

Implicit motivation: Past, present, and future

Melissa J. Ferguson
Cornell University

Ran Hassin
The Hebrew University

John A. Bargh
Yale University

Chapter to appear in J. Shah and W. Gardner (Eds.), Handbook of motivation science. NY: Guilford

Authors' note: Preparation of this chapter was supported in part by NIMH grant R03-MH067877 to Ferguson, Israeli Science Foundation grant 846/03 to Hassin, and NIMH grant R01-MH60707 to Bargh.

Implicit motivation: Past, present, and future

Why do people behave as they do? Although scholars across a wide array of disciplines and schools of thought have wrestled with this fundamental question from many perspectives, the lion's share of research in social psychology concerning this topic historically and contemporarily centers on a person's conscious and reportable experiences of intention and motivation. Specifically, much of this work examines the characteristics of a person's conscious intention to achieve various goals, and the relationship between those characteristics and the actual ways in which the person pursues those goals (e.g., Bandura, 1986; Carver & Scheier, 1998; Deci & Ryan, 1985; Gollwitzer, 1990; Locke & Latham, 1990; see also Mischel, Cantor, & Feldman, 1996 for a review). In particular, this research addresses the development, content, organization, and operation of people's conscious goals, and the influence of such goals on people's (conscious) judgments, feelings, plans, and behaviors.

Some of the research on motivation over the last two decades, however, has diverged from this tradition and can perhaps be termed *Implicit Motivation* in that much of it focuses on how goals operate in implicit or nonconscious ways. The scope of this area of research is broad - it does not focus exclusively on whether goals can be activated nonconsciously, for instance, but rather on the complex ways in which both consciously and nonconsciously instigated goals operate based on a variety of implicit mechanisms (e.g., Aarts & Dijksterhuis, 2000; Aarts, Gollwitzer, & Hassin, 2001; Bargh, 1990; Bargh, Gollwitzer, Lee-Chai, Barndollar, & Troetschel, 2001; Chartrand & Bargh, 1996; Bargh & Ferguson, 2000; Custers & Aarts, 2006; Ferguson, in press-a; Ferguson & Bargh, 2004; Fishbach & Ferguson, in press; Fishbach, Friedman, & Kruglanski, 2003; Fitzsimons & Bargh, 2003; Glaser & Banaji, 1999; Glaser & Kihlstrom, in press; Hassin, 2005, in press; Hassin, Aarts, Eitam, Kleiman, & Custers, in press;

Hassin, Bargh, & Uleman, 2005; Kruglanski, 1996; Moskowitz, 2003; Shah, 2002, 2003; Shah & Kruglanski, 2002; 2003; Shah, Kruglanski, & Friedman, 2002).

This relatively new area of motivation science reflects the influence of two major research trends within the field of social psychology over the last quarter of the century, and provides a somewhat different framework within which motivation can be studied, compared to the traditional reliance on reportable wants, needs, and urges. One trend is the increasingly adopted social cognitive approach to theory and methodology concerning classic social psychological phenomena (e.g., Abelson, 1994; Devine, Hamilton, & Ostrom, 1994; Fiske, 1992; Fiske & Taylor, 1984, 1991; Isen & Hasthoff, 1982; Jones, 1998; Kunda, 1999; Sherman, Judd, & Park, 1989; Wegner & Bargh, 1998; Zajonc, 1980a), and the other trend is the growing interest in the analysis of behavior according to conscious versus nonconscious processes (e.g., e.g., Bargh & Ferguson, 2000; Greenwald & Banaji, 1995; Hassin, Bargh, & Uleman, 2005). Although one trend represents an approach to research while the other reflects the popularity of a research question, we argue that they have each influenced the study of motivation over the last two decades, and ultimately stimulated the new area of implicit motivation.

In this chapter, we briefly review the research and theory that exemplify the influence of these two trends on the area of motivation, and then present recent findings in implicit motivation science research. The first group of new findings concerns the qualities that potentially differentiate between consciously versus nonconsciously activated and pursued goals (Hassin & Bargh, 2004). In particular, this work suggests that *flexibility* – one of the widely assumed hallmarks of conscious goal pursuit (Ajzen, 1991; Bandura, 1986; Deci & Ryan, 1985; Locke & Latham, 1990) – also characterizes nonconscious goal pursuit. These findings are thus in harmony with the notion that goal pursuit operates in the same way regardless of whether the

goal is activated with or without conscious intent (see Bargh et al., 2001; Lewin, 1929). This research also challenges traditional conceptions concerning the function of consciousness in goal choice and pursuit by demonstrating that flexibility is not uniquely conscious.

The second area of recent research addresses the implicit ways in which motivation might operate. Specifically, much research now suggests that a perceiver's current (either conscious or nonconscious) motivational concerns implicitly influence the accessibility in memory of goal-relevant knowledge, and that such changes in accessibility impact the effectiveness of the perceiver's goal pursuit (e.g., Aarts, Dijksterhuis, & DeVries, 2001; Fishbach et al., 2003; Moskowitz, 2002; Shah et al., 2002). The greater accessibility of goal-relevant knowledge is certainly functional in that it helps the perceiver to notice and recognize goal-relevant objects in the environment. Moreover, there is additional recent evidence suggesting that the functionality of implicit goal pursuit might extend to the way in which goal-relevant knowledge is appraised or evaluated (Ferguson, in press-a; Ferguson & Bargh, 2004).

Together, these new lines of work take the idea of implicit motivation one step further by suggesting that it is inherently functional and adaptive. Firstly, we argue that the system(s) involved in motivation allow people to automatically adapt their goal pursuit to changing external environments and the associated relevant demands and constraints. Secondly, these systems also allow people to automatically adapt evaluations to their goals; that is, automatic evaluations are sensitive to and contingent on people's *internal* environments (i.e., what one wants or is trying to do at the moment). This work reflects a theme that has emerged in recent research on implicit social cognition in general. Namely, these findings highlight a growing interest in the field of social cognition in the functional and adaptive nature of automatic processes (e.g., see Bargh, 1997; Greewald & Banaji, 1995; Moskowitz, 2004).

We turn now to a brief review of the influence of social cognition and automaticity on motivation research and then proceed to a description of the aforementioned new findings related to implicit motivation. We discuss in the section on recent findings various directions for future research in this area, some of which are comprehensively addressed in chapters in the current volume.

Motivation and the social cognitive perspective

The social cognitive approach to understanding human social behavior developed in the 1970s and consists chiefly of applying methods from cognitive psychology to the study of the perceptual and cognitive mechanisms underlying traditional social psychological phenomena, such as impression formation, the attitude-behavior relation, and the self (e.g., Abelson, 1994; Devine et al., 1994; Fiske, 1992; Fiske & Taylor, 1984, 1991; Isen & Hastorf, 1982; Jones, 1998; Kunda, 1999; Moskowitz, 2004; Sherman et al., 1989; Zajonc & Markus, 1985). Yet social psychology had been cognitive in its approach to many phenomena long before the emergence of the field of social cognition (see Zajonc, 1980b), such as in the early study of internal attitudes and beliefs (e.g., Thurstone, 1930), the role of motivation and values in perceptual processes (Allport, 1955; Greenwald, 1992), and Festinger's (1957) theory of cognitive dissonance. Instead, the difference between the social cognitive approach and traditional social psychology is one of the *degree* of attention to cognitive processes and mechanisms.

Motivational variables have been included in social cognitive analyses of phenomena, mainly as moderators of basic cognitive effects. For example, researchers have asserted that different levels and types of motivation influence how a person processes information. Much research suggests that people's goals influence the elements of a situation to which a person pays attention, and how he or she then processes information about those elements (e.g., Anderson &

Pichert, 1978; Cacioppo, Petty, Kao, & Rodriguez, 1986; Chaiken, Liberman, & Eagly, 1989; Fiske, 1992; Kruglanski, 1989; Srull & Wyer, 1986). A perceiver who is motivated to be accurate, for instance, might spend more time and effort in understanding a persuasive appeal than someone who is less motivated (e.g., Chen & Chaiken, 1999).

Most recently, researchers have focused on the cognitive nature of motivational phenomena – that is, the specific ways in which goals might be represented in memory and operate according to the standard characteristics of information-processing (e.g., Aarts & Dijksterhuis, 2000; Aarts et al., 2001; Bargh, 1990; Bargh, Gollwitzer, Lee-Chai, Barndollar, & Troetschel, 2001; Fishbach & Ferguson, in press; Hassin, in press; Baumeister & Vohs, 2004; Higgins, 1997, 1998; Kruglanski, 1996; Liberman & Trope, 1996; Trope & Ferguson, 2000; Moskowitz, 2002; Fishbach et al. 2003; Goschke & Kuhl, 1993; Shah et al., 2002; Shah & Kruglanski, 2002, 2003). This social-cognitive approach to the nature of motivational influences is evidenced by the attention devoted to the ways in which goals are structured in memory, and whether they operate according to principles such as the accessibility of knowledge (e.g., Bruner, 1957; Forster, Liberman, & Higgins, 2005; Higgins, 1996; Liberman, Forster, & Higgins, 2005).

