Chapter 6

Goal Achievement: The Role of Intentions

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ABSTRACT

The intention-to-behavior process is analyzed with respect to implementation intentions. These intentions link an intended goal-directed behavior to an anticipated situational context. The reported experimental evidence suggests that implementation intentions create a heightened accessibility of the mental representation of the specified situational cues and induce direct (automatic) control of the intended behavior through these cues. The formation of implementation intentions promotes goal achievement through both of these processes because they eliminate classic problems associated with the control of goal-directed action. Similarities and differences to other theoretical approaches on intentions, planning, and action control are discussed.

INTRODUCTION

The correspondence between expressed attitudes and subsequent behavior is a central theme in modern social psychology. In a recent review of research on this issue, Fazio (1990; see also Zanna & Fazio, 1982) distinguishes three generations of attitude–behavior studies. The first addressed the question of whether there is an attitude–behavior relation, the answer here being an assured "sometimes". Second generation research began to look for situational

factors, personality variables, and classes of attitudes and behaviors that might moderate the attitude–behavior relation. This research led to a lengthy list of effective moderators, and it paved the way to studies of the third generation raising the most fundamental question of attitude–behavior consistency: how do attitudes guide behavior? Fazio (1986) provides important answers to this question by pointing to the automatic processes by which a highly accessible attitude determines the evaluative (positive vs. negative) interpretation of the respective objects and events, thus assuring attitude-congruent behaviors toward them.

The research presented in this chapter also addresses questions of a third generation approach, albeit with respect to the *intention-to-behavior* relation. There has been much first and in particular second generation research on this theme in different fields of social psychology (self-regulation, see Markus & Wurf, 1987 for a review; goals, see Pervin, 1989; attitude-behavior relation, see Ajzen, 1988). We will move on and scrutinize the processes which translate intentions into action. More specifically, we will develop hypotheses about how intentions work by analyzing the functions they serve when people attempt to realize their desires and wishes. For this purpose, we will make a distinction between goal intentions ("I intend to achieve x!") and implementation intentions ("I intend to initiate the goal-directed behavior x when situation y is encountered!"). Implementation intentions are seen in the service of goal intentions. The former commit the individual to specific plans as to when, where and how the latter are to be achieved. Secondly, research from our laboratory will be presented which attests to both the positive effects of implementation intentions on the efficient achievement of goal intentions and the various psychological processes on which these effects are based. Reminiscent of Fazio's (1986) research on how attitudes work, our data suggest that implementation intentions are translated into action via automatic processes. These processes, however, are not related to evaluative interpretations as is the case with attitudes; instead, they pertain to the initiation of intended behaviors. The chapter will start with a review of two opposing traditional approaches on intentions (Ach vs. Lewin, see below) and one current approach popular with social psychologists (reviewed in Ajzen & Fishbein, 1977). This is intended to illuminate the roots and the distinctiveness of the present approach which conceives of intentions as a source of commitment.

TRADITIONAL PERSPECTIVES ON INTENTIONS

Intentions as Acts of Willing

Intentions entered upon the stage of psychological theorizing at the turn of the century, when the Würzburg school of thought turned from the analysis of

thought processes to the analysis of the will. The most prominent representative of the emerging "will psychology" was Narziß Ach. His primary research goal (Ach, 1905, 1910; for a summary, see Ach, 1935) was to demonstrate the distinctiveness of willing, thus justifying his claim that the analysis of willing requires a unique type of psychology. Ach considered the intention to execute a certain action in a specified situation to be the prototypical act of willing. Because willing serves the purpose of overcoming hindrances, he analyzed subjects' introspective reports about attempting to add specified numbers, although habit favored the execution of an antagonistic action (e.g. multiplying these numbers).

Ach discovered that intending to do something contrary to habit could not be reduced to those cognitive, sensory or emotional elements hitherto discovered by psychology's efforts to classify people's experiences. Instead, it turned out to be a unique experience incorporating four intertwined aspects: a sense of tension, forming an association or linkage between the intended action and the situation where it should be executed, sensations of effort, and finally, a commitment to execute the intended action, in the sense of "I really will do it."

Ach's ideas on how an intention achieves the reliable execution of the intended action were based on the concept of *determination*. He assumed that having formed an intention creates what he called a determination, and that this determination would urge the person to execute the intended action once the specified situation was encountered. The strength of the determination should depend on how concretely people specify the intended action and the respective situation; concreteness was thought to intensify determination. Moreover, the intensity of the act of intending (willing) should also increase determination, since this implies a heightened commitment to execute the intended action ("I really will do it!").

Ach speculated that determination may work outside of awareness. In other words, people do not have to become aware of determination when the specified situation is encountered. Rather, determination is expected to directly elicit the intended behavior without the person's conscious intent to get started. Ach's ideas on the processes that account for the effects of determination were equally speculative. He suggested that determination may affect perceptual and attentional processes so that the specified situation is cognized in a way which favors the elicitation of the intended action. Finally, determination could be expected to end as soon as the intended behavior had been executed successfully.

The concept of determination was first criticized by Selz (1910). He did not agree with Ach that determination solely originates from the intention to respond to certain stimuli with a certain type of action. For Selz, determination had also to be associated with the subject's consent to perform the task the experimenter requested. Such higher-order determination (or

"predetermination" as Selz called it) was the starting point of Lewin's critique of Ach's theory of intention.

Intentions as Needs

Ach's ideas on intentions were most fiercely criticized by Lewin (1926, 1951) in his seminal paper on "Intention, Will and Need". He scornfully termed Ach's ideas a "linkage theory of intention", and sketched out an alternative model which suggests that intentions affect people's behaviors in the same way as needs do. In a similar way to needs, intentions would assign a valence (in German: "Aufforderungscharakter") to objects and events in people's social and nonsocial surroundings; this in turn would press for actions that potentially achieve the intention. For the person who intends to post a letter a post-box entices (or at least calls or reminds one) to deposit the letter, very much like food entices the hungry person to eat. Since needs can be satisfied by various types of behaviors which may all substitute for each other in terms of reducing need tension (e.g. eating apples, cake, bread, and so forth), many different intention-related behaviors are assumed to qualify for satisfying the quasi-need associated with an intention. As a consequence, many different items and events in a person's surroundings may acquire a valence.

The intensity of the tension associated with the quasi-need was expected to affect a person's attempts to execute intention-related behaviors in the sense that higher intensity leads to more relevant efforts. The amount of tension may vary, however. It is primarily a consequence of quasi-need fulfilment, but it is also thought to depend on the strength of relevant real needs (i.e. super-ordinate drives and general life goals) and how strongly these are related to the quasi-need. Keeping to the post-box example: if the individual's real need to post the letter is low (i.e. a simple greeting card as compared to a job application), the intention to post the letter should be associated with a weak tension system. Therefore, the post-box should not acquire much valence and in turn fail to press for action (i.e. for depositing the letter).

In numerous experiments, Lewin's students (Lissner, 1933; Mahler, 1933; Ovsiankina, 1928; Sliosberg, 1934; Zeigarnik, 1927) tried to show that the intention-as-need notion was superior to Ach's linkage theory of intention. The most prominent experimental paradigm was that of the resumption of an interrupted action. Subjects were interrupted while working on a task and subsequent spontaneous resumption was observed unobtrusively. No matter which type of interruption was employed or how long it lasted, resumption rates were generally very high (Ovsiankina, 1928). This was interpreted as contradictory to Ach's ideas, because an interrupted task no longer represents the very situation (i.e. the untouched task) to which the intended action (i.e. solving the task) had been linked by the individual's act of will. Following Ach's ideas, the interrupted task should therefore fail to instigate the

intended behavior. However, resumption rates were observed to be low only when the time period that immediately followed the interruption was filled with a substitute task that served the same goal as the original, interrupted task (Mahler, 1933, Lissner, 1933). This was interpreted as strong support for the intention-as-need notion, because it was assumed that the substitute task had reduced the tension of the quasi-need associated with a subject's intention to solve the original task.

A critical analysis of Lewin's theory of intentions (see Gollwitzer & Liu, in press) quickly reveals, however, that it is not concerned with the processes that translate intentions into action. Rather, Lewin presents an easy-to-grasp metaphor that helps isolate conditions under which we can expect intentions to lead to behavior (e.g. the intended behavior still has to be important to the person and proper means to achieve the intention have to be available). Although the objective of Lewin's theorizing was to offer a model that speaks to the question of how intentions work, the type of theorizing adopted specifies moderators but does not point to potential mediators; accordingly, it is mute to the psychological processes that translate intentions into action.

Intentions as the Best Predictors of Behavior

Present-day social psychology's interest in the concept of intention originated from research on the impact of attitudes on behavior. In the 1960s, researchers (e.g. Campbell, 1963; Wicker, 1969) voiced disappointment with respect to the low to moderate correlations between attitudes and behavior. First attempts to improve these correlations focused on constructing reliable behavioral indices aggregating various attitude-relevant behaviors (e.g. Weigel & Newman, 1976; Werner, 1978). The underlying methodological rule was that of correspondence or compatibility between attitude and behavior— as spelled out by Ajzen and Fishbein (1977), and Ajzen (1988), respectively. According to this rule, the attitudes and behaviors under scrutiny should be measured at the same level of generality or specificity. When a specific behavior is to be predicted, the compatibility principle implies that the attitude to be measured is an attitude toward that very behavior.

Such attitudes toward behaviors (as compared to attitudes toward objects, such as religion, ethnic groups or foods) are central to Fishbein and Ajzen's (1975) efforts to understand the psychological processes by which attitudes serve as causes of behavior. In their *theory of reasoned action* they suggest that the proximal cause of behavior is one's *intention* to engage in the behavior. Whereas the attitude represents an evaluation of the action, the respective intention is seen as the result of a decision to execute this action and thus represents the person's willingness to act. Fishbein and Ajzen's theory primarily focuses on the antecedents of intentions. The formation of an intention is seen as being dependent both on the person's attitude toward the

critical behavior (i.e. its expected value) and the experienced normative pressures to execute it (the so-called subjective norm; see Fishbein & Ajzen, 1975). When behavioral attitudes are positive and subjective norms favor the execution of a critical behavior, chances are high that the respective behavioral intention is formed.

Although the collected data are supportive of the model (see the meta-analytic review by Sheppard, Hartwick & Warshaw, 1988), numerous criticisms of the theory have emerged. The criticisms focus primarily on the theory's claim that it provides a *sufficient* description of the attitude-to-behavior relation. With respect to the determination of intention it was pointed out that intentions may not only be determined by attitudes toward behaviors and subjective norms, but also by personal moral obligation (see Schwartz & Tessler, 1972; Zuckerman & Reis, 1978), self-identity concerns (see Biddle, Bank & Slavinge, 1987; Charng, Piliavin & Callero, 1988), the anticipated positive/negative feelings associated with executing the behavior (Triandis, 1977), and a person's self-efficacy feelings (Bandura, 1982, 1986) or perceived control over the behavior (see Ajzen's extension of the model to the theory of planned behavior; 1985, 1987, 1988).

