrand study, participants were given an anagram task that was very easy or impossible to solve; the importance of this task was downplayed by the experimenter as a ‘filler task’ in the larger study. However, for participants previously primed with the achievement (high performance) goal, but not for control group participants, working on the easy anagram task (success condition) resulted in elevated mood and increased motivation to work on a subsequent verbal task, and working on the difficult anagram task produced depressed mood and lower effort on the subsequent task.

Thus, successful goals become stronger (more likely to be pursued again by the individual) and unsuccessful goals become weaker, all without the individual’s knowledge or consent. Presumably this change in future goal strength is driven by the positive versus negative affect associated with the goal; that is, its “incentive value”. The above research by Bongers et al. and Chartrand suggests that this incentive value can be changed automatically,

without conscious involvement or awareness, as the result of success vs. failure at a goal the individual does not even know he or she is pursuing.

More direct evidence of unconscious changes in goal strength has emerged recently from cognitive neuroscience studies of the brain regions involved in motivated behavior. This research also bears on the prediction above that conscious and unconscious goal pursuits make use of the same underlying brain regions and structures. In an fMRI study of motivation-relevant brain regions, Pessiglione et al. (2007) showed that subliminal reward cues moderated the amount of effort participants gave on a hand-grip squeezing task; the higher the value of a coin flashed subliminally at the beginning of the trial, the more effort participants expended on that trial. The researchers also included conditions in which the incentive was consciously perceived by participants, and their imaging data revealed that the same region of the basal forebrain moderated task effort level in both the conscious and the unconscious incentive conditions. Pessiglione et al. (2007) concluded from their findings that “the motivational processes involved in boosting behavior are qualitatively similar, whether subjects are conscious or not of the reward at stake” (p. 906).

Similarly, recent experimental work by Custers and Aarts (2005, 2007) has shown that conditioning a positive affective response to the name of a particular goal increases the chances the individual will pursue that goal over other possible alternatives, again without the participant being aware of this influence on their choice of goals. Aarts et al., 2008) showed that both the goal of high performance (exertion) and the incentive attached to that goal could be manipulated unconsciously; participants subliminally primed with the goal of exertion outperformed a control group in a hand-grip squeezing task, but those primed simultaneously with both the exertion goal and positive stimuli performed the best of all.

Moreover, the complementary effect is found to occur when negative stimuli are paired with a goal; this increases the likelihood of disengagement from the goal (Aarts, Custers, & Holland, 2007). Thus both the goal itself and the incentives associated with the goal can be triggered through unconscious means and will then influence task performance just as if they had been consciously perceived and chosen. These studies provide further support for the hypothesis that the same underlying mechanisms and processes are involved in both conscious and unconscious goal pursuit.

Autonomy of active goals. Unconscious goal pursuit therefore produces the same outcomes and with the same processing stages and phenomenal, subjective qualities of goal pursuit as established previously for conscious goal pursuit. This high degree of similarity is consistent with the proposition that conscious goal pursuit makes use of pre-existing, unconscious motivational structures. However, the research on unconscious motivation indicates that there should be an additional important quality shared by conscious and unconscious goal pursuit – autonomy of goal operation, once the goal becomes activated.

If conscious and unconscious goal pursuits make use of the same underlying motivational system, then the autonomy of operation clearly demonstrated in the case of unconscious goal pursuit (in which the goal guides cognition and behavior towards the desired end-state without deliberate conscious knowledge or guidance) should also hold in the case of conscious goal pursuit. In other words, even those goals one intends to pursue, and of which one is aware, should “selfishly” pursue their agenda once activated, even if doing so runs against the self-interests of the individual.

In a test of this prediction, Bargh, Green, and Fitzsimons (2008) hypothesized that conscious and unconscious goal pursuit would share another important feature, that of

autonomous operation once active. Note that up to now, potential similarities between the two modes of goal pursuit had been assessed by testing whether unconscious goal pursuit possesses qualities that had been already established for the case of conscious goal pursuit (Chartrand & Bargh, 2002; Fitzsimons & Bargh, 2004). Bargh et al. (2008) made the reverse assertion: that conscious goal pursuit should be found to share a quality previously demonstrated only for unconscious goal pursuit – namely, that of operating on any relevant, applicable information in the environment regardless of whether the individual intends or is aware of this operation. In the case of conscious goals, the person is aware of pursuing them with regard to a specific target or set of targets; however, it should be kept in mind that just as unconscious goals operate on any and all perceived information to which they are applicable, conscious goals will too – even information that was not the originally intended focus of the goal.

Bargh et al. (2008) tested this hypothesis in two experiments by having participants watch a videotape of an ostensible job interview (in the control condition, participants were told it was of two people getting acquainted). They were told that the job in question was either a crime reporter for the *New York Daily News*, or a restaurant waiter position. The two jobs were pretested so that the desired personality characteristics were opposite of each other: the ideal crime reporter is tough and aggressive, while the ideal waiter is deferential and polite. During the taped interview, the two participants were interrupted several times by secretaries and co-workers, as in an actual busy office situation. The behavior of one of these interrupters (“Mike”) varied across the two experimental conditions. In one tape, Mike was very polite and deferential after interrupting; in the other, he was rude and aggressive. After the tape had been presented, participants were given a surprise impression task in which they

were not asked about the job candidate at all (on which they had been consciously focused), but simply how much they liked Mike.