Higgins and colleagues, for example, have demonstrated how basic motivational orientations and strategies are associated with certain patterns of knowledge accessibility (Higgins, 1987, 1997, 1998). For instance, for people who most often compare their current selves with their ideal selves, information about this discrepancy might be chronically more accessible in memory compared with information concerning a discrepancy with their ought selves. And, importantly, the accessibility of the discrepancy can predict a range of emotional and behavioral outcomes. The more an ideal-actual discrepancy is accessible, for example, the more that person is likely to focus on the presence or absence of positive versus negative things,

and the more that person is likely to experience emotions such as sadness rather than anxiety. The work by Higgins and colleagues more generally shows how the nature of chronically accessible information will likely guide not only the type of goals that people choose, but also the way that they pursue those goals (e.g., promotion versus prevention self-regulatory focus) and the emotional consequences of those pursuits (see also Higgins, Shah, & Friedman, 1997). This research exemplifies the social cognitive approach through its emphasis on the mediational role played by the structure and operation of relevant information in memory.

As another example, researchers have studied how the particular ways in which goals are represented in memory might influence the individual's goal pursuit (Kruglanski, 1996; Shah et al., 2002). Kruglanski and his colleagues have argued that research on how goals are represented and operate in memory can advance an understanding of mechanisms of goal pursuit and self-regulation more generally (e.g., Kruglanski, 1996). In their *goal systems theory*, they conceptualize goals as networks of cognitive associations (Shah et al., 2002). Although from this perspective goals are conceptualized as cognitive knowledge structures in memory, they are nevertheless thought to be distinct in certain ways from other cognitive structures. For example, the activation of goal structures involves affective consequences that are not necessarily implicated in non-goal structures (see Fishbach & Ferguson, in press; Shah et al. 2002).

These examples illustrate the increased attention that motivation researchers have devoted to the representational structure and format of goal knowledge, as well as to the cognitive-based mechanisms underlying phenomena of interest more generally. This research represents a shift in emphasis within motivation research and is thus an important forerunner of the contemporary work on the operation of implicit motivations.

Motivation and automaticity research

The second trend that has influenced the study of motivation concerns the nonconscious nature of many of the processes underlying higher-order cognitive processes, affect, decision-making, and behavior. Since the 1970s, researchers in both cognitive (e.g., Neely, 1976; Neisser, 1967; Posner & Snyder, 1975; Shiffrin & Schneider, 1977) and social (e.g., Bargh & Ferguson, 2000; Greenwald & Banaji, 1995; Hassin, Uleman, & Bargh, 2005) psychology have demonstrated how much of human psychological processing proceeds without the conscious guidance and intention once assumed to be necessary elements. In line with this trend, in the past decade researchers have systematically examined whether goals and motivation also similarly involve automatic processes. These studies have revealed that goals can indeed be activated nonconsciously, and can then operate without conscious choice or guidance (e.g., Aarts & Dijksterhuis, 2000; Aarts et al., in press; Bargh, 1990; Bargh & Gollwitzer, 1994; Bargh et al., 2001; Chartrand & Bargh, 1996, 2003; Fishbach et al., 2003; Fitzsimons & Bargh, 2003; Glaser & Kihlstrom, in press; Gollwitzer, Bayer, & McCulloch, in press; Hassin, 2005; Hassin et al., in press; Shah, 2002, 2003).

The first empirical paper to address this possibility was by Chartrand and Bargh (1996). In this paper, the authors replicated two classic studies in social cognition concerning the influence of conscious goals on the organization in memory of information about persons. Chartrand and Bargh tested whether the same effects would emerge even if the goals were covertly activated and then operated without participants' awareness. In particular, they sought to demonstrate that the goal to understand another person's behaviors can be nonconsciously activated from simply reading related words such as *interpret*, *judge*, and *impression* in the context of an ostensible test of verbal ability. Both of the earlier studies were in fact replicated, demonstrating for the first time that goals can be invoked nonconsciously and influence how

people interpret and organize information about other people, just as when they are pursued consciously.

Since then, researchers have demonstrated how goals activated without a person's conscious intention or choice can then influence how the person behaves in social situations (Aarts & Dijksterhuis, 2000; Bargh et al., 2001; Fitzsimons & Bargh, 2003). For instance, Bargh et al. (2001) demonstrated that a nonconsciously activated achievement goal caused experimental participants to work longer and harder on the assigned word puzzles; in fact, the majority of the goal-primed participants continued working on the puzzles even after they were supposed to stop, illustrating their concern with achieving the highest score possible on the puzzles.

That people can pursue goals and objectives without constant conscious monitoring and guidance makes sense from an economy-of-effort standpoint (e.g., Bargh, 1990, 1994; Baumeister, Heatherton, & Tice, 1994; Fiske & Taylor, 1991; James, 1890; Kahneman, 1973). Assuming that people possess multiple goals and objectives within and across situations, the system(s) responsible for such pursuit would be severely strained if constant attention was required for their operation. Indeed, much research demonstrates the severe limitations of a person's conscious regulatory capacity, in that the ability to consciously and effortfully regulate one's behavior can be quickly and easily exhausted (e.g., Baumeister, 2000, 2001; Baumeister, Bratslavsky, Muraven, & Tice, 1998; Muraven & Baumeister, 2000; Schmeichel, Vohs, & Baumeister, 2003). This research suggests the adaptive benefit of being able to negotiate the social environment according to important objectives in a relatively automatic fashion, without the necessity of conscious deliberation at every turn.

The work on the automatic activation and operation of goals is inherently in harmony with the social cognitive approach to studying motivation. Most of the above work is based on

the assumption that goals are represented in memory as structures that follow some (or all) of the same processing constraints as do stereotypes and attitudes, for example (see Bargh, 1990; Bargh et al., 2001). In addition, this research typically employs the types of priming methods that have become fixtures in social-cognitive research. However, these studies also suggest that a person's complex *sequence* or pattern of choices over time, rather than just single, static choices or movements, can be determined by an implicitly operating goal (Bargh et al., 2001). This area of research thus belongs squarely within the framework of implicit motivation science.

Recent advances in implicit motivation research

Researchers working on implicit motivation assume that once a goal has been repeatedly linked with a certain situation and with specific behaviors, the situation can itself activate the goal without the person's intention or awareness, and this activation can influence the perceiver's subsequent choices and actions (e.g., Bargh, 1990). Recent research suggests that the interaction of that activated knowledge with the dynamic, unfolding situation is more adaptive and flexible than previously suspected.

1. Flexibility and Goal Pursuit

As argued above, goal choice and pursuit are traditionally considered to be conscious, intentional, and effortful activities – that is, controlled processes. One of the main virtues of controlled processes is their ability to adapt to novel and changing circumstance. Such flexibility is crucial for successful goal pursuit. In adopting a goal one fixes a future end-state towards which she strives. If the means one usually uses to achieve similar goals are available, then goal pursuit can proceed rigidly or habitually. Flexibility becomes advantageous when new means, which happen to be more efficient than those that one usually uses, become available. It becomes a necessary condition for goal achievement when one's habitual means are either unavailable or

they stop working: Without flexibility the road to goal achievement is simply blocked in these cases. Because our physical and social environments frequently change, and with them the appropriateness and effectiveness of means, flexibility seems to be highly important for successful goal pursuit.

Previous research has shown that nonconscious goal pursuit produces the same outcomes as does conscious goal pursuit (Chartrand & Bargh, 2002). Moreover, the two modes of goal pursuit also possess similar qualities or operating characteristics, such as tenacity in the face of obstacles and persistence over time (e.g., Bargh et al., 2001). In the studies reported in this section of the chapter, we examine whether automatic goal pursuit is similar to controlled goal pursuit in another important respect – i.e., in the capacity to be flexible when faced with changes in the current situation.

At the outset there would seem to be two alternatives. One is that controlled goal pursuit is flexible, but automatic goal pursuit is not: it is rigid. This hypothesis is reminiscent of many dual process models in social psychology that suggest and find consistent differences between these two modes of operation (see Chaiken & Trope, 1999). The competing hypothesis is that both controlled and automatic goal pursuit are (potentially) flexible. This option would represent a rather marked shift in thinking as automatic processes have long been characterized as inflexible (e.g., Logan, 1988; Schneider, Dumais, & Shiffrin, 1984; Robinson, 1996; Wegner & Bargh, 1998; but see Stapel & Blanton, 2004).