With respect to the determination of behavior by intentions, the critical point was made that intentions may not be the only determinants of behavior. Triandis (1980) pointed out that past behavior or habit is also an important determinant of present behavior (for examples of empirical demonstrations see Bentler & Speckart, 1979, on use of alcohol, marijuana, and hard drugs; Bentler & Speckart, 1981, on studying and exercising; Budd, North & Spencer, 1984, on seat belt use). Moreover, Liska (1984) referred to resources, skills, and co-operation as further determinants of the successful execution of behavior, thus making it salient that the theory's proposition that intentions are the only determinants of behavior solely applies to behaviors over which the individual manages to establish perfect volitional control (see also Sheppard *et al.*, 1988).

Ajzen's (1985, 1987, 1988) revision of the model of reasoned action (i.e. *the theory of planned behavior*) accounts for this criticism by introducing people's perceived control as an additional predictor of behavior, assuming that people's perceived behavioral control reflects all of the anticipated relevant non-volitional determinants (such as the availability of opportunities and resources) of the behavior to be predicted. Studies supporting the revised model (e.g. Ajzen & Madden, 1986) demonstrate that adding perceived control makes for better predictions of behavior, in particular when the intended behavior requires resources or skills. Moreover, the new model considers perceived control not only as an additional predictor of behavior but also as an additional predictor (in addition to attitude and social pressure) of intention. People are not expected to form behavioral intentions when low control over the critical behavior is anticipated. In

other words, the theory predicts that whenever people expect hindrances in the form of bad habits or a lack of relevant opportunities, means, resources and skills, they should no longer form the intention to perform the behavior. This conceptualization considers intentions to be self-predictions, that is, the individual's estimate of the likelihood that he/she will actually perform the critical behavior. Not surprisingly, therefore, the proponents of the theory frequently measure intentions in terms of likelihood statements (e.g. how likely is it that you will perform behavior x?; see Fishbein & Stasson, 1990; Warshaw & Davis, 1985).

It is this aspect of the theory that is in direct opposition to the ideas of Ach and Lewin. Both of these traditional psychologists believed that people form intentions to assure the implementation of critical behaviors, implying that the act of forming an intention somehow furthers the execution of these behaviors. Accordingly, intentions are not a 1:1 reflection of the perceived likelihood that one will actually perform the critical behaviors; rather, they are assumed to be formed when people anticipate that the execution of the critical behavior will be threatened.

The similarity to the traditional models of Ach and Lewin may be seen in the fact that the Ajzen and Fishbein models also fail to concern themselves with the psychological processes that turn intentions into actions. In a recent conceptual analysis of the theory of reasoned action and its revision, Eagly and Chaiken (in press) point to this fact as the common weakness of the two models. One may be tempted to be content with the relatively high predictive power of these models and reject this criticism as insubstantial. Ignoring the processes that translate an intention into action, however, *is* consequential. It prevents any serious test of the traditional idea that the act of forming an intention may of itself instigate various psychological processes that further the implementation of the intention.

INTENTIONS AS A SOURCE OF COMMITMENT

After outlining two opposing historical theoretical approaches and one modern approach, we now turn to our perspective on intentions. Our approach subscribes to the idea that forming intentions is functional in the sense that it helps to achieve respective outcomes and to perform relevant behaviors. This postulated function of intentions is explored by focusing on people's attempts to realize their wishes and desires. Furthermore, we will suggest and test hypotheses on the types of psychological processes that serve this function.

One might want to object at the very beginning of our analysis that people do not need intentions to successfully turn their wishes and desires into reality; as long as people possess the relevant aptitudes or skills and proper means

or opportunities are available, the achievement of desired outcomes will be secured. Certainly, all of this is a necessary prerequisite, but everyday experience suggests that people's pursuit of desired outcomes often comes to an early halt or is not even begun, even though these prerequisites are met. A frequent cause of this is that the desirability of these outcomes was not high enough to "motivate the person". But even when people anticipate that the desired outcomes are highly attractive, this still does not warrant effective striving for them (e.g. although skiing vacations are commonly perceived as highly attractive, not all of the people who have the time, means and skills will actually try to take off to the mountains). Thus it appears that even when the achievement of desired outcomes is feasible and these outcomes are truly attractive, this does not yet imply that the individual will actually strive for them in an effective manner.

Yet another observation of daily life suggests that feasibility and desirability of outcomes are not the only determinants of successful striving. People often manage to pursue desired outcomes even though difficulties are piling up, barriers are encountered, or the means necessary for their achievement are scarce. Even in the case of diminishing returns (i.e. the desired outcomes become increasingly less attractive) their pursuit is not immediately halted. Instead, people may be found to stay in the field or to try to intensify their efforts. When we observe such phenomena, we readily attest to the high commitment of the individuals involved. But where does the source of this commitment lie? In the present chapter it is suggested that it stems from the various intentions these individuals form with respect to their wishes and desires, as well as the relevant implementational activities. But what type of intentions are most effective, how do they achieve their effectiveness, and when are they formed? Answers to these questions will be based on a recent conceptualization of goal pursuit that distinguishes various action phases and links them with different types of mental operations (Gollwitzer, 1990, 1991; Heckhausen, 1989, 1991).

The issue of how people turn their wishes and desires into action has seen many theoretical advances in recent years (see, for example, Heckhausen, Gollwitzer & Weinert, 1987; Kuhl & Beckmann, 1985; Frese & Sabini, 1985; Higgins & Sorrentino, 1990; Locke & Latham, 1990; Sorrentino & Higgins, 1986; Pervin, 1989). Some researchers follow cybernetic models and describe progress toward goal achievement in terms of discrepancy reducing (i.e. negative) feedback loops (Carver & Scheier, 1981; Gallistel, 1980; Miller, Galanter & Pribram, 1960; von Cranach, 1982). These feedback loops are thought to be hierarchically organized so that superordinate loops set the reference values for loops that are directly subordinate (Carver & Scheier, 1990; Powers, 1973). This hierarchical, vertical view implies that successful goal pursuit is a movement downward from goals that describe an abstract desired end state to goals that specify a distinct behavior. Moreover, at all levels of abstraction the

same principle is thought to account for progress toward goal attainment (i.e. the negative feedback loop).

Heckhausen (1989, 1991) and Gollwitzer (1990, 1991) have offered an alternative perspective that takes a comprehensive temporal (horizontal) view on the course of goal pursuit which extends from the origins of a person's wishes and desires to the evaluation of the respective attained outcomes. It is suggested that the course of goal pursuit encompasses *four different, consecutive action phases*. People are expected to solve a qualitatively distinct problem at each of these phases. Accordingly, progress within each of these phases is governed by different principles.

1. In the first action phase, called *predecisional*, people deliberate wishes and desires in an attempt to set priorities. To achieve this, the criteria of desirability and feasibility are employed. Selected wishes are highly desirable, but still feasible.

2. The subsequent *postdecisional*, but still *preactional* phase is characterized by efforts to promote the initiation of relevant actions via effective planning. The objective here is to get started with relevant actions, so that the realization of the selected wishes and desires is not put off.

3. Once relevant actions are initiated, the *actional* phase begins and the individual focuses on effectively achieving the desired outcomes.

4. When these outcomes are finally attained, the postactional *evaluative* phase (where the individual compares what has been achieved with what was desired) is entered and the individual tries to find out whether further attempts at realizing the respective wish are worthwhile or even necessary.

Where do intentions enter this picture? Successfully moving toward the achievement of a desired wish can be met with obstacles at each of the two preactional phases. Intentions associated with each of these phases can serve to overcome these obstacles and thus serve the function of promoting the realization of desired wishes.

Goal Intentions

When people are still deliberating their wishes or desires in the predecisional phase, *goal intentions* are to play their role. The various wishes and desires may be in conflict with each other, because there is not enough time, means, talent, and energy to pursue all of them effectively. In addition, some may even contradict each other (e.g. desires to spend relaxing weekends and never to fail to meet deadlines). But conflict may originate other than when a person's many wishes and desires are seen in comparison to each other. Often we experience conflict because the short-term and long-term consequences

have opposite values in terms of their attractiveness, or because a certain wish or desire is highly desirable but hardly feasible, or because we fail to reduce uncertainty about its feasibility or desirability.

As long as people are torn between their various wishes and desires or are contemplating whether or not to pursue a certain wish or desire, they remain unable to get started on making them come true. This situation can be changed to the positive, however, by forming intentions such as "I intend to pursue x!". Resolutions of this kind terminate further deliberation as they result in a *commitment* to realize the wish or desire. What was characterized by velleity has now been transformed into a binding goal. We therefore refer to this type of intention as *goal intention* (in German: "Absicht"). Clearly, goal intentions are more similar to Lewin's conceptualization of intentions than to Ach's, because goal intentions specify a desired end state; they do not link a narrowly defined stimulus to a behavioral response.

That goal intentions promote wish fulfilment by terminating endless deliberation was first observed by researchers in the tradition of dissonance theory. Jones and Gerard (1967, p. 181) summarized this research by stating that goal decisions stop the "babble of competing inner voices", and, by doing so, lead to an "unequivocal behavioral orientation". In a recent study (Gollwitzer & Malzacher, in preparation), we took the "babble of inner voices" metaphor literally. Subjects who had formed goal intentions were compared with those who were still entertaining wishes. Both groups of subjects were simply asked to clarify the implied desired end states. Thereafter, they were asked to list the thoughts they had experienced. Subjects who had already formed goal intentions reported thoughts related primarily to the pros of having attained the respective end state and about how to achieve it. Subjects who were still undecided on whether or not to pursue the wish under scrutiny reported thoughts primarily related to potential pros and cons, and the thoughts about cons matched those on pros in terms of frequency.

But goal intentions do not only promote goal achievement by terminating the "babble of inner voices". Commitment to a goal also furthers the successful completion of goal pursuit once it has been initiated. This is demonstrated by the research on people's readiness to resume interrupted tasks as conducted by Lewin's students (see above). The more subjects felt obligated to perform the assigned tasks, the greater their readiness to resume interrupted tasks. Wicklund and Gollwitzer's (1982) research on symbolic self-completion more directly speaks to the issue at hand: people who were highly committed to achieving certain identity goals (e.g. becoming a successful musician) did not respond to failures, shortcomings, barriers or hindrances by retreat; rather, they stepped up their efforts to reach the intended goal. Only the individuals with weak commitment readily gave up their goal pursuit. In Bandura's (1990) view, goal intentions operate through self-referent processes rather than regulating action directly. For instance, goals are

assumed to lead to an effective involvement with the respective activities. Accordingly, people are expected to experience discontent when they fall short of their goals and this in turn intensifies further goal pursuit. In addition, high standard goals are found to induce high self-efficacy beliefs. The latter make people expend much effort in reaching the goal and show high perseverance in the face of difficulties (Locke & Latham, 1990). In this context, Klinger's work on disengagement from current concerns (Klinger, 1975; Klinger, Barta & Maxeiner, 1980) such as spending more time with one's girl friend/boy friend, losing weight, or getting a better job, is also relevant. Klinger and his colleagues observed that people find it rather difficult to disengage from these goals in their thoughts, feelings, and actions. This is true even when subjects recognize that the chances to reach such goals have become nil (see also Martin & Tesser, 1989).