Under the hypothesis that the active conscious goal of evaluating a specific type of job candidate would also be applied to other people encountered at the same time, Bargh and colleagues (2008) expected that participants in the control and waiter-goal conditions would like “polite Mike” more than “rude Mike”, but that those in the reporter-goal condition would actually like “rude Mike” better. Results confirmed this prediction. Because Mike’s behavior matched the qualities that the active goal was looking for, and which would be evaluated positively by the active goal (see Ferguson, 2008; Ferguson & Bargh, 2004), participants in the reporter-goal condition showed a significant reversal of preferences compared to the other two conditions: they liked rude Mike more than polite Mike.

In a third study, some participants were instructed to help another participant (actually a confederate) with an experimental task, while others were not assigned this ‘helper’ role. Consistent with the autonomous-goal hypothesis, participants who were concurrently helping someone (compared to those who were not) showed a greater willingness to donate money to a charity and also to commit their time to helping a stranger who stopped by the experimental room to ask if the participant would fill out a lengthy questionnaire for her. Note that these are costs that one would not choose to incur were it not for this unintended influence of the active goal (as shown by the control and deactivated-goal conditions of that study), just as one would normally prefer a polite than a rude person.

These findings support the hypothesis that conscious as well as unconscious goals, once activated, operate autonomously in an open-ended fashion on any and all relevant information in the environment, even that which was not the original intended focus of the

goal pursuit (in the case of conscious goals). Intended goal pursuits thus can have unintended consequences. As shown by the results of the control condition, we do not normally find rude, aggressive people likable, and it is doubtful we'd like "rude Mike" under usual circumstances – but we do tend to like him if we are concurrently evaluating others for some purpose in which rudeness and aggressiveness happen to be valued traits.

Thus the similarity between conscious and unconscious forms of goal pursuit extends to autonomy of operation once activated. Even goals that are consciously chosen (or explicitly given to us by another person, such as through experimental instructions) and of which the individual is aware of pursuing will nonetheless operate to attain their desired end-states whether or not these outcomes are intended or desirable at the level of the individual (self). Therefore, contrary to contemporary models of motivation and the self which assume that "undoubtedly some portion [of human behavior] involves deliberate, conscious, controlled responses by the self ... acting autonomously on its own behalf" (Baumeister et al., 1998, p. 1252), the locus of proximal control over thought, judgment, and behavior appears instead to reside in the currently active goal and not at the more abstract level of the individual person or agentic self.

The critical dissimilarity: Awareness of the goal pursuit. There is, of course, one significant difference between conscious and unconscious goal pursuit: unlike unconscious goal strivers, conscious goal strivers know why they do what they do. In Study 2 of Bargh et al. (2001) the goal of cooperation was primed (unconsciously activated) in one condition and given explicitly (consciously pursued) in another. Following a 'resource commons' game in which their degree of cooperation was measured, all participants were asked to rate how committed they had been to the goal of cooperation during the task. For participants with the

conscious goal of cooperation, these ratings did correlate significantly with their actual degree of cooperative behavior – but for those pursuing the goal unconsciously (i.e., in the goal priming condition), these ratings were unrelated to the actual amount of cooperation they had just exhibited on the task. Even though the cooperation prime produced significantly more cooperation than found in the control group, and even though they were asked immediately after the task on which they had just cooperated, participants pursuing the unconscious cooperation goal were unable to report with any accuracy on the cooperative nature of what they had just finished doing. Accurate introspective access to the meaning and purpose of one’s behavioral responses may thus require conscious awareness of the goal being pursued at the time.

Awareness of one’s goal pursuits may also be important for accurate attribution of the emotional states that result from the goal pursuit. In studies of unconscious achievement motivation, it has been shown that success versus failure at the task produces a positive versus a negative mood, with the person unaware of the actual source of the mood and thus liable to misattribute it to some plausible cause of which they are aware (Bongers et al., 2008; Chartrand & Bargh 2002). Similarly, Oettingen, Grant, Smith, Skinner, and Gollwitzer (2006) have shown that when goals are not consciously adopted (i.e., are unconsciously 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 (see McGraw, 1987), the actual source of which they are unaware (and are thus again likely to misattribute).

The selfish goal

This observed relation between goals and the individuals holding them, with goals operating autonomously within their individual hosts, is strikingly similar to Dawkins' (1976) famous demonstration in *The Selfish Gene* that across the domain of living organisms, the locus of control over behavior is at the level of the gene, not the individual organism (see Huang & Bargh, 2009). If even consciously-pursued as well as unconsciously-pursued goals operate in an autonomous, independent manner, once activated, then one can speak of the 'selfish goal' pursuing its own agenda just as the 'selfish gene' is ultimately concerned with its own propagation. Dawkins (1976) described how our genes have designed us (through the blind process of natural selection) to be their "survival machines" on which they depend for their propagation into future generations – making genes, not individual organisms, the basic unit of natural selection. In an analogous fashion, active goals are the unit of control over higher mental processes, not the self or individual person, and active goals single-mindedly pursue their agenda independently of whether doing so is in the overall good of the individual person.