Yet it is this latter alternative that seems the more plausible from an economy of mental resources point of view. We assume that goal pursuit, in its various forms and levels, is ubiquitous in our lives. Given that mental resources to conduct effortful controlled processes are quite limited (e.g., Bargh, 1994; Baumeister, Heatherton, & Tice, 1994; Kahneman, 1973), it

seems reasonable to assume that a considerable proportion of our daily goal pursuits operate automatically. But if automatic goal pursuit is handicapped by rigidity, then goals that are automatically pursued should frequently fail. And this obviously would not be a very adaptive arrangement.

We do not suggest that automatic goal pursuit should always lead to enhanced flexibility. Rather, the flexibility of an automatic goal should manifest itself when (a) flexibility is a means of attaining that goal or (b) flexibility itself *is* the goal. In the following section, we describe the results of studies that examined the flexibility of automatic goal pursuit under these two conditions (Hassin, 2005; Hassin & Bargh, 2004).

Examining Automatic Flexibility Before we go on to describe the studies, a definitional note is in place. The concept of flexibility is complex, and the term has been used to refer to a family of related phenomena. For the current purposes, we adopted the definition of the Oxford English Dictionary, according to which flexibility is the “capacity for ready adaptation to various purposes or conditions.”

The Wisconsin Card Sorting Test. The first three studies use the Wisconsin Card Sorting Test (WCST) to measure flexibility. The WCST was originally developed to assess abstract reasoning and the ability to shift cognitive strategies in response to changing environmental contingencies (Berg, 1948; Heaton, Chelune, Talley, Kay, & Curtiss, 1993 p. 1). It consists of four response cards and 128 stimulus cards that depict figures of varying colors (red, blue, yellow or green), forms (stars, triangles, circles or crosses) and numbers (one, two, three or four). In the computerized version of the WCST, four response cards – one red triangle, two green stars, three yellow crosses and four blue circles – appear at the bottom of the computer screen. Participants see one stimulus card at a time, and their task is to match the stimulus card with one

of the response cards. The sorting rules refer to color, form or number, and are controlled by the software. Participants are given feedback about the accuracy of each sorting (“right” vs. “wrong”), but never about the sorting rule. After 10 consecutive correct sortings the rule is changed without prior warning, requiring the participants to use the negative feedback to realize that the sorting rule has changed and that a new rule should be found. In the version we used, the test continues until participants finish sorting all 128 cards.

There are a number of subscores of the WCST that will be discussed here. First, overall correct is defined as the number of correctly sorted cards. Errors can be of two kinds. When a participant persists sorting according to a rule that is no longer valid her errors are scored as perseverative errors (there are a number of criteria for perseverance, see Heaton et al., 1993). These errors constitute a widely accepted measure of flexibility (e.g., Miyake, Friedman, Emerson, Witzki, & Howerter, 2000): The more we persevere using a strategy that is no longer working, the less flexible we are. Finally, errors that do not match the perseverated-to principle are called non-perseverative errors.

The WCST is particularly suitable for examining mental flexibility for a few reasons. First, because one of the motivations for its development was to assess flexibility in thinking, it captures the essence of flexible adaptation to changing environments (e.g., Berg, 1948; Demakis, 2003). The logic is simple: Physical and social environments suggest behavioral rules that, if followed, lead to (better) survival. Changes in environments often entail changes in these rules, and at the essence of (better) survival stands rapid adaptation to these new rules. As the description above makes clear, the structure of the WCST reflects this logic: The rules that govern sorting change without a prior warning, and participants need to look for a new rule and follow it, without recourse to the previous rule.

Second, a recent latent-variable analysis concluded that “[T]he results from the perseveration measure [of the WCST]... support the conclusion that the Shifting ability is a crucial component of perseverative errors in the WCST” (Miyake et al., 2000, p. 75). As the ability to shift (strategies, attention, rules, approaches, tasks, etc.) is an important component of flexibility, these results suggest that flexibility is a crucial factor underlying successful performance in the WCST.

Automatic goal pursuit and the WCST. All of the studies described below used goal priming to look at flexibility of automatic goal pursuit. The priming manipulation was carried out in what was allegedly a first experiment, in which participants were asked to complete a word-search puzzle. In each of the two forms of the puzzle, a 10x10 matrix of letters was presented, below which was a list of 13 words that were embedded in the matrix. Each list contained the same set of six neutral words to be found, with the remaining seven words relevant (or not) to the concept of high performance. After they had completed the word-search tasks participants were asked to do the WCST, and they were then thoroughly debriefed. All of the results reported herein are from subjects who did not show any signs of awareness of being primed.

We hypothesized that primed subjects who, *ex hypothesis*, automatically pursue an achievement goal should do better on the WCST. Furthermore, since flexibility is a mean for good performance of the WCST, we hypothesized that primed subjects should be more flexible than control subjects. In the context of the WCST enhanced flexibility means that priming should result in fewer perseverative errors.

The results of the first study supported both hypotheses. Replicating previous findings regarding the behavioral results of automatic achievement pursuit, primed participants correctly

sorted significantly more cards than did non-primed participants. Crucially, primed participants also made fewer perseverative errors than did control participants. That is, primed participants were more flexible than non-primed participants.

In order to provide a replication of these results a second study was run, to which two new DVs of awareness were added. The first was a simple measure of goal commitment – “how important was it for you to succeed in this task” – that was accompanied by a 9-point scale that ranged from “not at all” to “very important.” Another question asked participants “what do you think one should do in order to succeed in this task.” If priming enhances the conscious importance of flexibility, or conscious intentions to be flexible, then participants’ responses on these new measures should reflect it.

The results of the second study replicated those of the first: Primed participants scored higher than did control participants and they were also more flexible (i.e., they made fewer perseverative errors). Notably, the goal commitment ratings of participants in the two conditions did not differ significantly from each other, and there were also no differences in the responses to the second question described above.

The first two studies show that automatic goal priming may lead to better adaptation to one’s surroundings. However, these studies enhanced flexibility indirectly, by priming the achievement goal. In the third study we sought to increase flexibility directly, by priming the goal of being flexible. This study was identical in design to the first two studies, except that the experimental version of the word-search task primed flexibility instead of achievement (using concepts such as flexible, elastic change, (to) adapt, and (to become) accustomed)¹. In addition, we again measured participants’ commitment to the goal of being flexible.

The results showed that the two conditions significantly differed in terms of their perseverative errors, with the primed group making fewer errors.. The two groups did not significantly differ in terms of their overall success, although the means suggest that primed participants fared better than controls. Importantly, the two groups did not differ in terms of their reported commitment to the goal of being flexible.

Flexibility as open-mindedness. The next study employed a different measure of flexibility. In this study we presented participants with a scenario, in which the protagonist, who served as a senior secretary to a CEO, got up in the middle of an important meeting and left the room. Embedded in the scenario were cues that could be used to form an explanation of this behavior. Thus, for example, the text subtly suggested that the secretary might have been romantically involved with one of the colleagues in the meeting; that it was getting too late for her; that her child was waiting in the other room, etc. Participants had been either primed with a flexibility goal or not, and were then asked to read the story and answer questions regarding the secretary's behavior. Specifically, participants were asked to assess, on a 9-point scale, "how likely it is that the secretary left the room because of X", where X stands for a possible reason for her behavior (e.g., "how likely it is that the secretary left the room because her child was waiting in the other room"). Participants were asked eight such questions.

This study extends the research in two ways. First, it examined a different aspect of flexibility, in a task that differs from those used in the previous studies. Second, it examined flexibility in a situation where no explicit feedback was available.

Flexibility may be manifested here in the degree of acceptance of the different reasons. That is, the more flexible and open-minded a person is, the more she should be willing to accept

multiple reasons for a behavior. And conversely, the more rigid and one-track-minded a person is, the less she should be willing to accept different causes.

The results corroborated our hypothesis. The two groups showed identical levels of reported commitment to the goal of being flexible and open-minded. Nevertheless, primed subjects were more willing than control subjects to accept numerous reasons for the secretary's behavior. That is, primed subjects were significantly more flexible than control subjects.

From flexibility to sensitivity. Recall that according to our definition flexibility is the “capacity for ready adaptation to various purposes or conditions.” In order for adaptation to take place, though, one has to know what to *adapt to*. That is, one has to know (understand, grasp) the state of the world at time t_1 , and sense the changes that occur thereafter. In its widest sense, then, flexibility is inherently interwoven with learning in general, and learning the structure of our environment in particular. The WCST studies suggest that automatically pursued goals make us more responsive to changes in the environment. However, these studies do not speak to the issue of sensitivity to the structure of the environment.

Recently we began to address this issue by examining the effects of automatically pursued goals on implicit learning (Eitam, Hassin, & Schul, 2004). If automatically pursued goals do indeed increase sensitivity to relevant structures in the environment then, *ceteris paribus*, goal-primed subjects should be better at implicit learning than are control subjects (to the extent that learning serves the pursued goals). To test this hypothesis we used an implicit learning paradigm developed by Berry and Broadbent (e.g., 1984, 1988). In this task participants are asked to control the production of a sugar factory, and to keep it at a certain level (e.g., 9,000 tons a month). In each trial, participants are required to enter the size of the workforce they choose (ranging from 1,000-12,000), and they then receive the resulting production.