The commitment to reach the goal should be present no matter what type of end state is specified by the goal intention. It may be an outcome of a complex behavioral episode or just one single behavioral act. The "amount of commitment" associated with goal intentions may vary, however. The amount of commitment (or volitional strength) associated with a goal intention should primarily depend upon the desirability of the specified goal— that is, how important achieving the goal is to the subject. It seems plausible that whenever conflicted wishes or desires (see above) are chosen, they will be furnished with an especially strong determination in order to secure their achievement. This implies among other things that an attractive desire which has been selected for implementation in spite of its low feasibility may actually be furnished with a heightened (instead of lowered) commitment— given that there exists at least a slim chance to realize this desire (for a related idea, on energy mobilization, see Wright & Brehm, 1989). The same may be true for selected desires that turn out to be less feasible than originally anticipated.

Implementation Intentions

Although forming goal intentions seems to have effects that favor goal pursuit, it certainly does not guarantee the immediate realization of one's wishes and desires and that the desired outcomes will be effectively achieved. Goal realization may still be hampered when it comes to the initiation or successful execution of relevant behaviors. At this point in time, *implementation intentions* come into play. Again, there is the issue of conflict; this time, it is conflict between different potential routes to implementation. Many different situations qualify as good opportunities to "get started", and this is also true for the means that can be employed to promote goal achievement. When the routes to implementation have habitualized, people become set and no conflict is experienced. But whenever this is not the case, people may feel torn

between acting here or there, now or later, or employing one means or another.

One can easily resolve this type of conflict, however, by committing oneself as to *when, where,* and *how* implementation is to be started, as well as *what course* the subsequent goal pursuit is to take. This may be done by forming intentions, such as, "I intend to initiate behavior x whenever the situational conditions y are met!" We call this intention an *implementation intention,* because it connects a certain goal-directed behavior with an anticipated situational context. Whereas the goal intention described above commits a person to achieving a certain end state, implementation intentions commit the person to executing an intended goal-directed behavior once the specified situational context is encountered. Implementation intentions, therefore, establish linkages between situations and behaviors; thus they are most similar to Ach's conceptualization of intentions. The linkage established by a goal intention is quite different; there the person and a desired end state become connected in the sense that the person feels committed to achieve this intended end state.

The purpose of an implementation intention is to lay down a specific plan that helps to promote the initiation and efficient execution of goal-directed activity. This means that an implementation intention always stands in the service of one or another goal intention. This subordinate role implies that in general they are not formed prior to goal intentions, but only conjointly or subsequently. We have already said that implementation intentions are needed when various potential routes of implementation of a given goal intention are in conflict and individuals cannot make up their mind on how to get started or what means to use. In what other circumstances are implementation intentions called for?

The implementation of goals can be at risk for many other reasons. One of these is based on the fact that people commonly entertain more than just one goal intention. This implies that in a given situation goal intentions may potentially rival each other if this situation is equally suited for the implementation of various different goal intentions. Such conflicts can be avoided, however, if individuals protect themselves by forming implementation intentions prior to encountering such critical situations; in this way, *one* of the goal intentions is given priority. Also, the realization of a certain goal intention may become problematic if the execution of relevant goal-directed behaviors requires situational contexts or means that are habitually used in the service of other behaviors. We believe that the formation of implementation intentions may redefine these situations and means thus putting them into the service of the goal intention that awaits implementation. Here is an example: one's office is habitually used for fulfilling professional duties. If one intends to arrange an appointment at the dentist, it might take an implementation intention to get started on this in one's office (e.g. "First thing I'll do in my office tomorrow morning is pick up the phone and call Dr X!").

Similarly to habits, chronic goals (Bargh, 1990; Bargh & Gollwitzer, in press) may also fix certain situational contexts so that they fail to be used for the implementation of pressing goal intentions. For instance, a person may have the chronic goal of "competing" whenever he or she meets people in a performance situation. Let us assume that in a given situation a person forms the novel goal intention of getting to know one of his competitors on a personal level. Again, it may take an implementation intention to give this interpersonal goal a chance (e.g. "As soon as she starts scoring more points than I do, I'll compliment her!").

Often, however, there is no progress with the implementation of goal intentions even when a good opportunity to get started presents itself. This is the case when we are highly absorbed in some ongoing involving activity, wrapped up in demanding ruminations, gripped by an intense emotional experience, or simply tired. In such cases, a good opportunity to get started may not receive much attention; it may even stay completely unnoticed in cases when it is hidden in a complex situational context. But even if it is noticed, we may not respond fast enough to use it. Some opportunities only present themselves very briefly (e.g. good opportunities to make one's point in an interpersonal exchange), and a quick response is required to seize them. Would implementation intentions prevent people from letting opportunities slip by under these circumstances? We believe they would. The underlying theory is that by forming implementation intentions people pass on control of goal-directed activities from the self to the environment. The intended behavior is subjected to external control through the environmental cues specified in one's implementation intention. In other words, when these cues (occasions or opportunities) or means are encountered, they are expected to prompt the intended behavior.

All of this implies that a certain opportunity or occasion will be more easily detected when it is specified in an implementation intention. In addition, the specified opportunity should draw attention to itself even when the person happens to focus attention on other, nonrelated issues. The potential to disrupt focused attention would certainly make it less likely that good opportunities stay unnoticed. But implementation intentions should not only affect perceptual and attentional processes related to specified opportunities or means. The initiation of the intended behavior should also be facilitated by an increased readiness to respond. Accordingly, we would expect that once the specified situational context is encountered, the intended behavior is initiated with great ease. This should facilitate quick and reliable initiation of the intended behavior, thus allowing people to also make use of opportunities which present themselves for only a moment. This heightened behavioral readiness may rest on automatic processes. It seems possible that the specified opportunity directly sets in motion psychological processes that are instrumental in the execution of the intended behavior.

In various experiments (reported below) we have put these ideas on how

implementation intentions work to the empirical test. But before conducting these studies, we wanted to first verify that implementation intentions give rise to the postulated effect of promoting the realization of goal intentions. For this purpose, both a correlational and an experimental study were conducted (Gollwitzer & Brandstätter, 1990).

DO IMPLEMENTATION INTENTIONS PROMOTE GOAL ACHIEVEMENT?

The distinction between goal intentions and implementation intentions rests on the assumption that the latter make a difference. People who furnish their goal intentions with implementation intentions should be comparatively more successful in goal achievement. Accordingly, we compared people who entertained mere goal intentions with people who had formed supplementary implementation intentions (i.e. people who had also committed themselves to *when* and *where* they wanted to begin implementing their goals). The comparison focused on the rate of goal completion, and we hypothesized that forming implementation intentions should increase people's chances to accomplish their goals.

A Correlational Study

We asked female university students in the period just before their Christmas break to indicate a personal project (i.e. a goal intention) which they intended to achieve before the end of the Christmas break. Subjects named various projects: 53% were career-related (e.g. writing a seminar paper); 29% lifestyle-related (e.g. finding a new apartment); and 18% were interpersonal (e.g. settling a fight with one's parents). To test our hypothesis that implementation intentions promote goal achievement, we asked subjects whether they had also formed an intention on *when* and *where* to get started. Subjects had to indicate by a simple "yes" or "no" answer whether they entertained such a supplementary intention. We also inquired about characteristics of subjects' projects which might alternatively facilitate project completion. Accordingly, we asked subjects to evaluate their personal project with regard to the following criteria: (a) how important it was; (b) how close they felt to the point of completion; (c) the subjective probability of success; (d) how familiar the required implementational actions were to them; (e) how many positive consequences might originate from goal attainment; (f) how many obstacles they anticipated on their way to goal achievement; (g) how many times they had unsuccessfully tried to achieve the goal; and (h) how many times they had let a good opportunity slip by.

A week after Christmas break was over, we wrote a follow-up letter to our subjects inquiring whether they had actually completed the critical project.

Subjects were asked to indicate on a simple questionnaire whether or not they had finished their project over Christmas break. Seventy subjects out of 89 returned the questionnaire. Despite the heterogeneity of projects, subjects who had furnished their project with an implementation intention were significantly more successful in achieving their project during Christmas break than subjects without an implementation intention. Actually, 62% of the subjects who had formed an implementation intention prior to Christmas did complete their project. The completion rate for subjects without an implementation intention was much lower (23%; see Figure 6.1, left side).

Because of the correlational nature of the present study, the formation of an implementation intention may not have been the critical variable that produced this pattern of results. Indeed, any of the other variables measured might have been the actual cause. We therefore sought to explore whether projects completed over Christmas differed from noncompleted projects on any of these variables. As it turned out, however, completed and noncompleted projects only differed with respect to two of these variables. Subjects who finished their projects felt comparatively closer to project completion prior to Christmas and they anticipated fewer hindrances. It seems possible, therefore, that these differences between completed and noncompleted projects produced the pattern of data observed. We explored these alternative explanations by calculating the
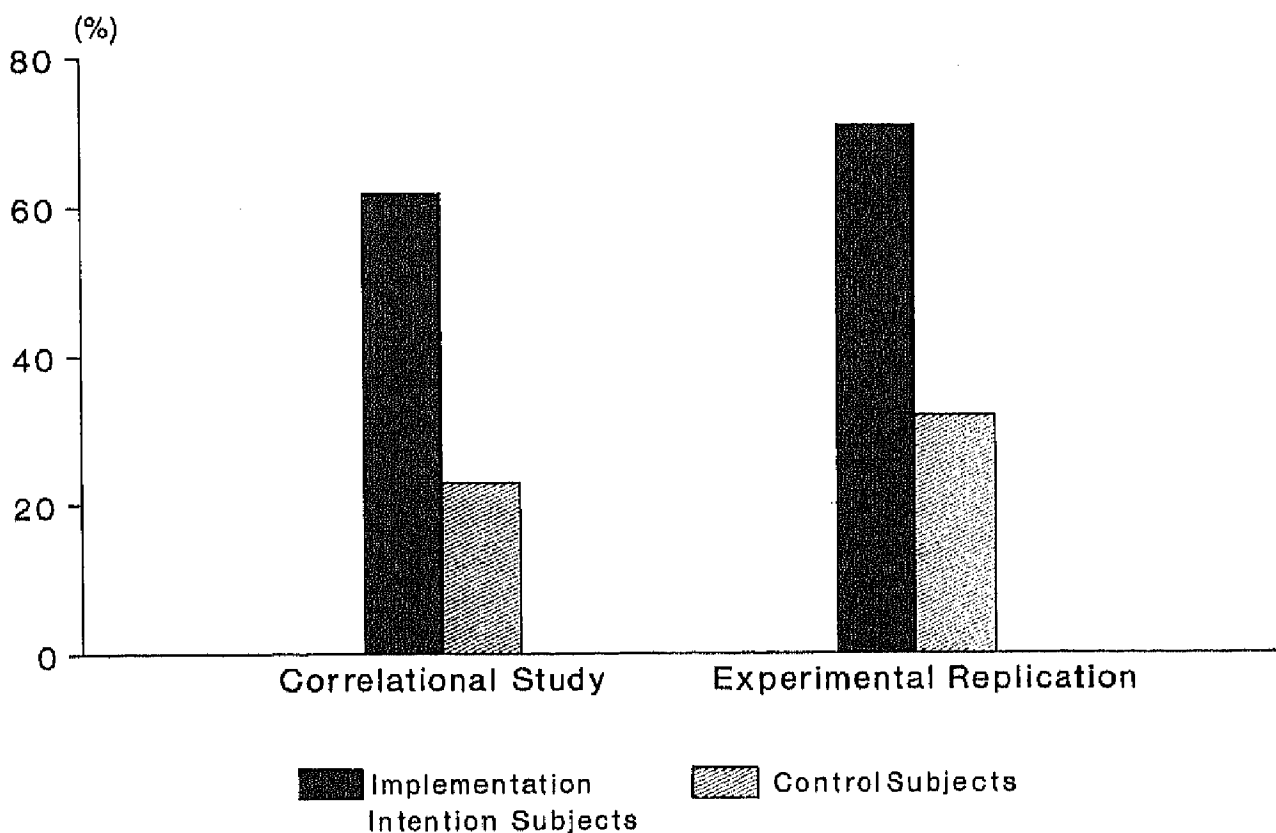
Figure 6.1 Percentage of subjects who completed their goal intention in time as a function of the formation of implementation intentions

correlation between forming implementation intentions and project comple-
tion while separating out "distance to project completion" and "number of
anticipated obstacles", respectively. For both correlations the coefficient re-
mained significant, suggesting that neither of these two variables mimicked
the postulated implementation intention effect.