Goals are to the self as genes are to the organism. That goals are to the self as genes are to their host organism is more than a metaphor, however. Evolutionary biologists and psychologists, as well as philosophers of science, consider motivations to be the crucial link between genetic influences and adaptive behavior (Campbell, 1974; Mayr, 1976; Neuberg et al., 2004; Pinker & Bloom, 1992, p. 468; Popper, 1972, pp. 256-280; Symons, 1992, p. 138; Tetlock, 2002; Tomasello et al., 2005; Tooby & Cosmides, 1992, p. 99). The close correspondence between genes and goals is attested to by the prevalence of goal-directed behavior in the organic world, which of course largely lacks the strategic, conscious information processing capabilities of humans. As evolutionary theorist Ernst Mayr (1976,

p. 389) stressed, “the occurrence of goal-directed processes is perhaps the most characteristic feature of the world of living organisms.” For example, a predator stalking its prey or the prey fleeing from the pursuing predator, a bird starting on its migration, an insect selecting its host plant, a male displaying to a female – all are acting purposefully yet unconsciously.

Why do genes require the proxy of goals and motives? Because the rate of genetic change is very slow, too slow for direct genetic controls over behavior to adapt quickly enough to constantly changing and shifting environmental conditions. Life offers too many different possible eventualities for all of them to be anticipated by specific genetic instructions, thus genes have to 'instruct' their host organisms not in specifics, but in the generally useful strategies and tactics of life. It is for this reason that evolution has shaped us to be open-ended systems (Mayr, 1976), with goal programs serving as the ‘local agents’ in the present to carry out genetic instructions from the distant past, but adaptively in the context of current environmental conditions and contingencies.

Mayr (1976, p. 23) identified two types of inherited behavior programs in the organic world: open and closed. Closed programs are those containing a nearly complete set of ready-made responses to particular stimuli in the environment; these characterize organisms with short life spans or highly stable and unchanging environments, in which there is little time or need to benefit from experience or adapt to local variations. Because humans, on the other hand, enjoy longer life-spans and also a long childhood under the supervision and protection of care-givers, most genetic behavior programs (goals) in humans are open. This is a great advantage to successful adaptation, because it allows the general tendencies furnished genetically to be fine-tuned to the specific local conditions into which the infant happens to be born. A well-known example of an open-ended program in humans is the

young child's ability to quickly learn the local language and absorb the local culture; any infant can be taken to any location on earth and over time will learn that language and that culture as well as if they'd been born there (Pinker, 1994).

The open-ended nature of human goal pursuit is further illustrated by the readiness and ability of unconsciously activated goals to operate on whatever goal-relevant input occurs in the environment. The unconsciously active goal operates on whatever goal-relevant information happens to occur next in the experimental situation, which could not be known to the participant beforehand—just as genetic influences from the distant past programmed us through open-ended motivations to be capable of adapting to local conditions far into a future that could not have been anticipated in any detail (Dawkins, 1976). Moreover, based on the striking similarity of outcomes and process between conscious and unconscious goal pursuit, and evidence that consciously-pursued goals are also characterized by autonomy of operation once active (Bargh et al., in press), the principle of autonomous operation appears to hold for all goal pursuits, conscious and unconscious alike.

The selfish goal is in control

If the currently active goal is the proxy of genetic influences and the most proximal locus of control over behavioral responses, then it should be capable of recruiting and directing other psychological systems and processes in the service of that goal. Accordingly, one should find that the active goal drives selective attention to the goal-relevant aspects of the environment, evaluation of environmental stimuli (objects, people, events) in terms of whether they help or hinder the goal pursuit, and the perceptual interpretation of stimuli in manners best suited to attainment of the goal. In other words, the active goal tends to take

the helm of one's mental machinery and "adjusts its settings" in a single-minded way to maximize the chances of goal attainment.

Attention. Bruner (1957) was facing a similar situation 50 years ago when seeking to explain how the 'New Look' findings of motivational and value-driven biases in perception could occur in terms of basic underlying psychological processes. His efforts gave us the extremely useful notions of goal-directed [selective] attention in which one's currently active goal drives what one attends to in the busy real world, and of category accessibility, the theoretical mechanism by which goals could exert this influence on attention. An active goal (e.g., to find something to eat) caused the mental representations relevant to attaining the goal (e.g., restaurants, bodegas) to become somewhat more active than usual and thus more ready to become activated by corresponding stimuli in the environment.

This selective attention process can be quite striking in its ability to filter incoming stimuli so that we notice what is goal-relevant and do not notice what might distract us from the goal pursuit. The power of the effect of active goals on attention is such that very salient, unusual events can be missed entirely, as in the "attentional blindness" research (Mack, 2003; Most, Scholl, Clifford, & Simons, 2005; Simons & Chabris, 1999; see also related earlier work by Neisser, 1979; Neisser & Becklen, 1975). In one such study, participants given the explicit, conscious task of counting the number of ball tosses between actors on a computer display failed to notice a gorilla walking right through the ball-tossing game while they were busy counting tosses.