Unbeknownst to them, there is a rule that relates their input and the factory's production, such that the production at the n -th trial is a function of the workforce (W_n), the production at the $(n-1)$ th trial, and random noise. Importantly, this rule comes from a class of systems described in engineering science as requiring adaptive control (Berry & Broadbent, 1984, p. 211). Despite behavioral evidence that shows that participants learn these rules, they are typically unaware of having learned anything (e.g., Berry & Broadbent, 1984, 1988).

In one experiment (Eitam et al., 2004, experiment 1), we gave participants the sugar factory task either after having been primed with a performance goal, or following a control word-search task. The results supported our hypothesis: Primed participants implicitly learned the production rule faster, and reached higher levels of performance at the end of the experiment (after two blocks of 30 trials). Importantly, there were no differences in their explicit knowledge of the rules or in their goal commitment.

Summary We began this section in a presentation of two competing hypotheses. One was in line with the traditional view of automaticity: Automatic processes are inflexible and rigid. The second hypothesis, derived from the principle of economy of mental resources, suggests that automatic goal pursuit should be flexible. Evidence from five studies, involving three different paradigms, favored the latter view: Automatic goal pursuit can enhance sensitivity to relevant aspects of the environment, and it can enhance cognitive and behavioral flexibility of related processes.

These results draw automatic and controlled goal pursuit a little closer. Specifically, they show that one of the central characteristics of controlled goal pursuit, flexibility, may also describe automatic goal pursuit. And these, we suggest, are good news: If they were not flexible, automatic goal pursuits would frequently fail, and thus so would we.

2. Automatic Evaluative Processes and Goal Pursuit

Beyond the findings on nonconscious goal activation and pursuit, researchers have also been exploring the low level, implicit ways in which even conscious goals might operate. Various findings suggest that the activation of a goal in memory, whether by conscious or nonconscious means, implicitly influences how the person sees and acts in the world. Moreover, these effects have been characterized as functional in that they seem to foster the success of the person's goal pursuit. We review below some recent research demonstrating such implicit effects.

Goals render goal-helpful knowledge more accessible. There is a long history in psychology of theorists asserting a fundamental relationship between a perceiver's motivational priorities and the accessibility of memories relevant to those priorities (e.g., e.g., Ach, 1935; Bargh 1990; Bruner, 1957; Gollwitzer, 1996; Jones & Thibaut, 1958; Klinger, 1996; Kruglanski, 1996; Kuhl, 1983; Lewin, 1926; McClelland & Atkinson, 1948). Bruner (1957), for instance, argued that one determinant of heightened accessibility of particular memories is the relevance of those memories to what the perceiver is trying to do at the moment. His argument was that the relationship between knowledge accessibility and goal pursuit is *functional* in that the perceiver whose attention is directed at goal-helpful objects as a consequence of that heightened accessibility should be more likely to attain the goal.

Research in social cognition over the last five years has provided strong empirical support for this theoretical connection between motivational states and knowledge accessibility (e.g., Aarts & Dijksterhuis, 2000; Aarts, Dijksterhuis, & DeVries, 2001; Ferguson & Bargh, 2004; Fishbach & Ferguson, in press; Fishbach et al., 2003; Forster et al., 2005; Liberman et al., 2005; Moskowitz, 2002; Shah et al., 2002; Sherman et al., 2003). Specifically, these findings

suggest that knowledge concerning objects that are relevant for a currently active goal becomes more accessible in memory (Moskowitz, 2002), which in turn can make the perceiver more likely to notice goal-helpful objects in the environment (Aarts et al., 2001).

For example, Aarts et al. (2001) found that participants who were induced into a thirsty state responded significantly faster to words related to beverages (e.g., water) as well as drinking objects (e.g., bottle), compared with those who were not thirsty. This effect suggests that knowledge related to objects that could satisfy thirst was more accessible in memory for thirsty versus non-thirsty participants. In addition, Aarts et al. (2001) also found that thirsty participants were more likely to spontaneously recall drinking-related objects (e.g., soda can) in a room in which they had previously been waiting, compared to those who were not thirsty. This suggests that increased accessibility of goal-relevant knowledge leads to relatively more attention spontaneously directed toward goal-relevant objects in the environment, just as theories on knowledge accessibility and attention would predict (e.g., Higgins, 1996; Moskowitz, 2002).

This work establishes a clear link between what a perceiver is trying to do at the moment and the accessibility of knowledge in memory related to the perceiver's pragmatic concerns. As such, these findings are consistent with a long tradition of conceptualizing thinking as in the ultimate service of action (Bruner, 1957; Fiske, 1992; Glenberg, 1997; James, 1890; Lewin, 1935; Roskos-Ewoldsen & Fazio, 1992; Schwarz, 2002; Smith & Semin, in press). In other words, the current goals of a perceiver provide limitations and constraints on the types of knowledge that are accessible in memory, and this drives the perceiver's attention toward certain elements within the environment and away from others. Assuming that the heightened accessibility of goal-relevant objects makes the perceiver more likely to attend to those objects in the environment and thus approach them (or avoid them, depending on the goal), this research

suggests that the ability to effectively pursue a goal is facilitated by implicit changes in the accessibility of knowledge relevant to the goal.

Goals render goal-interfering knowledge more inhibited. Researchers have also demonstrated that during active goal pursuit knowledge concerning objects or activities that could disrupt the focal goal implicitly becomes more inhibited relative to when the goal is not active in memory (e.g., Fishbach et al., 2003; Liberman et al., 2005; Shah et al., 2002; Trope & Fishbach, 2000). Fishbach et al. (2003) for example showed that the perception of words related to academic achievement (e.g., graduate, grades) resulted in the immediate inhibition of knowledge related to tempting alternative, and less important, goals (e.g., watching TV, talking on the phone). Importantly, Fishbach et al. (2003) also demonstrated that the aforementioned effect emerged only for those who were successful in the goal domain of academic achievement, and not for those who were less successful. These results suggest that successful self-regulation relies in part on active goal states implicitly inhibiting alternative goals (see also Mischel, Shoda, & Rodriguez, 1989). In particular, the more tempting alternatives are inhibited in memory during a focal goal pursuit, the less likely the perceiver will be to stray from her or his focal goal trajectory.

These findings are also in accord with research in cognitive psychology in the area of prospective memory concerning the *intention superiority effect* (Goschke & Kuhl, 1993; Marsh, Hinks, & Bink, 1998; Marsh, Hicks, & Bryan, 1999). This work suggests that an intention to perform some action in the future enjoys a heightened state of activation in memory before it is performed, and once the intention has been carried out, it becomes inhibited in memory for a brief amount of time. Together, these findings highlight the ways in which motivation (e.g.,

goals states, intentions) implicitly influences the accessibility and inhibition of relevant knowledge in memory.

Goal effects on evaluative knowledge accessibility. Recent research has expanded on the above work by examining how goal states influence knowledge accessibility according to the *evaluative* characteristics of that knowledge (Ferguson & Bargh, 2004; Sherman et al., 2003). These findings suggest that active goal pursuit may not simply render more accessible all knowledge about goal-helpful objects; instead, goal states seem to influence the accessibility of knowledge in memory in a more selective manner. In particular, goal states seem to render *accessible* the evaluatively *positive* aspects of goal-helpful objects, and actively *inhibit* the evaluatively *negative* aspects of those same objects. In this way, goal pursuit automatically renders goal-helpful objects ***approach-friendly***.

For example, in the studies by Ferguson and Bargh (2004), the implicit accessibility of positively versus negatively valenced knowledge about objects was measured via a sequential affective priming paradigm (Fazio et al., 1986). In the traditional version of the paradigm, primes that represent various objects (e.g., *puppy*, *bugs*) are paired with positive and negative adjectives (e.g., *terrific*, *repulsive*) across many trials. Within a particular trial, the presentation of a prime is quickly followed by the presentation of an adjective, which participants are usually asked to classify as either positive or negative in meaning. The central dependent measure in this paradigm is the speed with which participants respond to the adjectives, as a function of the valence of the preceding prime. A substantial literature on evaluative priming has demonstrated that responses to the target adjectives are facilitated when the preceding primes are of congruent (vs. incongruent) valence (e.g., for reviews, see Fazio, 2001; Ferguson, in press-b; Musch & Klauer, 2003).