An Experimental Replication

Although these additional data analyses suggest that none of the measured
characteristics of subjects' projects produced the observed effect, there is still
the possibility that characteristics other than those measured were effective or
that we had not measured some characteristics reliably. These considerations
led us to conduct an experimental study where implementation intentions
were manipulated. In this study, we created the same goal intention in all of
the subjects and then randomly instructed half of the sample to form a respec-
tive implementation intention. We ran the study with a large number of male
and female university students, again just before their Christmas break. In a
cover story they were told that we were conducting a demographic study on
how people spend Christmas Eve. They should therefore write a report on
how they had experienced that evening and send this report to the Institute.
To assure vivid reports, it was requested that they be written no later than two
days after Christmas Eve (in Germany both these days are holidays).

Then, half the subjects were handed a questionnaire that instructed them to
form an implementation intention specifying (in writing) *when* and *where*
during these two holiday days they intended to write their report. These
subjects picked a specific point in time (e.g. right after church) and a certain
place (e.g. in a quiet corner in the living room) for implementing this project.
The other half of the subjects (control subjects) were not requested to form
such intentions. When we analyzed the reports we received after Christmas in
terms of the date when they were written, it turned out that 71% of the
implementation intention subjects wrote their reports within the requested
time period as compared to only 32% of the control subjects (see Figure 6.1,
right side). We could confidently rule out the possibility that subjects deceived
us by writing false dates on their reports by checking the postmarks on sub-
jects' return letters. Control subjects' letters carried significantly later
postmarks than did implementation intention subjects.

We conclude from this that, committing oneself to a specific point in time as
well as to a specific place helped implementation intention subjects to fulfil
their goal—that is, to write a report about Christmas Eve within two days of
the event. Since we had randomly assigned subjects to conditions, we can
assume that both groups of subjects did not differ with respect to the degree
to which they wanted to help us conduct our presumed demographic study on
how people experience Christmas Eve. The only difference between groups

was in whether or not subjects had formed an implementation intention, and this difference was an effective one. One may be tempted to interpret this effect of implementation intentions in terms of obedience to the authority of the experimenter. Being aware of this problem, the experimenter granted subjects absolute anonymity. Employing a sophisticated coding system, however, it was possible to match the first questionnaire subjects had filled out with the reports they sent to the Institute. It was impossible, however, to discover which subject handed in which questionnaire or report. Most importantly, the experimenter took great pains to explain to subjects this consequence of our coding system.

Conclusion

When a goal intention is furnished with implementation intentions its chances of being accomplished increase. Interestingly, goal intentions that were not supplemented with implementation intentions showed rather low completion rates, suggesting that the realization of bare goal intentions is easily stifled. This has also been observed in a study by Kuhl (1982) on high school students' goal intentions relating to leisure time activities. The students were asked to indicate in the morning how much time they intended to spend performing various listed leisure time activities (such as reading a book, going to the movies, doing some sports) during the course of that afternoon. The following day the students were asked how much time they had spent performing each of these activities. Nonsubstantial correlations between both measures were observed for state-oriented students (as measured by a self-report scale, see Kuhl & Beckmann, 1985); action-oriented subjects on the other hand evidenced significant positive correlations. Kuhl (1983) defines state-orientation as a personal attribute that makes people primarily concerned either with desired goal states or experienced failures to achieve these states, what in turn leads to a lack of involvement with issues that relate to implementing goals; the opposite is assumed for action-oriented people. Accordingly, these findings suggest that simply focusing on the goal intention (i.e intending to achieve a desired end state) will not guarantee progress in terms of achieving this goal. Goal achievement is furthered, however, when the individual is ready to address questions of how to achieve the goal. The set of studies presented above points to forming implementation intentions as a very effective form of dealing with implementational issues.

HOW DO IMPLEMENTATION INTENTIONS WORK?

After being able to demonstrate that implementation intentions further the achievement of goals, we started to formulate and test hypotheses about

how these beneficial effects might come about. An analysis of the question of when implementation intentions are needed (see above) was used as a theoretical starting point. We postulated that implementation intentions should set in motion various psychological processes that help to overcome problems with initiating and successfully executing goal-directed behaviors. Since implementation intentions consist of two distinct elements—that is, the specified situational context and the intended behavior—we ended up with two sets of hypotheses. The first set relates to the situational context specified in implementation intentions. The second set of hypotheses focuses on the behavioral part of implementation intentions, that is, people's readiness to execute the intended behaviors once the specified opportunity to act is encountered.

The Intended Opportunities or Means

Superior Recall

We have said above that implementation intentions are needed to resolve conflict between acting here or there, now or later, or employing one means or another. By forming implementation intentions people commit themselves to certain opportunities and means, and, as a consequence, they are no longer torn between various possible options. What are the processes that underlie this very function of implementation intentions? We hypothesized that the opportunities and means specified in implementation intentions should be particularly easy to access in memory, so that when questions arise on whether to act here or there, now or later, or of using one means or another, a decisive answer is readily retrieved from memory.

In two recent experiments (Gollwitzer, Dubbert & Seehausen, in preparation) we measured subjects' recall performance for opportunities and means specified in implementation intentions. The cover story was the same for both experiments; it told subjects that they were participating in a study about a form of psychotherapy called play therapy. Subjects were told that the particular research question was whether playing self-chosen games in one's own way was experienced as being more pleasant than playing assigned games in a predetermined way. Accordingly, subjects were told that they would be given a chance to choose between games commonly used in play therapy and to play them in the way they preferred.

We presented four so-called games (a dancing game, a typical computer game, playing conjuring tricks, and a sculpture modelling game) and subjects had to choose two of them. For each of their choices (i.e. goal intentions), subjects had to commit themselves as to how they wanted to play the game (i.e. form implementation intentions). In a questionnaire using a multiple choice format, various predesigned options were offered for each of the

following categories: time, place, method, setting and atmosphere, as well as the social surroundings in which subjects would play the game. For example, a subject who selected the dancing game could choose from dancing in front of an audience, alone, or in a group (social surrounding), or between chamber music, jazz, and pop music (atmosphere). Experimental subjects had to mark the option of their choice for each of these categories. In both studies, experimental subjects expected to play the game at a second visit to the Institute. But instead of being asked to return to the Institute, subjects were asked to recall all of the offered options of how to play the games. Control subjects were yoked to experimental subjects and asked to study the questionnaires of a respective experimental subject.

In the first study, recall performance for the chosen options was exceptionally high for experimental subjects (> 85% evidenced a perfect score), and very bad for control subjects (< 14% achieved a perfect score). In addition, chosen options were remembered significantly better than nonchosen ones. In the second study, this pattern of data was replicated. In this second study, we requested recall after subjects had worked on a task that created either high or low cognitive load. This did not affect the pattern of data, however, ruling out the possibility that superior recall for specified opportunities and means is due to intensive rehearsal. We also gave half the subjects a reason to memorize their choices by telling them that on their second visit to the Institute, the experimenter would ask them to recall their choices. The other half of the subjects were made to expect that the experimenter would remind them of their choices. Again, this manipulation did not affect the pattern of data, indicating that high recall performance for chosen options does not require an intention to memorize one's choices.

The results of both studies may call to mind the well documented superior recall of action events (e.g. Bäckman & Nilsson, 1984; R.L. Cohen, 1983; Engelkamp & Zimmer, 1989). These researchers observed that items on a word list (e.g. verbs) are more easily recalled when performed as compared to when they are read or imagined. Again, this effect is not based on rehearsal processes and also appears when recall is not anticipated (i.e. under conditions of incidental recall). There is a difference, however, between this type of recall effect and the one studied here. We demonstrated superior recall for the intended ways of performing a task to be achieved (project, goal), whereas research on memory for action events points to superior recall of actions that have already been performed. This implies that the mere planning of how to achieve a goal creates memory traces that are easily accessed; the actual performing of the planned behaviors is not needed to create such traces. Recent findings by Knopf (1992) are in line with this conclusion. In a sophisticated series of experiments on the superior recall of action events she observed that planning the execution of behavioral episodes improves the recall of these episodes.

Our memory studies bear some similarity to recent research on so-called prospective remembering (G. Cohen, 1989; Ellis, 1988; Harris, 1982; Kvavilashvili, 1987; Meacham & Leiman, 1982). These psychologists interested in how memory works in natural contexts describe strategies that help prevent the forgetting of one's intentions. Such strategies employ external retrieval cues such as the famous knot in the handkerchief, a note in one's agenda, or the placing of objects in unfamiliar places. The rationale of these strategies is that the individual's attention is stirred by these changes inflicted on the environment, and that these changes are associated in memory with the individual's intention. By noticing these changes in the environment, individuals should therefore readily remember their intentions. Obviously, this line of research is different from what we are trying to demonstrate here. We are trying to show that the conditions specified by the individual for the execution of an intended project (task or goal) are easily accessed in memory. Because of this easy access, individuals who experience a conflict between acting here or there, now or later, or employing one means or another, can end this conflict by retrieving their choices from memory. So the superior recall for chosen conditions seems to promote goal achievement by reducing implementational conflict. In this sense, our research is most similar to memory studies conducted by Dellarosa and Bourne (1984). These authors observed that when people make goal decisions, arguments supporting the decision are more easily recalled than counter-arguments. This memory effect also helps to reduce conflict; in Dellarosa and Bourne's study, however, the conflict is between choosing or not choosing a goal, whereas we are concerned with conflict between various ways of implementing a chosen goal.

Disruption of Focused Attention

Chances to promote goal achievement often fail to be utilized because good opportunities that present themselves in immediate social or nonsocial surroundings escape our attention. The reason for this is that attention is focused on other things which have nothing to do with the question of how to achieve the intended goal. Implementation intentions could alleviate this problem if specified opportunities and means disrupt focused attention by attracting attention to themselves.