Need states, such as hunger and thirst, drive selective attention to stimuli that will satisfy the need; the stronger the need, the stronger the attentional bias (e.g., Aarts, Dijksterhuis, & de Vries, 2001; Lavy & van den Hout, 1993). For example, participants who

had fasted for 24 hours were faster at detecting food-related words in a display than those who had fasted for 10 hours, who were faster than non-fasting participants; moreover, having a snack right before the experiment eliminated the effect (Lavy & van den Hout, 1993). In summarizing this research, Strack and Deutsch (2004) concluded that need states become strongly linked in memory with the behaviors and situations in which the need was satisfied, so that subsequent experiences of that need activate an attentional bias, or perceptual readiness (Bruner, 1957) for those same situational features.

Evaluation. Not only do goal and need states drive selective attention to relevant environmental stimuli, they also cause those stimuli to be automatically evaluated as positive or negative. Lewin (1935, p. 78) held that the evaluation or valence of an environmental object or event was a function of whether it helps or hinders attainment of one's current goals or satisfaction of one's current needs. For example, a state of food deprivation (hunger) causes both greater selective attention to food cues and more positive automatic evaluations of them (Drobes, Miller, Hillman, Bradley, Cuthbert, & Lang, 2001). Because automatic positive evaluations are directly linked to approach motivations towards the stimulus, and negative automatic evaluations to avoidance motivations towards the stimulus (e.g., Chen & Bargh, 1999; Kawakami et al., 2000; Lewin, 1935), changes in evaluation caused by the active goal or need state would serve the purpose of directing the individual towards goal-helpful stimuli and away from goal-hindering stimuli.

This implies that changes in goal or need state should produce corresponding changes in automatic evaluation of goal-relevant stimuli. Supporting this prediction is evidence reviewed by Olson and Fazio (2003) that the results of the well-known 'implicit association test' (IAT; Greenwald, McGhee, & Schwartz, 1998) measure of one's automatic attitudes can

be moderated by current goals or need states. For example, Sherman, Rose, Koch, Presson, and Chassin (2003) had long-term cigarette smokers (many of whom wanted to quit) abstain from cigarettes for several hours prior to the experimental session. One group was allowed to smoke just before the experiment (thus satisfying the need) while another group was not (the need was still strongly present). Automatic attitudes towards smoking and smoking related stimuli (cigarettes, ashtray, matches) were found to be negative in participants without the strong need to smoke, but positive for those participants in whom the need was present).

Similar results have been obtained with a different measure of automatic attitudes, the sequential priming task. Ferguson and Bargh (2004) showed that active goal pursuits temporarily cause stimuli (e.g., the letter C) to be automatically evaluated as positive if they help attain the currently active goal (e.g., find as many letter C's as possible in a page of text). Importantly, when the goal-task has been completed (i.e., the goal is now inactive), the valence of that attitude object reverted back to its default state. Ferguson (2008) has coined the term *evaluative readiness* to refer to the tendency of active motivational states to assign valences to environmental objects and events on the basis of whether they help or hinder the active goal pursuit.

Brendl, Markman, and Messner (2003) have demonstrated a complementary effect: in their studies, activating a need caused objects unrelated to satisfaction of the need to be less positively evaluated than otherwise. Thus the autonomous active goal keeps the individual on track towards attainment of the goal by reducing positivity and thus strength of approach motivation towards stimuli that might distract or divert the individual away from the goal.

Goal-driven evaluations are also a powerful determinant of our impressions of other people as well as social groups. The warm-cold dimension of interpersonal behavior has long been known to be critical in impression formation; the presence of “warm” versus “cold” in an otherwise identical description of a target individual dramatically alters the perceived likeability of the individual (Asch, 1946; Kelley, 1951). Moreover, Fiske and colleagues have shown that the warmth dimension, along with competence, are the two basic dimensions of all out-group stereotypes around the world, with warmth being the primary of the two (e.g., Fiske, Cuddy, Glick, & Xu, 2002). Warmth judgments turn out to be a function of whether the individual or group is seen as not being an obstacle or threat to obtaining one’s own goals: “outgroups are seen as relatively warm and nice to the extent that they do not compete with others” (Fiske et al., 2002, p. 881), and “a primary source of negative affect toward out-groups results from perceived incompatibility of their goals with in-group goals” (Fiske & Ruscher, 1993).

The active goal’s effect on evaluations is so powerful that it can modify our feelings towards the significant others in our lives. Given the power of the active goal to transform the valence of external stimuli to suit the needs of the goal pursuit, it may be the case that at least part of our positive feelings towards our friends is that they generally facilitate our important goal pursuits. Such an effect has been demonstrated by Fitzsimons and Shah (2008). They asked participants to identify a set of friends who helped them to achieve academically, and a set who did not. These participants were then nonconsciously primed with the achievement goal (or not, in the control condition); the achievement-primed participants consequently evaluated their academic-helper friends more positively than their

non-academic-helping friends. Control participants who did not have the achievement goal currently active did not exhibit the same momentary favoritism for goal-instrumental friends.