Importantly, given this well-established effect that positively valenced primes facilitate responses to positive target adjectives, and negatively valenced primes facilitate responses to negative target adjectives, it is possible to use this paradigm to measure participants' idiosyncratic automatic evaluation of a particular object (or set of objects). This can be done by examining whether the object facilitates responding to positive over negative adjectives, relative to a control comparison object or to a comparison group of other participants (e.g., Fazio et al., 1995; see Wittenbrink, in press). Such an evaluation is inherently relative, and can be based on either faster responses to positive adjectives in the goal versus control condition, or slower responses to negative adjectives in the goal versus control condition, or both. Either outcome would ostensibly make the object more likely to be approached for those in the goal condition.

This paradigm is regarded as implicit because participants are not asked to evaluate the prime objects (only the targets), and also show no awareness during debriefing that their evaluations have been measured (e.g., Bargh et al., 1992; Fazio et al., 1986; Greenwald & Banaji, 1995). The assumption that the evaluations measured by this paradigm are made automatically is also based on previous research (Neely, 1976, 1977) that suggests that the short time delay (300 milliseconds) between the presentation of the objects and the presentation of the adjectives is too brief to allow strategic, intentional processing to occur. This measure therefore allows an assessment of how goal states *unintentionally* influence the accessibility of evaluative information about objects, suggesting the low-level (i.e., not prompted by the perceiver's conscious intentions or strategic processing) operation of an evaluative self-regulatory mechanism.

In one experiment (Ferguson & Bargh, 2004), participants were induced into a thirsty or non-thirsty state. They then completed an evaluative priming paradigm in which some of the

primes represented objects or activities that were relevant to sating their thirst (i.e., *water, juice, drinking*). Based on their response latencies from the priming paradigms, the positive aspects of those objects that could satisfy thirst were significantly more accessible in memory for thirsty than for non-thirsty participants. Furthermore, this effect for thirsty participants only emerged in response to those objects or activities that had been previously rated as thirst-quenching (e.g., *water, juice, drinking*) and not for objects that were rated as less relevant (e.g., *coffee*) or completely irrelevant (e.g., *chair, phone*). This finding demonstrates that implicit goal-driven evaluative processes are sensitive to the *degree* to which objects can satisfy an active goal.

In another experiment, participants' active goal states rendered negative information about goal relevant objects relatively more *inhibited* compared to those who had just completed the goal as well as those who were never pursuing the goal. Participants played a word game and were told either that the task would measure their verbal intelligence (goal condition) or that the task was being developed for future use in experiments (control condition). Crucially, participants completed the evaluative priming paradigm at varying points during the experiment. One group of participants completed the paradigm while they were still playing the word task (unfinished condition), while the other group completed the paradigm after they had finished the word task (finished condition). The evaluative priming paradigm contained objects that were considered helpful to game performance (e.g., *words*). Those who were in the goal condition and unfinished condition exhibited significantly greater inhibition of negativity associated with objects that were helpful to task performance. In this case, then, participants' approach-friendly automatic evaluations were caused by the inhibition of negative information about goal-helpful objects. Those in the other three conditions did not differ in the speed of their responses to positive versus negative adjectives.

The results from this series of experiments therefore suggest that participants who were actively involved in an important goal pursuit exhibited more **approach-friendly** automatic evaluations of objects that could facilitate the goal. That is, active goal states implicitly facilitated knowledge about the positive aspects of goal-helpful objects or else inhibited knowledge about the negative aspects of goal-helpful objects (or both). It is important to note that these effects occurred only for those who were still actively engaged in goal pursuit, and not for those who were not involved in goal pursuit or who had just completed the goal.

These goal-dependent, approach-friendly automatic evaluations represent a *functional* consequence of the goal state because such implicit evaluations are likely to make the goal-helpful objects more desirable and thus more likely to be approached. Indeed, research suggests that automatic evaluations of objects influences subsequent behavior and judgments toward those objects, as well as to other objects of the same valence (e.g., Chen & Bargh, 1999; Fazio, Jackson, Dunton, & Williams, 1995; Ferguson, in press-a; Ferguson & Bargh, 2002; Ferguson, Bargh, & Nayak, 2005; McConnell & Leibold, 2001; Nosek & Banaji, 2002).

Avoidance-inducing automatic evaluations. Do goal states also influence how goal-*harmful* objects are automatically evaluated? That is, are such objects more likely to be evaluated in an avoidance-inducing fashion while the perceiver is engaged in an important goal pursuit? Recent findings suggest that the answer to this is yes (Ferguson, 2006). Furthermore, these findings suggest that such effects are contingent on the person's skill at the goal. Across the experiments, an evaluative priming paradigm was again used to measure the implicit effects of goal states on positive versus negative object-information. Avoidance-inducing (i.e., relatively negative) evaluations would emerge if the object facilitated negative adjectives over positive adjectives to a greater degree in the goal versus control condition. The negativity of

such evaluations would again be inherently relative, and could mean that the object led to faster response times to negative adjectives in the goal condition relative to the control condition, or to slower responses to positive adjectives in the goal condition versus control condition, or both. The former case would suggest that negative object-information was particularly accessible for those in the goal (vs. control) condition, whereas the latter case would suggest that positive object-information was more inhibited for those in the goal (vs. control) condition. Either outcome would mean that such repelling evaluations would ostensibly make the object *less* likely to be approached by those in the goal condition.

In one experiment, participants' automatic evaluations of distractions or hindrances to the goal of academic achievement (e.g., TV) were assessed as a function of participants' success at the goal (those with a relatively high GPA were classified as high success and those with a lower GPA were classified as low success) and whether the academic goal was nonconsciously activated at the time of the evaluative priming paradigm. The results showed that high success participants who had been subliminally primed with words related to the achievement goal (e.g., *graduate, homework*) automatically evaluated distractions to the academic goal as significantly more avoidance-inducing (i.e., relatively negative) than did all other participants. Moreover, as predicted, those who were more successful in the goal domain implicitly evaluated distractions to the goal as more negative when the goal had been automatically activated versus not. In other words, these results show that it is not the case that those high in academic success walk around with chronically negative automatic evaluations of activities that might disrupt their goal. Rather, their negative evaluations of such distractions are turned on only when the respective higher order goal has been activated. Such a pattern of findings suggests that goal-relevant automatic evaluations are highly sensitive to the perceiver's current motivational context.

Conclusions. The recent work on the goal-dependence of automatic evaluations shows that the way in which people automatically evaluate objects, other people, and possibly even themselves, is contingent on what they happen to be trying to do at that moment (Fazio, 1989; Ferguson & Bargh, 2002; Roskos-Ewoldsen & Fazio, 1992), which is in line with classic theorizing in psychology (Lewin, 1926, 1935). In this way, these findings add to the growing evidence for the contextual dependence of automatically activated evaluations and attitudes (e.g., Blair, 2002; Dasgupta & Greenwald, 2001; Mitchell, Nosek, & Banaji, 2003; Wittenbrink, Judd, & Park, 2001). However, it should be noted that the research on the goal-dependence of automatic evaluations shows that they are not simply (or solely) contingent on the nature (i.e., valence) of recent experiences with the corresponding attitude objects, as in other work (e.g., Dasgupta & Greenwald, 2001). That is, participants who were still engaged in active goal pursuit exhibited more positive automatic evaluations of goal-relevant objects than even those who had just successfully completed the goal (Ferguson & Bargh, 2004). This means that automatic evaluations sometimes reflect desired *future* experiences with the attitude objects, rather than *recent* experiences with them. In other words, the content of these types of evaluations can be *prospective* in that they reflect a goal yet to be attained rather than a goal effectively completed.

This work not only speaks to the goal dependent nature of automatic evaluation, it also demonstrates that implicit evaluative processing is an integral component of conscious and nonconscious goal pursuit (see also Custers & Aarts, 2005; Moors & De Houwer, 2001; Moors, De Houwer, Hermans, & Eelen, 2005). As such, these findings suggest that *automatic evaluation* is an important addition to the emerging cognitive model of goal development, representation, and operation (e.g., for a review see Fishbach & Ferguson, in press; Kruglanski,

1996). Such an inclusion would be in line with the historically close ties in research and theory between motivation, affect, and behavior (e.g., Arnold, 1960; Custers & Aarts, 2005; de Rivera, 1977; Frijda, 1986, 1993; Lazarus, 1991a, 1991b; Omdahl, 1995; Ortony et al., 1988; Scherer et al., 2001; Smith & Ellsworth, 1985; Weiner, 1985).

General Conclusions

We have argued that a new area of motivation science, termed *implicit motivation*, has evolved over the last two decades. Researchers in this area focus on the cognitive representation and operation of goal pursuit and self-regulation, and the implicit processes underlying that operation. We described new findings that address the functional aspects of implicit motivation, both in terms of the characteristics of automatic goal-pursuit, and the implicit processes underlying conscious goal pursuit. These new findings therefore reflect both the broad scope of implicit motivation research, and also an increasing emphasis on the functionality of the underlying processes and mechanisms of automatic processes in general.