How does one test whether opportunity-related stimuli manage to disrupt focused attention? A typical focused attention paradigm is the so-called dichotic listening task in which words are presented to both ears simultaneously and subjects are instructed to repeat (i.e. shadow) the words presented to one ear (i.e. the attended channel) and ignore the words presented to the other ear (i.e. the nonattended channel). Focusing attention to the shadowed ear becomes difficult when the words presented to the nonattended ear attract attention by themselves. This is the case for words that relate to temporarily

or chronically active categories or schemata (see Johnston & Dark, 1986, pp. 63–65). Examples are words related to a personal attribute (e.g. independence) with respect to which subjects are schematic (Bargh, 1982), sexually explicit words in a college student sample high on state anxiety (Nielsen & Sarason, 1981), and word passages with which subjects had been made highly familiar prior to performing the dichotic listening task (Johnston, 1978). Our memory studies presented above suggest that opportunities and means specified in implementation intentions may also work as activated schemata, because heightened accessibility (there evidenced in terms of superior recall) is one of the central features of activation (see Higgins, 1989, for a review). Accordingly, we hypothesized that words related to intended opportunities and means should succeed in attracting attention to themselves.

Whether an item presented on the nonattended channel has the potential to attract attention, and thus disrupt focused attention, can be assessed in two different ways. First, by checking whether shadowing becomes faulty—that is, shadowing speed decreases and shadowing mistakes increase (see Dawson & Schell, 1982; Nielsen & Sarason, 1981). Second, and more sensitively, by testing whether subjects allocate more attention to the target channel in an attempt to hinder disruption and prevent faulty shadowing (Egeth, 1967; Kahneman, 1973; Logan, 1980). The amount of attention allocated to the shadowing task is commonly assessed by the probe reaction time technique (Bargh, 1982; Johnston, 1978; Johnston & Heinz, 1978), in which subjects are instructed to optimize shadowing while using remaining capacities to respond to a subsidiary probe stimulus (e.g. quickly turning off a light that goes on at irregular intervals). It is assumed (see also Kahneman, 1973; Logan, 1979) that the more attention is required by the shadowing task, the slower are subjects' responses to subsidiary visual probe stimuli.

Following these ideas, we recently performed two experiments in which words related to opportunities and means specified in implementation intentions were presented to the nonattended channel in a dichotic listening task (Gollwitzer, Mertin & Steller, in preparation). These critical words were solicited from subjects in the following manner. First, they had to name a project (i.e. goal intention) which they intended to achieve in the near future and indicate the degree to which its implementation was given priority. Then, they were asked to divide the implementation of this project into five major steps and commit themselves (in writing) to when, where and how they wanted to implement each of these steps. From these implementation intentions we abstracted the critical words (i.e. the specified opportunities and means) for the dichotic listening task.

In the first study, subjects had to perform the dichotic listening task at a second visit to the Institute (two days later) where they first had to check whether their implementation intentions were still valid. Then, they were asked (in an allegedly independent second study) to shadow four stimulus

word blocks presented to the right ear after having worked on a sample block of words. All of these words were irrelevant to subjects' implementation intentions. This was also true for the first and third block of words presented simultaneously to the nonattended left ear. Only the second and fourth stimulus word blocks were filled with critical words. A probing light was turned on at various points during the four stimulus word blocks and subjects' probe reaction times were measured. Supporting our hypothesis that critical words related to specified opportunities and means attract attention, critical word lists reduced subjects' speed in turning off the probing light. Apparently, subjects had to pay more attention to the primary task (i.e. the shadowing task), and thus did less well on the subsidiary task. Moreover, with control subjects who had been yoked to experimental subjects (i.e. they studied the implementation intentions of one or the other experimental subject), we did not observe any effects of the critical word lists on probe reaction times.

The second study differed from the first in various aspects. Most importantly, subjects returned to the Institute for the dichotic listening task much sooner (i.e. only 24 hours after their first visit) and immediately started to work on the dichotic listening task. This time we also assessed subjects' shadowing performance (in terms of both shadowing errors and shadowing speed), and we applied a recognition test that allowed us to determine whether subjects had switched attention to the critical words on the nonattended channel. Again, the critical words turned out to be highly disruptive to focused attention. Not only did they reduce subjects' speed in turning off the probing light, they also worsened their shadowing performance. As observed by Dawson and Schell (1982), shadowing errors are a clear indication that switches in attention to the nonattended channel have occurred. Not surprisingly, therefore, recognition performance was better for critical than for noncritical words. Thus it appears that even when efforts to direct attention to the shadowing task are stepped up (as indicated by the reduced speed in turning off the probing light), the critical words still manage to attract attention (as indicated by a weak shadowing and a high recognition performance). Further support for our hypothesis, that intended opportunities and means are disruptive to focused attention, came from control subjects who had been yoked to experimental subjects. For these subjects, critical words did not produce any of the effects observed in experimental subjects.

One has to keep in mind that in the present set of two experiments, intended opportunities and means were presented to subjects in terms of a verbal description only. When subjects in everyday life actually enter a situational context which entails these opportunities and means in reality, their potential to attract attention should be even stronger. This implies that intended opportunities and means will not escape people's attention, even when attention is focused on other things than the respective goal pursuit.

Perceptual Readiness

Research findings reported under the heading of the "new look" in perception indicate that the heightened accessibility of a category affects the perception of related stimuli. Bruner (1957) speaks of perceptual readiness as a consequence of category accessibility. Perceptual readiness expresses itself among other things in the fact that relevant stimuli are more easily and swiftly recognized (Bruner & Goodman, 1947). "New look" researchers (Bruner, 1948, 1951; Bruner & Klein, 1960; Bruner & Postman, 1948, 1949) considered internal factors such as expectancy, need states, interests and values as potential determinants of category accessibility. The memory and attention studies reported above suggest that implementation intentions should also affect category accessibility. More specifically, they are expected to furnish intended opportunities and means with heightened accessibility.

This implies that stimuli representing intended opportunities and means should be recognized comparatively more effectively. A recent dissertation experiment by Steller (1992) was designed to test this hypothesis. It employed a newly developed experimental paradigm which is based on the observation that in real life situations, intended opportunities and means are hidden between numerous irrelevant stimuli and thus easily overlooked. To mimic this real life phenomenon, the critical stimuli were embedded into complex geometrical figures, that is, the so-called Gottschaldt Figures (Gottschaldt, 1926, 1929)—also named "embedded figures" after Witkin's (1950) colored version. These are complex geometrical figures (b-figures) that contain a smaller partial figure (a-figure). Employing Gestalt principles, the a-figure is hidden within the b-figures and is thus difficult to detect.

In the cover story of the present experiment, two a-figures (Figure 6.2) were presented to subjects as potential new road signs (so-called multi-signs). Multi-signs were allegedly constructed to reduce the overall number of road signs by combining the informational value of several signs that often occur together into one sign. The subjects' task was to design one of the randomly assigned a-figures as a multi-sign according to their own ideas, impulses and conceptions.

a – figure 1   a – figure 2
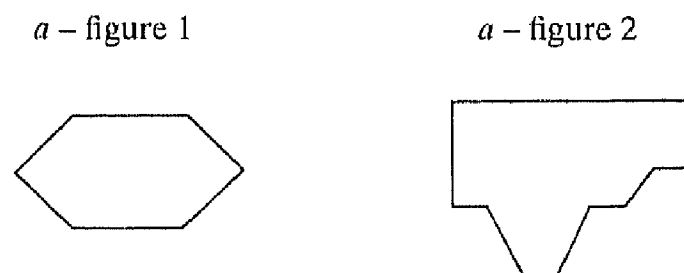
Figure 6.2   So-called multi-signs as presented to subjects

The subjects in the *goal intention* condition were merely informed about the subsequent designing task. They then had to solve intricate arithmetical problems to prevent them from spontaneously forming intentions about how to "create" this new sign. The subjects in the *implementation intention* condition had to commit themselves to a choice of which informational values they wanted to combine in their sign, what colours they would use, etc. All of this was done in writing, following a well-structured program. The subjects in the *intensified implementation intention* condition also made such decisions. They were then requested to mobilize their maximal will power for each detail of the design by saying to themselves, "I will do it in exactly this way". It was hoped that this procedure would lead to highly mandated decisions.

Before being allowed to paint a paper model of their multi-sign, the subjects were first asked to work on a visual search task. Subjects received an explicit instruction to search for the assigned a-figure in 18 b-figures which either contained ($n = 6$) or did not contain this a-figure ($n = 12$). Subjects were requested to press "yes" (contained) or "no" (not contained) buttons mounted on a panel and to do this as quickly as possible. Subjects in the intensified implementation intention condition were superior to those of the simple implementation intention condition in detecting the assigned a-figure (discrimination index: z-transformed *hits* minus *false alarms*). The performance of the goal intention condition was by far the worst (Figure 6.3). Such
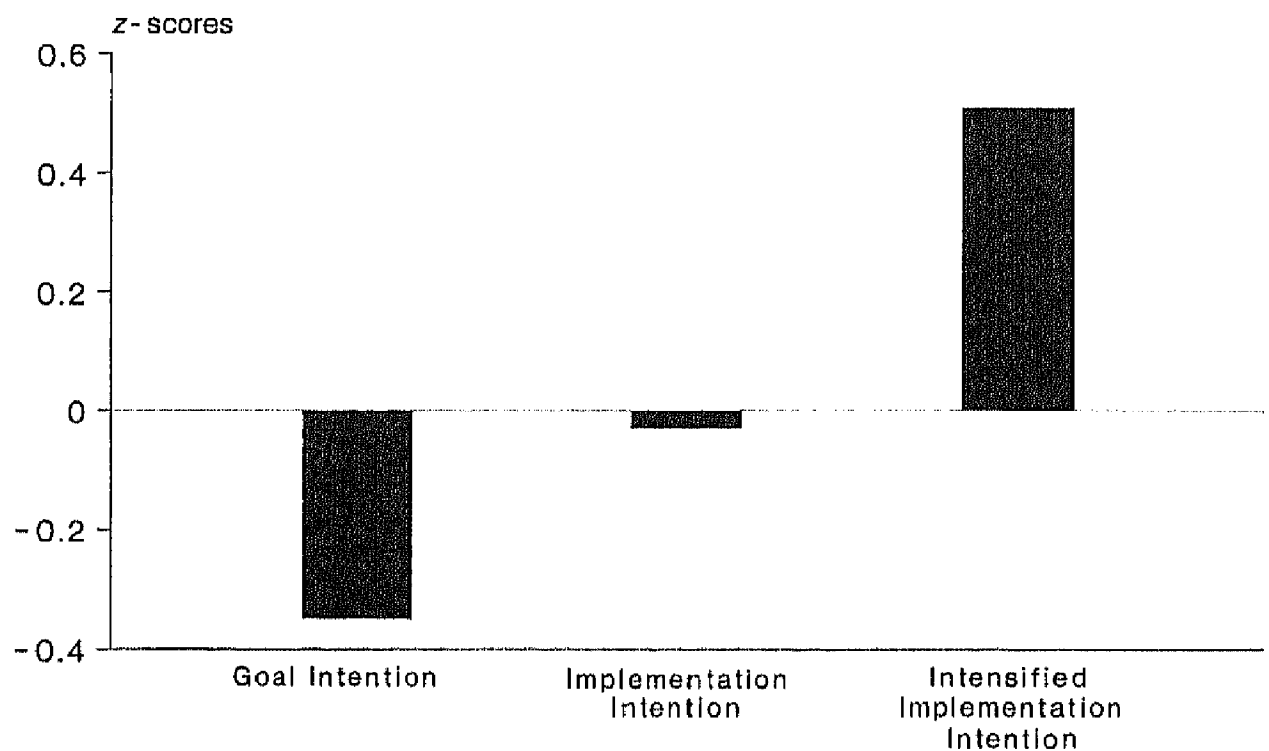
Figure 6.3   Mean discrimination performance for the assigned a-figure as a function of experimental condition

differences in discrimination performance could not be observed, however, when subjects were instructed to search for the nonassigned a-figure in a second set of 18 b-figures. This pattern of data suggests that forming an implementation intention facilitates the detection of the specified opportunity, and forming these intentions with additional will power seems to strengthen the effect.