These findings are reminiscent of the successful intervention by Sherif, Harvey, White, Hood, and Sherif (1961) in the classic Robbers' Cave study. Boys attending a summer camp were arbitrarily divided into two groups, the Rattlers and the Eagles, with their own cabin and t-shirts. Soon the two groups were warring, raiding the other group's cabin and behaving in a generally antagonistic manner towards each other. Sherif et al. (1961) restored harmony and friendship at the camp by giving both groups a common goal, for which everyone's help and cooperation was needed. Sharing this goal dramatically changed the feelings of the Rattlers and Eagles towards each other, making friends out of summer-long 'enemies'.

Perception. A longstanding research tradition in social psychology has established the phenomenon of motivated perceptual interpretation of events (Bruner, 1957; Hastorf & Cantril, 1954; Kunda, 1990). Motivated biases in perception are so commonplace in daily life as to be unremarkable – in sporting events, fans of both teams involved are completely convinced that the referees are against them (Hastorf & Cantril, 1954); similarly with the fervently expressed belief of political party members on both sides of the aisle that the media coverage of an election is biased against their candidate. Self-protective biases operate to transform ego-threatening outcomes (e.g., failure on a test) into more palatable versions that exonerate oneself and put the blame instead on forces outside one's personal control or responsibility (e.g., Bradley, 1978; Crocker & Park, 2004; Sinclair & Kunda, 2000).

Motivational states are found to bias perception of ambiguous events across a wide variety of domains, always in the furtherance of goal pursuit. In the classic study by

McClelland and Atkinson (1948), for example, participants deprived of food (compared to non-hungry participants) were more likely to report that briefly presented slides contained objects associated with eating (e.g., plates), when in actuality all participants were exposed to blank slides. Similarly, participants in an ostensible ‘taste-testing’ study by Balci et al. and Dunning (2006) were told that the computer running the study would determine whether they would drink fresh orange juice or an unappealing veggie smoothie, and would signal this outcome by flashing a letter for one drink, or a number for the other drink. All participants were then exposed to an ambiguous cue for 400 ms, one that could be interpreted either as the letter ‘B’ or the number ‘13.’ Participants for whom a letter signaled the desirable drink were more likely to report seeing the letter ‘B’, whereas those for whom a number signaled the desirable drink were more likely to perceive the number ‘13’.

Research on evolved goals has shown that an active mating goal increases the perceived attractiveness of potential partners (Maner et al., 2003; Maner et al., 2007; Neuberg et al., 2004), and even increases the degree of arousal perceived in the faces of attractive women (Maner et al., 2005). Commitment to a close relationship (the person is motivated to maintain the relationship) produces an increase in positive illusions concerning the relationship (Lemay, Clark, & Cohen, 2007; Murray, Holmes, & Griffin, 1996). In each of these cases, the goal’s effect on perception serves to increase the probability of goal attainment; for example, by keeping the individual in a relationship despite evidence that might possibly lead to a breakup if viewed more objectively.

Overriding chronic, automatic processes. The executive power of the active goal is indicated further by its ability to override chronic, automatic encoding tendencies. The principle that the current goal can dominate otherwise automatic processes was first proposed

by Posner and Snyder (1975), and tested in a series of experiments by Neely (1976, 1977). These studies showed that category labels such as “BODY” and “FURNITURE” automatically activated their associated categories and thus primed the category members (i.e., names of parts of the body, or kinds of furniture); in a sequential priming task (prime-target pairs on each trial), participants were faster to respond (lexical decisions) to body-part names (e.g., heart, leg) when BODY was the prime compared to FURNITURE, and to types of furniture (e.g., chair, table) when FURNITURE was the prime compared to BODY. Thus the chronic automatic effect of presenting a category label is to activate members of that category.

However, what if the current state of the world is such that the usual rules do not apply? This situation was captured in the Neely (1977) paradigm by a condition in which on 80% of the trials BODY was followed by names of types of furniture (and only 20% by body parts), and FURNITURE was followed by names of parts of the body (and only 20% of trials by types of furniture). In this condition, the long-term automatic association between category label and category members would lead the participant astray by activating the wrong set of targets, and thereby slow down responses. This is indeed what occurred in the condition in which the time gap between prime and target (i.e., stimulus onset asynchrony, or SOA) was too short (250 ms) for a strategic, task-goal-driven process to guide responses on that trial. But in a condition where the SOA was long enough to permit a strategic, goal-driven response (750 ms), it was found to override the ‘hard-wired’ automatic generation of same-category responses. That is, participants in this condition actually responded faster to the prime-target mismatch trials (e.g., BODY-table) than the match trials (e.g., BODY-heart). The task goal to respond as quickly as possible to the target words adapted quickly to the

reversed contingencies of the situation and caused the normally automatic encoding effect to be inhibited, and the novel contingency to become (temporarily) automatic.