References

- Aarts, H., & Dijksterhuis, A. (2000). Habits as knowledge structures: Automaticity in goal -directed behavior. *Journal of Personality and Social Psychology*, *78*, 53-63.
- Aarts, H., Dijksterhuis, A., & De Vries, P. (2001). On the psychology of drinking: Being thirsty and perceptually ready. *British Journal of Psychology*, *92*, 631-642.
- Aarts, H., Gollwitzer, P. M., & Hassin, R. (2004). Goal contagion: Perceiving is for pursuing. *Journal of Personality and Social Psychology*, *87*, 23-37.
- Abelson, R. P. (1994). A personal perspective on social cognition. In P. G. Devine, D. L. Hamilton, & T. M. Ostrom (Eds.), *Social cognition: Impact on social psychology* (pp. 15-37). San Diego, CA: Academic Press.
- Ach, N. (1935). Analyse des willens [Analysis of the will]. In E. Abderhalden (Ed.), *Handbuch der biologischen arbeitsmethoden* (Vol. 6 Part E). Berlin: Urban & Schwarzenberg.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*(2), 179-211.
- Allport, F. H. (1955). *Theories of perception and the concept of structure: A review and critical analysis with an introduction to a dynamic-structural theory of behavior*. New York: Wiley.
- Anderson, R. C., & Pichert, J. W. (1978). Recall of previously unrecallable information following a change in perspective. *Journal of Verbal Learning and Verbal Behavior*, *17*, 1-12.
- Arnold, M. B. (1960). *Emotion and personality*. New York: Columbia University Press.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Upper Saddle River, NJ: Prentice-Hall.

- Bargh, J. A. (1990). Auto-motives: Preconscious determinants of social interaction. In E. T. Higgins, & R. M. Sorrentino (Eds.), Handbook of motivation and cognition: Foundations of social behavior (Vol. 2., pp. 93-130). New York, NY, USA: The Guilford Press.
- Bargh, J. A. (1994). The four horsemen of automaticity: Awareness, intention, efficiency, and control in social cognition. In R. J. Wyer & T. K. Srull (Eds.), Handbook of social cognition (pp. 1-40). Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.
- Bargh, J. A. (1997). The automaticity of everyday life. In R. S. Wyer (Ed.), *Advances in social cognition* (Vol. 10, pp. 1-61). Mahway, NJ: Erlbaum.
- Bargh, J. A., Chaiken, S., Govender, R., & Pratto, F. (1992). The generality of the automatic attitude activation effect. Journal of Personality and Social Psychology, *62*, 893-912.
- Bargh, J. A., & Ferguson, M. J. (2000). Beyond behaviorism: On the automaticity of higher mental processes. Psychological Bulletin, *126*, 925-945.
- Bargh, J. A., & Gollwitzer, P. M. (1994). Environmental control of goal-directed action: Automatic and strategic contingencies between situations and behavior. In W. D. Spaulding (Ed.), *Nebraska symposium on motivation* (Vol. 41, pp. 71-124).
- Bargh, J. A., Gollwitzer, P. M., Lee-Chai, A., Barndollar, K., & Troetschel, R. (2001). The automated will: Nonconscious activation and pursuit of behavioral goals. Journal of Personality and Social Psychology, *81*, 1014-1027.
- Baumeister, R. F. (2000). Ego-depletion and the self's executive function. In A. Tesser, R. B. Felson, & J. M. Suls (Eds.), *Psychological perspectives on self and identity* (pp. 9-33). Washington, DC: American Psychological Association.
- Baumeister, R.F. (Ed.). (2001). *Social psychology and human sexuality*. New York: Psychology Press.

- Baumeister, R. F., Bratslavsky, E., Muraven, M., & Tice, D. M. (1998). Ego depletion: is the active self a limited resource? *Journal of Personality and Social Psychology*, 74(5), 1252-1265.
- Baumeister, R. F., Heatherton, T. F., & Tice, D. M. (1994). *Losing control: How and why people fail at self-regulation*. San Diego: Academic.
- Baumeister, R. F., & Vohs, K. D. (Eds.). (2004). *Handbook of self-regulation: Research, theory, and applications*. New York: Guilford Press.
- Berg, E. A. (1948). A simple objective test for measuring flexibility in thinking. *The Journal of General Psychology*, 39, 15-22.
- Berry, D. C., & Broadbent, D. E. (1984). On the relationship between task performance and associated verbalizable knowledge. *Quarterly Journal of Experimental Psychology*, 36A, 209-231.
- Berry, D. C., & Broadbent, D. E. (1988). Interactive tasks and the implicit-explicit distinction. *British Journal of Psychology*, 79, 251-272
- Blair, I. (2002). The malleability of automatic stereotypes and prejudice. *Personality and Social Psychological Review*, 6, 242-261.
- Bruner, J. S. (1957). On perceptual readiness. *Psychological Review*, 64, 123-152.
- Cacioppo, J. T., Petty, R. E., Kao, C. F., & Rodriguez, R. (1986). Central and peripheral routes to persuasion: An individual difference perspective. *Journal of Personality and Social Psychology*, 51, 1032-1043.
- Carver, C. S., & Scheier, M. F. (1998). *On the self-regulation of behavior*. New York: Cambridge University Press.
- Chaiken, S., Liberman, A., & Eagly, A. H. (1989). Heuristic and systematic information

- processing within and beyond the persuasion context. In J. S. Uleman & J. A. Bargh (Eds.), *Unintended thought: Limits of awareness, attention, and control* (pp. 212-252). New York: Guilford Press.
- Chaiken, S., & Trope, Y. (1999). Dual process theories in social psychology. New York, NY: Guilford Press.
- Chartrand, T. L., & Bargh, J. A. (1996). Automatic activation of impression formation and memorization goals: Nonconscious goal priming reproduces effects of explicit task instructions. *Journal of Personality and Social Psychology*, 71, 464-478.
- Chartrand, T. L., & Bargh, J. A. (2002). Nonconscious motivations: Their activation, operation, and consequences. In A. Tesser & D. Stapel (Eds.), Self and motivation: Emerging psychological perspectives (pp. 13-41). Washington, DC: American Psychological Association.
- Chen, M., & Bargh, J. A. (1999). Consequences of automatic evaluation: Immediate Behavioral predispositions to approach and avoid the stimulus. Personality and Social Psychology Bulletin, 25, 215-224.
- Chen, S., & Chaiken, S. (1999). The heuristic-systematic model in its broader context. In S. Chaiken & Y. Trope (Eds.), *Dual-process theories in social psychology* (pp. 73-96). New York: Guilford Press.
- Custers, R., & Aarts, H. (2005). Positive Affect as Implicit Motivator: On the Nonconscious Operation of Behavioral goals. *Journal of Personality and Social Psychology*, 89(2), 129-142.
- Dasgupta, N., & Greenwald, A. G. (2001). On the malleability of automatic attitudes: Combating automatic prejudice with images of liked and disliked individuals. *Journal of*

- Personality and Social Psychology*, 81, 800-814.
- de Rivera, J. (1977). A structural theory of the emotions. *Psychological Issues*, 10, No. 4, Monograph 40. New York: International University Press.
- Deci, E. L., & Ryan, R. M. (1985). The general causality orientations scale: Self-determination in personality. *Journal of Research in Personality*, 19(2), 109-134.
- Demakis, G. J. (2003). A Meta-Analytic Review of the Sensitivity of the Wisconsin Card Sorting Test to Frontal and Lateralized Frontal Brain Damage. *Neuropsychology*, 17(2), 255 – 264.
- Devine, P. G., Hamilton, D.L., & Ostrom, T.M. (1994). *Social cognition: Impact on social psychology*. San Diego, CA: Academic Press.
- Eitam, B., Hassin, R. R., & Schul, Y. (2004). Implicit motivation for implicit learning. Unpublished manuscript, The Hebrew University.
- Fazio, R. H. (1989). On the power and functionality of attitudes: The role of attitude accessibility. In A. R. Pratkanis, S. J. Breckler, & A. G. Greenwald (Eds.), *Attitude structure and function* (pp. 153-180). New Jersey: Erlbaum.
- Fazio, R. H. (2001). On the automatic activation of associated evaluations: An overview. *Cognition and Emotion*, 14, 1-27.
- Fazio, R. H., Jackson, J. R., Dunton, B. C., & Williams, C. J. (1995). Variability in automatic activation as an unobtrusive measure of racial attitudes. A bona fide pipeline? *Journal of Personality and Social Psychology*, 69, 1013-1027.
- Fazio, R. H., Sanbonmatsu, D. M., Powell, M. C., & Kardes, F. R. (1986). On the automatic activation of attitudes. *Journal of Personality and Social Psychology*, 50, 229-238.
- Ferguson, M. J. (in press). On the automatic evaluation of end-states. *Journal of Personality*

and Social Psychology.