One might argue that the observed heightened perceptual readiness for the critical a-figure in both of the implementation intention conditions may be due to increased familiarity with this figure. After all, subjects of both of these experimental groups were more extensively exposed to the critical figure, and familiarity is known to be a prominent determinant of category accessibility (Higgins, 1989; Srull & Wyer, 1986). But this seems unlikely for the following reasons: first, Gottschaldt (1926, 1929) observed that familiarizing subjects with the a-figures employed in the present experiment (up to 500 presentations of these figures) did not make it easier to detect them in the b-figures. Secondly, the familiarity notion fails to explain the results of the intensified implementation intention—that is, an increase in discrimination performance as compared to the simple implementation intention condition. There is no reason to assume that the instructions given to subjects in the intensified condition further familiarized subjects with the critical a-figure. The instructions focused on mobilizing will power and, therefore, should only have strengthened subjects' commitment to deal with this figure as intended.

The results of a second study, employing the same experimental design, also suggest that differences in familiarity with the critical figure did *not* produce the observed pattern of discrimination performance. In this second study, subjects first had to rate the familiarity of the b-figures. They then had to evaluate the b-figures on a semantic differential which employed dimensions commonly affected by familiarity (e.g. attractive vs. unattractive, simple vs. complex) and, finally, they reported on their spontaneous thoughts elicited by the b-figures. No significant differences between conditions were observed in terms of subjects' familiarity ratings, or on any of the dimensions of the semantic differential. A content analysis of subjects' reported thoughts revealed that subjects in the goal intention condition were much more concerned with the theme of the experiment's cover story, that is, traffic signs. Apparently, forming implementation intentions did put a halt to further rumination about this issue.

The findings of both studies taken together suggest that forming implementation intentions leads to a heightened perceptual readiness with respect to the specified opportunity to act. This heightened perceptual readiness seems based on an increase in activation of the opportunity's conceptual representation. It is unlikely that familiarity with the specified opportunity produces this activation: rather, what seems responsible for it is the mandate originating from the implementation intention.

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The Intended Behaviors

Speed of Action Initiation

Implementation intentions do not only specify when and where one plans to get started on goal achievement, they also lay down how this should be done and thus specify the intended behavior. More importantly, however, they create a link between the specified situational context and the intended behavior in the sense that one feels committed to initiate this behavior once the situational context is encountered. Does forming such linkages facilitate the initiation of the intended behavior, given the presence of the specified opportunity and/or means? This would guarantee that people will not let good opportunities slip by even if these present themselves for only a very short time.

In the domain of social influence and persuasion good opportunities to make one's point do not last forever. They are particularly short-lived when it comes to making counterarguments to an opponent's determined expression of his/her point of view. Following this line of thought in her dissertation, Brandstätter (V. Brandstätter, 1992, study 1) developed a new experimental paradigm that allowed her to study whether implementation intentions lead to the swift initiation of the intended behavior when the specified opportunity is encountered. Male university students were asked to take a convincing counterposition on racist remarks made by a confederate presented on video-tape; all of the subjects readily complied with this request. After the subjects were made familiar with these remarks in a first viewing of the video, a second run was carried out, so that subjects could mark those points on the tape which they considered to be suitable (i.e. a good opportunity) for a counterargument. One group of subjects was additionally asked to make a resolution to deliver certain counterarguments later at the marked places (*implementation intention* condition). In a modified third run (eight new remarks of the confederate were added to the eight already presented), the subjects were finally allowed to stop the video-tape at any point and deliver their opinion on audio-tape.

Without subjects' being aware of it, a computer recorded the marks they had made on the video-tape, and also the points in time when they started to speak. In this way it was possible both to determine whether the subjects actually did seize the opportunities they had marked on the tape for speaking up, and to compute the relative frequency with which each subject spoke up within a narrowly defined critical time period surrounding the points in time previously marked. This relative frequency was significantly higher for the subjects in the implementation intention condition than for *control* subjects, who had merely been requested to mark good opportunities, without, however, forming any intentions that linked specific counterarguments to these opportunities. There was an *additional control* group to counter the

alternative explanation—that this effect is solely due to the implementation intention subjects' concern with specific counterarguments. Subjects in this group expected to deliver specific counterarguments, in writing, at a later date. Nevertheless, they were comparatively less successful in using the marked opportunities to speak up than the experimental subjects.

One might argue that subjects in the implementation intention condition responded so readily to their "marks" because they wanted to look consistent in the eyes of the experimenter. This seems unlikely, however, because the experimenter's cover story focused subjects' concerns on choosing good opportunities to act, and not on acting swiftly once these opportunities arose. Actually, subjects were not aware of the fact that the experimenter had recorded their "marks" and thus was in a position to determine how swiftly they responded to the opportunities marked. Also, at the outset of the experiment, a number of personality dimensions had been measured employing an adjective version (16 PA) of the 16 PF-test (H. Brandstätter, 1988). If looking consistent in the eyes of the experimenter had been an issue for implementation intention subjects, those high on the dimension of social dependency should have been particularly eager to achieve consistency, and would thus have responded most readily. This was not the case, however.

All of the subjects in the reported study intended to achieve the goal of taking a convincing counterposition to a racist view. Nevertheless, good opportunities elicited goal-directed behaviors (i.e presenting counterarguments) with greater speed when subjects had linked critical situations (good opportunities) to behaviors (counterarguments) by forming implementation intentions. The mental act of forming such linkages obviously managed to increase the speed of action initiation. This "speeding" effect resembles one of the consequences which habits have on the initiation of behavior. As we know from learning theory, habitualized behavior is elicited with comparatively higher speed (Guthrie, 1952, 1959; Hull, 1943, 1952; Thorndike, 1913). Thus it appears that simple mental acts (i.e. implementation intentions) are able to mimic a central effect of habits. This is rather amazing in view of the fact that habits commonly are the result of time-consuming, laborious practice.

Encouraged by these findings, Brandstätter (1992, study 2) explored whether it might be possible wilfully to speed up the execution of intended behaviors even further. The question to be answered was the following: given that a person has formed implementation intentions to respond quickly to a set of stimuli with a certain type of action, is it possible to speed up the initiation of this action to a subset of those stimuli by forming complementary implementation intentions? These may take the following form: "With respect to stimulus x, I intend to respond particularly quickly". In addition, Brandstätter wanted to know whether the expected additional increase in speed of responding remained unaffected by the demands of a dual task. Assuming that implementation intentions mimic the effects of habits, it was

hypothesized that the demands of a dual task should not be reflected in the speed of responding to the critical stimulus, because habitualized behaviors turn out to be automated in the sense that they are performed without putting much load on limited processing resources (Kahneman & Treisman, 1984; Norman & Shallice, 1986; Posner, 1978; Shiffrin & Schneider, 1977).

Following this line of thought, subjects were asked to work simultaneously on two tasks (dual-task technique); these were both presented on a computer monitor, but in two different, adjacent windows. The primary task consisted of working on meaningless syllables that appeared one by one at a fixed time interval. This task was presented to each subject at low and high difficulty levels (i.e. freely associate to the meaningless syllables, and memorize them, respectively), and it was designed in a way that demanded complete and steady attention. The secondary task was to press a button as quickly as possible when numbers appeared, but not when letters were shown. Numbers and letters were presented at random intervals, and the numbers constituted the cues for the button-press response.

The experimental manipulation consisted of instructing half the subjects to form the intention to respond as quickly as possible to a specific number (i.e. critical number), whereas the other half (control group) was asked to familiarize themselves with the critical number by repeatedly writing it out on a sheet of paper. Control subjects were told to do this for the purpose of speeding up their responses to this number. However, no difference in the speed of the pressing response for critical and non-critical numbers was observed for control subjects. In the experimental group, the complementary implementation intention led to a marked acceleration of responding to the critical number, and this without being detrimental to the speed of responding to non-critical numbers (the speed for non-critical numbers was similar to that of the control group). Also, this pattern of data was not affected by the level of difficulty of the primary task (see Figure 6.4).

The results of both these studies suggest that the initiation of behavior can be speeded up by forming implementation intentions. Most interestingly, this effect seems to occur automatically in the sense of not requiring much processing capacity. Once the specified opportunity is encountered, action initiation is promoted even when the individual is heavily involved with performing a highly demanding task. This leads to the question of whether the initiation of intended actions is also automatically controlled in the sense of not requiring a conscious deliberate intent. Research on slips of action (Norman, 1981; Reason, 1979, 1983; Reason & Mycielska, 1982) suggests that with overlearned, habitualized actions, no conscious intent is required to get such actions started. Their initiation is directly controlled by the situational context to which the habitualized action belongs. This is also suggested by the highly sophisticated phenomenological analysis offered by Ach (1935, pp. 320–24), which describes various phases of how practice turns conscious control over
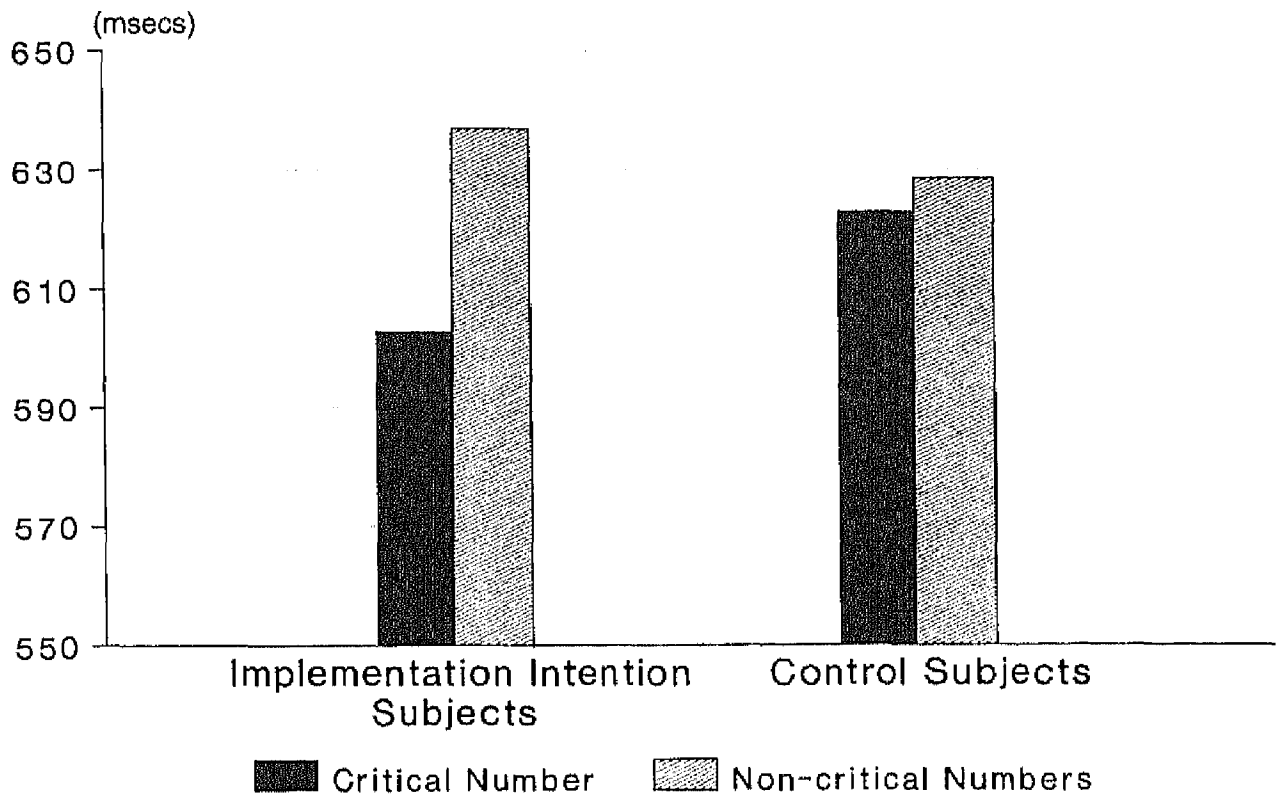
Figure 6.4   Mean reaction times to critical and non-critical numbers as a function of implementation intention

action initiation into automatic, environmental control. (For a similar phases theory, albeit related to the execution of an action sequence, see Fitts & Posner, 1967.) But how does one test whether the initiation of the action as specified in an implementation intention is triggered without a conscious intent? The study reported below gives an interesting answer to this question.