Logan and Zbrodoff (1979) demonstrated the same effect in a spatial paradigm in which participants responded as quickly as they could on each trial as to whether a presented target word appeared above versus below a fixation point on the screen. On some trials the actual words ABOVE or BELOW were presented, and not surprisingly, participants were faster than usual to make the ‘above’ or ‘below’ response when the word ABOVE appeared above the fixation point or the word BELOW appeared below the fixation point. (The design of this experiment is conceptually identical to the classic Stroop (1935) color-naming paradigm, in which naming a presented word’s color is faster if the presented word is the color name itself [e.g., the word RED presented in red].) But what if on the majority (80%) of trials the reverse contingency is true: the word ABOVE appears below the fixation point and the word BELOW appears above it? Here again, participants are faster to respond ABOVE when the word BELOW appears above the fixation point than when the word ABOVE appears there, and vice versa.

In another demonstration of an active (unconscious) goal overriding automatic, habitual responding, Sassenberg and Moskowitz (2005) primed a “think different” goal of generating creative solutions to a problem. Participants in the think-different condition, compared to a control group, indeed generated more unusual uses for a given object and more uncommon answers in a free-association task, instead of the habitual or automatically generated ones. In each of these studies, the currently active goal (i.e., the explicit task goal given to participants by the experimental instructions) dominates otherwise automatic, chronic responses if the latter interfere with the attainment of the goal. (For more on the

neural mechanics of how a current task goal overrides automatically suggested alternative responses, see Cohen, Dunbar, & McClelland [1990].)

The principle that the currently active goal can temporarily ‘reconfigure’ the automatic (immediate, efficient) responses made to environmental stimuli, if this helps attain the goal, extends to complex social information processing situations as well. For example, there is much evidence of the automatic manner in which other people are encoded or categorized in terms of their race, age, and gender (e.g., Bargh, 1999; Brewer, 1988). However, if doing so hinders the successful completion of the currently active goal, this does not happen. Kurzban, Tooby, and Cosmides (2001, Study 2) gave participants the explicit goal of coalition detection, and subsequently presented them with a situation in which allied targets were visibly linked by shirt color. The experimenters found that participants encoded targets using the most useful information current to that context—which in this case, was target shirt color, not their race (which did not designate targets’ group affiliations). The goal of coalition detection overrode the usual automatic encoding of people in terms of racial categories, because race was not diagnostic of in-group membership in this context.

As described earlier, implementation intentions are also examples of the power of the currently active goal to override habitual, automatic responses. Much recent research has shown implementation intentions to facilitate goal striving even when it is threatened by strongly competing habitual responses (e.g., Cohen et al., 2008; Holland et al. 2006; Lydon et al., 2008; Gollwitzer & Schaal, 1998). Through the formation of strategic implementation intentions, one can strategically switch from top-down control of one’s actions by active goals to bottom-up control by situational cues, temporarily creating new ‘habit’-like behavioral responses that aid in the goal pursuit instead of threaten it.

Moskowitz, Gollwitzer, Wasel, and Schaal (1999) provided a particularly compelling demonstration of the currently active goal dominating antagonistic automatic processes. In their studies, all participants showed evidence of automatic stereotype activation upon the mere perception of minority group features. However, those participants who possessed a chronic motivation to treat others in an egalitarian fashion were found to inhibit or shut down the automatically activated stereotype almost immediately after it became active, such that the stereotype did not influence their perceptions of the minority group members. The active egalitarian goal overrode the otherwise automatic tendency to categorize people in terms of the group stereotype, as such stereotypic treatment would run counter to the active goal's aim of thinking about people the same regardless of their race, gender, or ethnicity.

Temporary creation of automatic processes. Treating other people fairly is a positive social goal of course, but in line with the notion that the self is comprised of many, often conflicting goals, people also have strong goals to protect their self-esteem. If this self-protective goal is active, for example following a threat to one's self-esteem (e.g., failure at a task), it can instead cause the stereotyping of minority group members, even under conditions known to normally prevent such stereotyping. In a series of experiments by Spencer, Fein, Wolfe, Fong, and Dunn (1998), automatic stereotyping effects were shown to be blocked by an attentional load (secondary task) manipulation, replicating earlier work by Gilbert and Hixon (1991). The secondary task thus created conditions under which it was normally difficult for automatic stereotyping of minority group members to occur.

However, Spencer et al. (1998) then threatened the self-esteem of some participants through bogus task-failure feedback, in order to trigger a goal of restoring positive self-regard. As one common method of restoring one's self-esteem is to denigrate others,

especially minority group members, the active self-protective goal was expected, and found, to cause automatic stereotyping effects to reemerge. Participants who had been told they'd failed on the task thus showed automatic stereotyping effects under conditions known to prevent such stereotyping under normal conditions. The active goal of restoring positive self-esteem thus created automatic effects where none existed without the goal.

Lakin, Chartrand, and Arkin (2008) have recently reported a similar effect, in which socially excluded individuals subsequently become more likely to mimic and imitate interaction partners. The exclusion presumably triggered the need-to-belong goal (Baumeister & Leary, 1995; Fiske, 2004) and the mimicry behavior as a means to that end (as mimicry has been shown to increase bonding and liking between individuals; Chartrand & Bargh, 1999), without the participant's awareness of either their mimicry behavior or the reason for it.