Ferguson, M. J. (2007-a). The automaticity of evaluation. Invited chapter in J. A. Bargh (Ed.), *Social Psychology and the Unconscious: The automaticity of higher mental processes* (pp. 219-264). Psychology Press.

Ferguson, M. J. (2007-b). The effect of goals on implicit evaluations of temptations and distractions. Unpublished manuscript, Cornell University.

Ferguson, M. J., & Bargh, J. A. (2004). Liking is for doing: Effects of goal-pursuit on automatic evaluation. *Journal of Personality and Social Psychology*, 88, 557-572.

Ferguson, M. J., & Bargh, J. A. (2002). Sensitivity and flexibility: Exploring the knowledge function of automatic attitudes. In L. F. Barrett & P. Salovey (Eds.), The wisdom in feeling: Psychological processes in emotional intelligence (pp. 383-405). Guilford Press.

Ferguson, M. J., Bargh, J. A., & Nayak, D. A. (2005). After-affects: How automatic evaluations influence the interpretation of unrelated, subsequent stimuli. *Journal of Experimental Social Psychology*, 41, 182-191.

Festinger, L. (1957). *A theory of cognitive dissonance*. Evanston, IL: Row, Peterson.

Fishbach, A., & Ferguson, M. J. (in press). The goal construct in social psychology. Chapter to appear in A. W. Kruglanski & E. T. Higgins & (Eds.). *Social psychology: Handbook of basic principles*. Volume II. New York: Guilford Press.

Fishbach, A., Friedman, R., & Kruglanski, A. W. (2003). Leading us not unto temptation: Momentary allurements elicit automatic goal activation. Journal of Personality and Social Psychology, 84, 296-309.

Fiske, S. T. (1992). Thinking is for doing: Portraits of social cognition from Daguerreotype to laserphoto. Journal of Personality and Social Psychology, 63, 877-889.

- Fiske, S., & Taylor, S. (1984). *Social cognition*. Reading, MA: Addison-Wesley.
- Fiske, S., & Taylor, S. (1991). *Social cognition (2nd ed.)*. New York: McGraw-Hill.
- Fitzsimons, G. M., & Bargh, J. A. (2003). Thinking of you: Nonconscious pursuit of interpersonal goals associated with relationship partners. *Journal of Personality and Social Psychology*, 84(1), 148-163.
- Förster, J., Liberman, N., & Higgins, E. T. (2005). Accessibility from active and fulfilled goals. *Journal of Experimental Social Psychology*, 41(3), 220-239.
- Frijda, N. (1986). *The Emotions*. Cambridge, England: Cambridge University Press.
- Frijda, N. H. (1993). Mood, emotion episodes, and emotions. In M. Lewis & J. M. Haviland (Eds.), *Handbook of emotions* (pp. 381-403). New York: Guilford Press.
- Glaser, J. & Banaji, M.R. (1999). When fair is foul and foul is fair: Reverse priming in automatic evaluation. *Journal of Personality and Social Psychology*, 77, 669-687.
- Glaser & Kihlstrom, in press
- Glenberg, A. M. (1997). What memory is for. *Behavioral and Brain Sciences*, 20, 1-55.
- Gollwitzer, P. M. (1990). Action phases and mind-sets. In E. T. Higgins & R. M. Sorrentino (Eds.), *Handbook of motivation and cognition: Foundations of social behavior* (Vol. 2, pp. 53-92). New York: Guilford Press.
- Gollwitzer, P. M. (1996). The volitional benefits of planning. In P. M. Gollwitzer & J. A. Bargh (Eds.), *The psychology of action: Linking cognition and motivation to behavior* (pp. 287-312). New York, NY: Guilford Press.
- Gollwitzer, Bayer & McCulloch, in press
- Goschke, T., & Kuhl, J. (1993). Representation of intentions: Persisting activation in memory. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 19, 1211-1226.

- Greenwald, A. G. (1992). New Look 3: Reclaiming unconscious cognition. *American Psychologist*, 47, 766-779.
- Greenwald, A. G., & Banaji, M. R. (1995). Implicit social cognition: Attitudes, self-esteem, and stereotypes. *Psychological Review*, 102, 4-27.
- Hassin, R. R. (in press). Non-conscious control and implicit working memory. In R. R. Hassin, J. S. Uleman & J. A. Bargh (Eds.), *The New Unconscious*. New York: Oxford university press, pp. 196-224.
- Hassin, R. R., & Bargh, J. A. (2004). Automatic but flexible: Evidence from goal pursuit. Unpublished manuscript, The Hebrew University.
- Hassin, R. R., Uleman, J. S., & Bargh, J. A. (Eds.). (2005). *The New Unconscious*. New York: Oxford university press.
- Heaton, R. K., Chelune, G. J., Talley, J. L., Kay, G. G., & Curtiss, G. (1993). *Wisconsin card sorting test manual (revised and expanded)*. Lutz, FL: PAR, inc.
- Higgins, E. T. (1987). Self-discrepancy: A theory relating self and affect. *Psychological Review*, 94, 319-340.
- Higgins, E. T. (1996a). Ideals, oughts, and regulatory focus: Affect and motivation from distinct pains and pleasures. In P. M. Gollwitzer & J. A. Bargh (Eds.), *The psychology of action: Linking cognition and motivation to behavior* (pp. pp 91-114). New-York: Guilford Press.
- Higgins, E. T. (1996b). Knowledge activation: Accessibility, applicability, and salience. In E. T. Higgins & A. W. Kruglanski (Eds.), *Social psychology: Handbook of basic principles* (pp. pp 133-168). New York: Guilford.
- Higgins, E. T. (1997). Beyond pleasure and pain. *American Psychologist*, 52, 1280-1300.

- Higgins, E. T. (1998). Promotion and prevention: Regulatory focus as a motivational principle. In M. P. Zanna (Ed.), Advances in experimental social psychology (Vol. 30, pp. 1-46). New York: Academic Press.
- Higgins, E. T., Shah, J., & Friedman, R. (1997). Emotional responses to goal attainment: Strength of regulatory focus as moderator. Journal of Personality & Social Psychology, 72, 515-525.
- Isen, A.M., & Hastorf, A.H. (1982). Some perspectives on cognitive social psychology. In A.H. Hastorf and A.M. Isen (Eds.), *Cognitive Social Psychology*. New York: Elsevier North-Holland.
- James, W. (1890). The principles of psychology (Vol. 2). New York: Holt.
- Jones, E. E. (1998). Major developments in five decades of social psychology. In D. T. Gilbert, S. T. Fiske, & G. Lindzey (Eds.), *The handbook of social psychology* (4th ed., Vol. 1, pp. 3-57). Boston, MA: McGraw-Hill.
- Jones, E. E., & Thibaut, J. W. (1958). Interaction goals as bases of inference in interpersonal perception. In L. Petrullo & R. Tagiuri (Eds.), *Person perception and interpersonal behavior* (pp. 151-178). Stanford, CA: Stanford University Press.
- Kahneman, D. (1973). Attention and Effort. Englewoods Cliff, NJ: Prentice-Hall.
- Kruglanski, A. W. (1989). *Lay epistemic and human knowledge: Cognitive and motivational biases*. New York: Plenum.
- Kruglanski, A. W. (1996). Goals as knowledge structures. In P. M. Gollwitzer and J. A. Bargh (Eds.), The psychology of action: Linking cognition and motivation to behavior (pp. 599-618). New York: Guilford.
- Kuhl, P. K. (1983). Perception of auditory equivalence classes for speech in early infancy. *Infant Behavior and Development*, 70, 263-285.

- Kunda, Z., (1999). *Social Cognition: Making Sense of People*. Cambridge, MA: MIT Press.
- Lazarus, R. S. (1991a). *Emotion and adaptation*. New York: Oxford University Press.
- Lazarus, R. S. (1991b). Progress on a cognitive-motivational-relational theory of emotion. *American Psychologist*, 46, 819-834.
- Lewin, K. (1926). Vorsatz, Wille, und Bedürfnis [Intention, will, and need]. Psychologische Forschung, 7, 330-385.
- Lewin, K. (1935.) A dynamic theory of personality. New York: McGraw-Hill.
- Liberman, A. & Trope, Y. (1996). Social hypothesis testing: Cognitive and motivational mechanisms. In E. T. Higgins & A. W. Kruglanski (Eds.), *Social Psychology: Handbook of basic principles* (pp. 239-270). New York: Guilford.
- Locke, E. A., & Latham, G. P. (1990). A theory of goal setting & task performance. Upper Saddle River, NJ: Prentice-Hall, Inc.
- Logan, G. D. Toward an instance theory of automatization. Psychological Review, 95(4), 492-527.
- Marsh, R. L., Hicks, J. L., & Bryan, E. S. (1999). The activation of unrelated and canceled intentions. *Memory and Cognition*, 27, 320-327.
- McClelland, D. C., & Atkinson, J. W. (1948). The projective expression of needs, I: The effect of different intensities of the hunger drive on perception. *Journal of Psychology*, 25, 205-232.
- McConnell, A. R., & Leibold, J. M. (2001). Relations among the Implicit Association Test, discriminatory behavior, and explicit measures of racial attitudes. Journal of Experimental Social Psychology, 37, 435-442.
- Mischel, W., Cantor, N., & Feldman, S. (1996). Principles of self-regulation: The nature of