Automatic Control of Action Initiation

A recent dissertation study by Malzacher (1992) explored whether the opportunity specified in an implementation intention directly (automatically) prompts cognitive processes that facilitate initiating the intended action. The processes considered were (a) the automatic activation of knowledge that is instrumental to the effective initiation of the intended action, and (b) the automatic inhibition of knowledge that potentially disturbs the initiation of this action. If, for instance, an intended action consisted of retaliating to an insult in the form of a verbal complaint, facilitory knowledge would entail attributes to be ascribed to an unfriendly person, whereas inhibitory knowledge would entail attributes one would ascribe to a friendly person. Malzacher actually used a retaliation paradigm (modelled after Zillmann & Cantor, 1976) to test this line of thought.

In her experiment, two of three groups were treated by the first experimenter, via a taped recording, in an unfriendly, provocative manner. The third group, who listened to a neutral tape with the same voice, served as the control. After the unfriendly episode had occurred, a second experimenter encouraged subjects in the *goal intention* condition to confront the first experimenter at a later point in time. For subjects in the *implementation intention* condition, the second experimenter additionally made plans with the subjects as to when and how they should tell the unfriendly experimenter what they thought of her (in this case, using some adequate adjectives). This resulted in the following implementation intention: "As soon as I see this person, I'll tell her what an unfriendly person she is!" Finally, all subjects were made familiar with the unfriendly experimenter as well as with other experimenters working at the Institute using photographs that gave a recognizable likeness of the individuals concerned.

In an allegedly independent second study (run by the second experimenter), subjects were asked to read as quickly as possible a series of adjectives successively presented on a screen. The adjective list consisted of positive and negative words, all suitable for describing people. Shortly before each adjective (average stimulus onset asynchrony [SOA]: 107 msec), the face either of a neutral experimenter or that of the unfriendly experimenter was presented subliminally and in random order. The faces were presented for an extremely short time and were pattern-masked. The chosen presentation time was below the individual perception threshold (determined at the outset of the experiment)—mean presentation time was approximately 7 msec. This procedure ensured that subjects did not notice the faces presented prior to the adjectives, and, therefore, subjects' speed of reading the adjectives should not have been affected by any conscious processes elicited by these faces. In addition, the narrow time gaps between the onset of the faces and the adjectives (SOAs) should also have prevented conscious processes from taking control over subjects' reading responses (see Bargh, Chaiken, Govender & Pratto, 1992; Neely, 1977; Warren, 1977).

In the implementation intention condition, negative adjectives presented directly after the face of the unfriendly experimenter tended to be read faster than those presented directly after the face of a neutral experimenter. Moreover, positive adjectives were read much more slowly after presentation of the face of the unfriendly experimenter than after presentation of the neutral face. Most importantly, this pattern of data was not observed either in the control group or in the goal intention group (see Figure 6.5). Apparently, when implementation intentions are formed, negative adjectives are more easily accessible in the presence of the critical stimulus, whereas access to positive attributes is hindered. This suggests that the stimulus specified in an implementation intention directly elicits processes (in this case the activation of relevant knowledge and the inhibition of irrelevant knowledge) that facili-
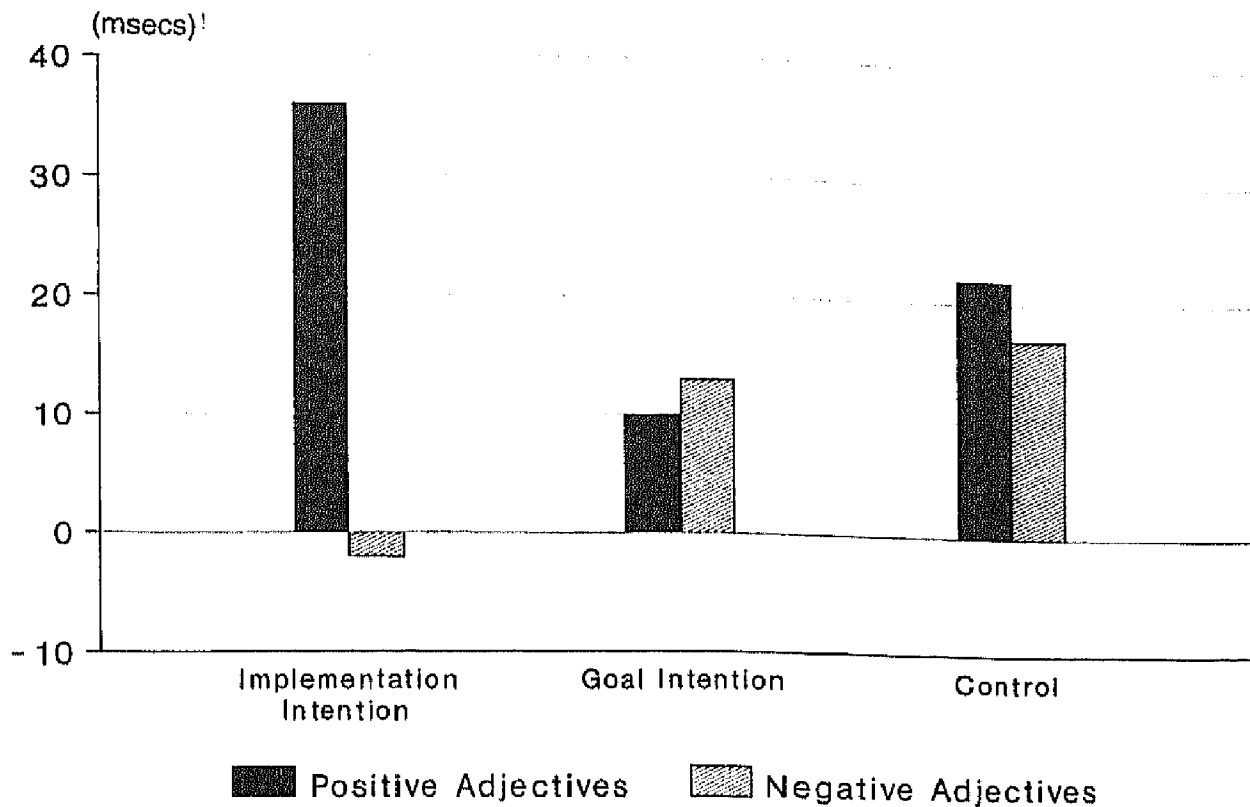
Figure 6.5 Mean reading latencies (difference scores: critical minus non-critical prime stimulus) as a function of experimental condition

tate the initiation of the intended action. The present findings also tell us that the mere formation of a goal intention is not sufficient to produce this effect. Apparently, automatic facilitation of action initiation only occurs when goal intentions are supplemented with implementation intentions.

Further Consequences of Forming Implementation Intentions

The situational contexts specified in implementation intentions are effectively stored in memory, readily attended to, and easily recognized; in addition, the related intended behaviors are initiated swiftly. It is probable that all of this accounts for the fact that goal intentions, furnished with implementation intentions, are accomplished better than those without implementation intentions. Planning, in the sense of forming implementation intentions, however, has a further consequence which also promotes the achievement of goal intentions. This consequence does not relate to processes associated with the situational contexts or behaviors specified in implementation intentions. Instead, it relates to the general cognitive orientation or *mind-set* that originates from getting involved with planning.

Once people start to lay down how they intend to achieve a chosen goal or goal intention, their general cognitive orientation changes in a direction that

facilitates goal achievement. In a number of experimental studies (summarized elsewhere, see Gollwitzer, 1990, 1991), the following distinct features of the cognitive orientation associated with planning (i.e. the so-called *implemental mind-set*) were discovered. First, processing of information that relates to the implementation of the chosen goal is very effective (see experiments by Gollwitzer, Heckhausen & Steller, 1990; Heckhausen & Gollwitzer, 1987; Schmalt, 1990). This should definitely be instrumental in initiating goal-directed behaviors. Secondly, an overestimation of the desirability of the chosen goal (Gollwitzer, 1991, Chapter 7), as well as an illusory positive view of its feasibility, can be observed (Gollwitzer & Kinney, 1989). This guarantees that people keep trying to implement a chosen goal even when information is encountered that questions the goal's desirability and feasibility. Thirdly, the implemental mind-set is characterized by a certain closed-mindedness with respect to irrelevant information (i.e. information which does not pertain to the question of how to achieve the goal at hand; see Gollwitzer, 1991, Chapter 4; Gollwitzer & Heckhausen, 1987). Accordingly, people who are involved with planning should find it relatively easy to concentrate on the initiation of goal-directed actions.

The implemental mind-set forms a stark contrast to the cognitive orientation associated with deliberating on one's wishes and desires in an attempt to set priorities (i.e. the *deliberative mind-set*). People who are still deliberating and thus far from planning the execution of goals are found to be open-minded, and they show an impartial and objective analysis of information that relates to the feasibility and desirability of wishes and desires. Moreover, they are particularly effective in processing information related to feasibility and desirability issues. All of this promotes intensive deliberation of wishes and desires. People in a deliberative mind-set are in a position to respond readily to feedback on the desirability and feasibility of their wishes and desires by changing priorities.

It appears then that planning (i.e. forming implementation intentions) leads to the activation of a *general cognitive orientation* which facilitates the initiation of goal-directed behaviors. The strength of this activation (and the associated implemental mind-set effects) relates positively to how intensively individuals become involved with planning the implementation of their goal intentions (see Gollwitzer, 1991, Chapter 8).

IMPLICATIONS AND PROSPECTIVE

The present theoretical and empirical analysis of the role of intentions for goal achievement has revealed that intentions promote the pursuit of goals in a variety of different ways. First, intentions alleviate the conflict between wishes and desires by setting priorities. We have called this type of intention

a goal intention, because it creates a commitment to attain a desired end state. As a consequence, further deliberation between wishes is ended and an orientation towards implementing the goal intention originates. Moreover, the goal pursuit is furnished with persistence so that barriers and hindrances do not lead to retreat but to stepping up one's efforts to achieve the goal.