Of course, the original demonstration of such 'strategic automaticity' was the research on implementation intentions (Gollwitzer & Brandstaetter, 1997), in which an active goal creates temporarily automatic processes in service of the goal pursuit. Forming implementation intentions turns top-down conscious control into bottom-up automatic or unconscious control by the situational cues specified in the if-component of an if-then implementation intention.

Completed goals turn off regardless of the individual's best interests. It has been argued here that the operation of the active goal is autonomous from the interests and values of the individual person or agentic self. Another class of motivational phenomena consistent with this hypothesis is the "goal turn-off effect": once a goal pursuit attempt is completed, the goal de-activates (e.g., Atkinson & Birch, 1970; Lewin, 1926) and then inhibits the

mental representations used to attain the goal (Foerster et al., 2005; Liberman et al., 2007). In the case of unconscious goal pursuit, it is clear that the deactivation of the goal must occur independently of conscious intention and awareness (because the individual was not even aware the goal was active in the first place). Thus, several studies have found that once a unconscious goal is satisfied, its influence on cognition and behavior disappears (e.g., Kawada et al., 2004).

The same goal turn-off effect occurs for conscious goals as well -- even for positively valued, prosocial goals such as helping another person (Bargh et al., 2007, Study 3). The goal turn-off effect is part of the autonomous operation of the active goal, and not under the individual's (or self's) awareness and control; this can be seen most clearly in studies where an unequivocally positive goal deactivates after fulfillment, actually inhibiting the individual from continuing to behave in this positive fashion! A dramatic example of this phenomenon is found in recent research on "moral credentials".

Monin and Miller (2001) found that participants who were given the opportunity to disagree with blatantly sexist comments (thus fulfilling their goal to be egalitarian and non-sexist) were later more willing (compared to a control condition) to recommend a man for a stereotypically male job. According to the authors, after participants had been allowed to establish their moral credentials in the first part of the experiment, they stopped pursuing this goal in a subsequent part. Thus, after the egalitarian goal was fulfilled, it shut off, leaving its "host" individual vulnerable to behaving in a manner contrary to his or her egalitarian values.

The "Macbeth effect" (Zhong & Liljenquist, 2006) provides another illustration of the goal-completion effect running against the individual's presumed values and behavioral intentions. In this study, participants were induced to consider performing some unethical

behaviors, and were then given a choice among several small gifts for taking part in the study. Compared to a control condition, these participants were more likely to an antiseptic tissue-wipe than other gifts. Most importantly, those who were given an opportunity to wash their hands after contemplating the unethical behavior subsequently were less likely to help a stranger. Considering an unethical act thus triggered the participants' goal to cleanse themselves in any way possible (i.e., morally or physically), and satisfying that goal by washing of the hands (physical cleansing) turned off the goal and made it less likely they would engage in ethical behavior (moral cleansing).

When morally threatened participants washed their hands, the selfish goal was fulfilled—and therefore no longer on the lookout for opportunities to restore its host's moral self. Consequently, morally-restored participants were more likely to decline helping a person in need. Once again, as with the moral-credentialing effect, the effect of completion of the cleansing goal runs counter to the presumed conscious intentions of the individual. As one of the Macbeth-effect study's authors asked rhetorically in an on-line interview, "Do you really want your past sins to be easily washed away, which discourages you from engaging in ethical behaviors to help others?" (Hirshon, 2006).

In the Bargh et al. (2008) Study 3, in which the conscious goal to help one's experimental-task partner carried over to helping strangers who interrupted the experiment, a condition was included in which the conscious helping goal was completed prior to any further requests for help. Because it had been completed, the helping goal 'turned off' and so in this condition the participant no longer tended to help those who asked for it. Completing the pursuit of the helping goal caused the individual to subsequently become less likely to

help others in need – less prosocial and altruistic -- a tendency running against the likely self-concepts of the participants that they are helpful to those in need.

Summary

Traditional models of motivation in which a conscious, agentic self is posited to be the ultimate controller of individual human behavior must face up to accumulating evidence to the contrary. For one thing, conscious intentions and awareness are not necessary to put motives and goals into operation, nor to guide them to completion. For another, once activated these goals operate to produce the same outcomes, and with the same signature set of phenomenal qualities as when consciously pursued. Thirdly, all goals, whether consciously or unconsciously pursued, operate autonomously from control by the individual person or ‘self’ – they operate on all relevant information in the environment, even on target people or events for which their operation is unintended by the individual and might produce unwanted consequences for him or her. As part of their operation, they turn off after completion even if this causes the individual to be less likely during that time to act in line with his or her important (e.g., prosocial, egalitarian) self-values.

The evidence thus points to the existence of unconscious motivational structures that guided human behavior prior to the development of conscious psychological processes (Bargh & Morsella, 2008; Huang & Bargh, 2009). The striking similarities observed in the outcomes and qualities of unconscious versus conscious goal pursuit suggests that the later-developing conscious route to goal pursuit made use of pre-existing unconscious motivational processes and structures. Moreover, this approach to human motivation in which unconscious, not conscious processes are given primacy of place fits well with the

long-term perspective of evolutionary biology, in which unconscious processes capably and adaptively drive the behavior of all living organisms (e.g., Mayr, 1976).