- willpower and self-control. In E. T. Higgins & A. W. Kruglanski (Eds.), Social Psychology: Handbook of basic principles. New York: Guilford Press.
- Mischel, W., Shoda, Y., & Rodriguez, M. L. (1989). Delay of gratification in children. Science, 244, 933-938.
- Mitchell, J. P., Nosek, B. A., & Banaji, M. R. (2003). Contextual variations in implicit evaluation. *Journal of Experimental Psychology: General*, *132*, 455-469.
- Miyake, A., Friedman, N. P., Emerson, M. J., Witzki, A. A., & Howerter, A. (2000). The unity and diversity of executive functions and their contributions to complex "frontal lobe" tasks: A latent variable analysis. Cognitive Psychology, 41, 49-100.
- Moors, A., & De Houwer, J. (2001). Automatic appraisal of motivational valence: Motivational affective priming and simon Effects. *Cognition and Emotion*, *15*, 749-766.
- Moors, A., De Houwer, J., Hermans, D., & Eelen, P. (2005). Unintentional processing of motivational valence. *Quarterly Journal of Experimental Psychology: A*, *58A*, 1043-1063.
- Moskowitz, G. B. (2002). Preconscious effects of temporary goals on attention. Journal of Experimental Social Psychology, 38, 397-404.
- Moskowitz, G. B., Li, P., & Kirk, E. R. (2004). The implicit volition model: On the preconscious regulation of temporarily adopted goals. In M. P. Zanna (Ed.), *Advances in Experimental Social Psychology* (Vol. 36, pp. 317-404). New York: Academic Press.
- Muraven, M., & Baumeister, R. F. (2000). Self-regulation and depletion of limited resources: does self-control resemble a muscle? *Psychological Bulletin*, *126*(2), 247-259.
- Musch, J., & Klauer, K.C. (2003). The psychology of evaluation: Affective processes in cognition and emotion. Mahwah, NJ: Lawrence Erlbaum.

- Neely, J. H. (1976). Semantic priming and retrieval from lexical memory: Evidence for facilitatory and inhibitory processes. Memory and Cognition, *4*, 648-654.
- Neely, J. H. (1977). Semantic priming and retrieval from lexical memory: Roles of inhibitionless spreading activation and limited-capacity attention. Journal of Experimental Psychology: General, *106*, 225-254.
- Neisser U. 1967. *Cognitive Psychology*. New York: Appleton-Century-Crofts.
- Nosek, B. A., Banaji, M. R., & Greenwald, A. G. (2002). Math = Male, Me = Female, therefore Math = Me. Journal of Personality and Social Psychology, *83*, 44-59.
- Omdahl, B. L. (1995). *Cognitive appraisal, emotional, and empathy*. Mahwah, NJ: Erlbaum.
- Ortony, A., Clore, G. L., & Collins, A. (1988). *The cognitive structure of emotions*. New York: Cambridge University Press.
- Posner, M. I., & Snyder, C. R. R. (1975). Attention and cognitive control. In R. L. Solso (Ed.), *Information processing and cognition: The Loyola symposium* (pp. 55-85). Hillsdale, NJ: Erlbaum.
- Robinson, M. D. (1996). Running from William James' Bear: A Review of Preattentive Mechanisms and their Contributions to Emotional Experience. Cognition and Emotion, *12(5)*, 667 - 696.
- Roskos-Ewoldsen, D. R., & Fazio, R. H. (1992). On the orienting value of attitudes: Attitude accessibility as a determinant of an object's attraction of visual attention. *Journal of Personality and Social Psychology*, *63*, 198-211.
- Scherer, K.R., Schorr, A., & Johnstone, T. (Eds.). (2001). *Appraisal processes in emotion: Theory, methods, research*. New York: Oxford University Press.
- Schmeichel, B. J., Vohs, K. D., & Baumeister, R. F. (2003). Intellectual performance and ego

- depletion: Role of the self in logical reasoning and other information processing. *Journal of Personality and Social Psychology*, 85, 33-46.
- Schneider, W., Dumais, S. T., & Shiffrin, R. M. (1984). Automatic and controlled processing and attention. In R. Parasuraman & D. Davies (Eds.), Varieties of attention (pp. 1-17). New York: Academic press.
- Schwarz, N. (2002). Situated cognition and the wisdom of feelings: Cognitive tuning. In L. Feldman Barrett & P. Salovey (Eds.), The wisdom in feelings (pp. 144-166). New York: Guilford.
- Shah, J. (2003). The Motivational Looking Glass: How Significant Others Implicitly Affect Goal Appraisals. *Journal of Personality and Social Psychology*, 85(3), 424-439.
- Shah, J. Y., Friedman, R., & Kruglanski, A. W. (2002). Forgetting all else: On the antecedents and consequences of goal shielding. *Journal of Personality and Social Psychology*, 83, 1261-1280.
- Shah, J. Y., & Kruglanski, A. W. (2002). Priming against your will: How goal pursuit is affected by accessible alternatives. *Journal of Experimental Social Psychology*, 38, 368-382.
- Shah, J.Y., & Kruglanski, A.W. (2003). When opportunity knocks: Bottom-up priming of goals by means and its effects on self-regulation. *Journal of Personality and Social Psychology*, 84, 1109-1122.
- Sherman, S. J., Judd, C. M., & Park, B. (1989). Social cognition. *Annual Review of Psychology*, 40, 281-326.
- Sherman, S. J., Rose, J. S., Koch, K., Presson, C. C., & Chassin, L. (2003). Implicit and explicit attitudes toward cigarette smoking: The effects of context and motivation. *Journal of Social & Clinical Psychology*, 22(1), 13-39.

- Shiffrin, R. M., & Schneider, W. (1977). Controlled and automatic human information processing. *Psychological Review*, 84, 127-190.
- Smith, C. A., & Ellsworth, P. C. (1985). Patterns of cognitive appraisal in emotion. *Journal of Personality and Social Psychology*, 48, 813-838.
- Smith, E. R. & Semin, G. R. (2004). Socially situated cognition: Cognition in its social context. *Advances in Experimental Social Psychology*, 36, 53-117.
- Strull, T. K., & Wyer, R. S., Jr. (1986). The role of chronic and temporary goals in social information processing. In R. M. Sorrentino & E. T. Higgins (Eds.), *Handbook of motivation and cognition* (Vol. 1, pp. 503-549). New York: Guilford Press.
- Stapel, D. A., & Blanton, H. (2004). From seeing to being: Subliminal social comparisons affect implicit and explicit self-evaluations. *Journal of Personality and Social Psychology*, 87, 468-481.
- Thurstone, L. L. (1930). The learning function. *Journal of General Psychology*, 3, 469-493.
- Trope, Y., & Ferguson, M. J. (2000). How and when preferences influence inferences. In J. Bargh & D. K. Apsley (Eds.), Unraveling the complexities of social life: A festschrift in honor of Robert B. Zajonc. Washington, D.C.: APA Press.
- Trope, Y., & Fishbach, A. (2000). Counteractive self-control in overcoming temptation. Journal of Personality and Social Psychology, 79, 493-506.
- Wegner, D. M., & Bargh, J. A. (1998). Control and automaticity in social life. In D. T. Gilbert, S. T. Fiske, & G. Lindzey (Eds.), *Handbook of social psychology* (4th ed., Vol. 1, pp. 446-496). Boston, MA: McGraw-Hill.
- Weiner, B. (1985). Attribution theory of achievement motivation and emotion. *Psychological Review*, 92, 548-573.

- Wittenbrink, B., Judd, C. M., & Park, B. (2001). Spontaneous prejudice in context: Variability in automatically activated attitudes. *Journal of Personality and Social Psychology*, 81, 815-827.
- Wittenbrink, B., & Schwarz, N. (Eds.), *Implicit measures of attitudes*. Guilford Press, 2007.
- Zajonc, R.B., & Markus, H. (1985). Must all affect be mediated by cognition? *Journal of Consumer Research*, 12 (December), 363-364.
- Zajonc, R. B. (1980a). Thinking and feeling: Preferences need no inferences. *American Psychologist*, 35, 151-175.
- Zajonc, R. B. (1980b). Cognition and social cognition: A historical perspective. In L. Festinger (Ed.), *Retrospections on social psychology* (pp. 180-204). New York: Oxford University Press.

¹ In Hebrew both “(to) adapt” and “(to become) accustomed” are one-word verbs.