Intentions play a crucial role again when it comes to planning the implementation of one's goal intentions. In so-called implementation intentions, we stipulate when, where and how we intend to achieve our goals. Such commitments specify the situational contexts and means that are to be used, and they spell out the behaviors that are to be initiated once these contexts and means are encountered. As a consequence, the latter function as behavioral cues that are effectively stored in memory, manage to disrupt focused attention, and are easily detected even when hidden in larger situational contexts. Moreover, given the presence of these cues, the intended behavior is initiated swiftly. Finally, forming implementation intentions affects various features of the individual's general cognitive orientation or mind-set which are instrumental to goal achievement.

In the reported experiments on how people store, attend to, detect and respond to the situations and means specified in their implementation intentions, the following general perspective was found to emerge: by forming implementation intentions people pass the control of their behavior on to the environment. Situations and means are turned into elicitors of action that are hard to forget, ignore, and miss. They possess the potential to instigate the respective intended behaviors directly, that is, without any further conscious intent on the side of the individual. This is most clearly demonstrated by both the fact that the subliminal presentation of these "elicitors" suffices to favor action initiation, and the observed low capacity demands of the swift initiation of intended behavior.

Thus it appears that forming an initiation intention is a conscious mental act that has automatic consequences. This discovery calls in question two currently popular views in research on automaticity (Uleman & Bargh, 1989): First, that automatic control of behavior is always the result of frequently and consistently performing this behavior (e.g. Shiffrin & Schneider, 1977, but for an exception see Logan, 1988). And second, that habitualized behavior only is subject to automatic control whereas willed or intended behavior is subject to conscious control (e.g. Norman & Shallice, 1985). Contrary to these views, our experiments document the fact that automatic processes instigated by implementation intentions are the result of one single mental act (i.e. the forming of an implementation intention), and that the behavior affected by these processes is definitely intended or willed.

Our findings are also relevant to recent theoretical work on planning as presented by cognitive psychologists (e.g. Hayes-Roth & Hayes-Roth, 1979;

Mannes & Kintsch 1991; Kreitler & Kreitler, 1987; Bruce & Newman, 1978) and researchers in the field of artificial intelligence (Wilensky, 1983). Both of these research traditions construe planning in terms of the processes that lead to the viable sequencing of behaviors so that certain behavioral tasks or goals, such as fetching a book from the library, are performed smoothly and effectively. It seems plausible to assume that this kind of planning is subjected to conscious control as it demands the mental simulation of future events, activities, hindrances, and so forth (Miller, Galanter & Pribram, 1960; Taylor & Schneider, 1989).

The research reported in this chapter suggests, however, that this type of planning can be supplemented by committing oneself to the execution of a certain behavior in the presence of specified situational cues (i.e. form implementation intentions). Planning in the sense of forming implementation intentions has behavioral effects which are based on automatic processes. Possibly the strongest support for the present proposition that these two distinct aspects of planning are subject to different modes of control (i.e. conscious vs. automatic) comes from neuropsychology. Patients with lesions to the prefrontal region of the brain show major impairments when it comes to planning in the form of finding a viable route to the solution of a given behavioral problem (see Shallice, 1982). This is not surprising, because the frontal lobe is commonly considered to be the site of any conscious control of thought and action (Luria, 1966; Walsh, 1978), and this type of planning requires conscious control. Most interestingly, however, frontal lobe patients do not evidence any impairment when it comes to the after-effects of planning in the sense of forming implementation intentions. In a recent dissertation experiment with frontal lobe patients, Lengfelder (in preparation) discovered that implementation intentions speed up the initiation of intended actions in the same way as was observed with university students (see V. Brandstätter, 1992, study 2). Apparently, this speed-up effect is based on automatic control processes; no conscious control is needed.

So far we have studied the role of implementation intentions and the respective processes in the context of action initiation. But getting started may be only one of the situations where it pays off to form implementation intentions. Controlling one's impulses might be another one. Imagine a person who has decided to stop drinking (i.e. formed the respective goal intention of staying away from alcohol) but is still tempted to take a sip of wine whenever he opens the refrigerator. One effective way of preparing himself against this temptation may be the forming of an implementation intention that favors the execution of an antagonistic behavior. In the present example, such an implementation intention could relate to eating instead of drinking (e.g. "I'll grab a bite to eat whenever I open the refrigerator"). Future research needs to establish the actual effectiveness of implementation intentions in terms of controlling people's impulses.

The Interplay of Goal Intentions and Implementation Intentions

The three different theories on intentions presented at the beginning of this chapter (i.e. the two traditional opposing approaches by Ach vs. Lewin, and the contemporary approach by Ajzen & Fishbein) all fail to address (albeit for different reasons) the issue of how goal intentions and implementation intentions interrelate. The intentions discussed by Ajzen and Fishbein are formed on the basis of desirability criteria only (theory of reasoned action; Fishbein & Ajzen, 1975) or on the criteria of both desirability and feasibility (theory of planned behavior; Ajzen, 1985, 1987, 1988), and thus qualify as goal intentions. Neither model allows for the possibility that people furnish their goal intentions with supplementary implementation intentions. Although it is recognized that people's goal intentions may differ in terms of the abstractness of the desired goal (e.g. the intention to have children vs. the intention to send off a greeting card to a friend) and that intentions which specify rather concrete goals predict particularly well, both models neglect the fact that people may form additional intentions to specify when, where and how they will go about implementing these goals. This fact has also been pointed out by Eagly and Chaiken (1992; see also Sternberg, 1990) who state that the intentions described by Ajzen and Fishbein do not relate to any plans about how to execute the intended goal or behavior. Accordingly, the Ajzen and Fishbein models of intention do not conceive of implementation intentions and therefore are not concerned with how they relate to goal intentions. Narziß Ach (1905, 1910) did not reflect on the interrelation of goal and implementation intentions, because he refused to address the issue of higher-order intentions (e.g. the goal intention to oblige the experimenter) as *not* belonging to the theme of the psychology of willing. Goal intentions are formed on the basis of motivational reasons—as, for instance, the desirability of the anticipated consequences of goal achievement. Accordingly, Ach considered goal intentions as subject to the "battle of motives", and, therefore, did not consider them to be "acts of willing". (For more on the controversy surrounding this issue, see Michotte and Prüm, 1910; Selz, 1910.) In Ach's view, only intentions that link specified situations to certain behaviors (i.e. implementation intentions) qualified as acts of willing.

Kurt Lewin (1926) *did* address the issue of the interplay between goal intentions and the Ach-type intentions. For Lewin, the latter type of intention is only effective when it is embedded within strong higher-order goal intentions (e.g. life goals) or needs. Accordingly, the effectiveness of implementation intentions is seen as absolutely dependent on the strength of goal intentions: Lewin and his students, therefore, decided not to study questions of when implementation intentions are formed and with what effect (see Gollwitzer & Liu, in press).

The theory of intentions presented in this chapter assigns a different role to

implementation intentions as compared to goal intentions. In this sense, the two types of intentions are seen as distinct and independent, which allows us to raise the question of their interplay. But they are also seen as related, because both types of intentions are thought to provide commitment which ultimately serves the same purpose—that is, to promote goal achievement. It seems necessary, therefore, to study their interrelation to better understand how they work together in promoting people's goal pursuits.

One issue of interrelation pertains to the question of what type of goal intentions lead to forming implementation intentions. We have said above that by forming implementation intentions people lay down how they intend to achieve their goal intentions. Accordingly, people should more readily furnish with implementation intentions those goal intentions that are comparatively more important. Because implementation intentions are meant to ease the way to goal achievement, this should only be true, however, if problems are anticipated on the way to goal attainment; otherwise, there is no need to form implementation intentions. This hypothesis corresponds with William James' (1890) distinction between ideo-motor action and willed action. According to James, the application of will can only be expected when resistance to performing an action is anticipated or experienced by the individual. Most action, however, is mere ideo-motor action; thinking about the consequences of an action is quickly followed by its execution.

Indirect empirical support for our hypothesis that implementation intentions are formed when people anticipate barriers and hindrances comes from research on action identification theory (Vallacher & Wegner, 1985, 1987). This theory proposes that people may conceive of their goal pursuits at different levels of abstraction. High levels of identification define goals in terms of their ultimate purpose (e.g. getting exercise), whereas low levels of identification refer to the implementational steps (e.g. going to the gym before dinner). Although people generally prefer high levels of identification, they move towards low level identifications whenever goal achievement becomes problematic (Vallacher, Wegner & Frederick, 1987). This tendency to think about the implementational intricacies once goal pursuit is hampered is a first step towards actually forming implementation intentions.

A further issue of the interrelation of goal intentions and implementation intentions boils down to the following question: do the effects of implementation intentions depend on the strength (importance) of the respective goal intention? There are a number of observations, outlined below, that suggest that the effectiveness of implementation intentions is independent.

1. In an experimental study (Gollwitzer, Heckhausen & Ratajczak, 1990), subjects were asked to form implementation intentions with respect to their wishes—that is, subjects had not yet formed goal intentions but were still

undecided whether or not to pursue the wish. Although these implementation intentions were not backed up by goal intentions, they proved to be effective. Subjects with implementation intentions evidenced an immediate and delayed (three weeks later) increase in their readiness to form goal intentions—that is, in their willingness to turn their wishes into action.

2. Research on action "slips" has identified a certain type of slip which also suggests that implementation intentions unfold their effects independent of the respective goal intention. These action slips occur because the situation specified in an implementation intention still triggers the intended behavior although the respective goal intention has already been achieved by some other type of action (Heckhausen & Beckmann, 1990) or has become obsolete (Birenbaum, 1930).

3. In the study employing embedded figures reported above (Steller, 1992), the effectiveness of implementation intentions was increased when subjects were asked to intensify their implementation intentions by mobilizing will power. Assuming that the strength of the respective goal intention remained unaffected by these efforts, this finding implies that the effectiveness of implementation intentions is *not* solely dependent on the strength of the respective goal intention. Other factors modify their effectivenes; in Steller's study, it was the mobilization of will power. Further factors, however, such as specifying the critical situations and behaviors with great exactness and precision, might play a similar role.

As much as these observations speak for independence of implementation intentions from goal intentions, it is easy to find convincing arguments for the counterposition of dependence. After all, action slips of the kind noted above are the exception rather than the rule. This implies that implementation intentions possess the potential to be sensitive to the strength of the respective goal intention. Accordingly, one would expect that in the retaliation study reported above (Malzacher, 1992), an apology should not simply weaken subjects' goal intention to retaliate (see Ohbuchi, Kameda & Agarie, 1989). The observed effects on reading speed for positive and negative adjectives when subjects were primed subliminally by the face of the critical experimenter, should also be attenuated. In other words, situations specified in implementation intentions should no longer trigger automatic processes that help the initiation of the intended behavior once the goal intention to retaliate has become obsolete (for a discussion on goal-dependent automaticity, see Bargh, 1989). In any case, there are good arguments for dependence as well as independence of implementation intentions from goal intentions. Given this state of affairs, empirical research on the interplay of goal intentions and implementation intentions should attempt to identify the conditions that make the effects of implementation intentions sensitive to the strength of the respective goal intention.

ACKNOWLEDGEMENTS

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