The other important themes emerging from the research on unconscious motivation are the autonomy of active goal operation and the power of the active goal to transform cognitive and affective processes – even habitual and automatic ones – in the furtherance of the goal pursuit. Autonomy of operation appears to be yet another feature of goal pursuit that characterizes both conscious and unconscious goal pursuit: active goals operate independently to pursue their own agendas, and thus can produce outcomes that are unintended and even unwanted at the level of the individual person (hence the “selfish goal”; Huang & Bargh, 2009). Moreover, while in operation the goal has great power over other psychological systems such as evaluation and perceptual interpretation, driving the outcomes of these processes towards those helpful to the goal pursuit; this power appears to be so strong that otherwise automatic (immediate, efficient) effects (e.g., stereotype activation) can be prevented from occurring, and normally non-automatic effects made to operate automatically.

We stress that the notion of the ‘selfish goal’ should in no way imply selfishness at the level of the individual person, mainly because the individual or “self” is comprised of many goals – self-interested ones to be sure, but also prosocial and morally principled ones as well (e.g., Mansbridge, 1990; Miller, 1999). Prosocial goals such as cooperation, helping, and putting the welfare of others over one’s own have been shown to operate entirely automatically and unconsciously, testifying to their innate or well-practiced nature (see Bargh et al., 2001, Study 2; Chen et al., 2002; Tomasello et al., 2005). Because selfishness means putting one’s own welfare and needs above those of other people (Elster, 1990;

Jencks, 1990), unconsciously operating goals for cooperation and for ensuring the welfare of another person (see Clark & Mills, 1993) show that “selfish” goals (in terms of their single-minded pursuit of their own agendas) do not necessarily produce “selfish” individuals (in terms of pursuing outcomes that benefit others more than oneself).

That goals can be ‘selfish’ without making their host individuals behave selfishly is a nice thought on which to end this section, because it shows yet again that it is the active goal which is the unit of autonomous behavior control, not the individual human being (or “self”) – just as Dawkins and others had shown earlier that the gene is the unit of natural selection, not the individual organism. The active goal pursues its agenda regardless of whether this fits the agenda of its individual host, just as selfish genes pursue their own propagation whether or not this is good for their host organisms.

Conclusions

These are halcyon days for the scientific study of human motivation. Research under the traditional model, in which the individual consciously sets goals to attain, commits to and then strives for them, is flourishing. Important advances have been made in our knowledge of effective ways to set goals, such as *mental contrasting*, in which the individual’s present circumstances (e.g., obesity) are contrasted with a future state (e.g., a healthy, trim physique) that the person desires to attain. Goal-striving research has focused on effective ways to overcome problems such as getting started; here *implementation intentions* in which the individual forms a concrete “if-then” plan to carry out the desired action have been shown quite effective. Other threats to successful goal striving have received research attention as well, such as knowing when to disengage from a fruitless goal pursuit, ego depletion effects

(self-control as a limited resource), and overcoming short-term temptations for the greater long-term good.

This ongoing research on conscious goal pursuit has been complemented by an increasing focus on the *unconscious* mode of goal pursuit, in which goal representations become activated automatically by relevant environmental stimuli and then operate, without conscious guidance or awareness, over extended time periods to guide cognition, affect, and behavior towards the desired end-state. This research has led to the conclusion, in line with dominant models in evolutionary biology, that unconscious motivational structures existed prior to the emergence, over evolutionary time periods, of conscious forms of thought and information processing, so that the conscious mode of goal pursuit likely makes use of those pre-existing processes and structures. This is shown by the high degree of similarity recent research has found between conscious and unconscious modes of goal pursuit in the outcomes they produce, the phenomenal or experiential qualities associated with the goal pursuit, as well as the brain regions supporting them.

Taken together, the two lines of research have advanced our knowledge of human motivation not only by revealing a unifying single (or at least, highly similar) mechanism underlying both conscious and unconscious goal pursuit, but by pointing to what is perhaps the key functional difference between conscious and unconscious thought. For it is clear from the different focus and agendas of the research on conscious versus unconscious motivation that the former has been concerned mainly with *planning* – the creation, establishment, and maintenance of new set goals, with topics such as how new goals are chosen, how one becomes committed to them, and how one overcomes obstacles and difficulties in their way. The research on unconscious goal pursuit, on the other hand, has

focused on already-existing goal representations and how they are capable of operating outside of conscious knowledge and guidance.

Planning, after all, still seems to be a uniquely human activity – some have argued that it is *the* ability that distinguishes us from all other species, including our closest primate neighbors (e.g., Byrne & Bates, 2007; among other candidates being actively debated at present are theory of mind capabilities and an innate cooperation motive; see Tomasello et al., 2005). Such mental time travel appears to be the special domain of conscious thought, giving us the ability to escape or transcend our immediate present circumstances by planning for the future or remembering the past (Bargh, 1997). Unconscious processes make this time travel possible by keeping the individual adaptively in touch with the present, “minding the store” while consciousness is away (Bargh, 1997) through the various unconscious behavioral guidance systems discovered by social cognition research over the past quarter century.

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