CHAPTER 13

The Volitional Benefits of Planning

Peter M. Gollwitzer

Assume that you have decided to accomplish a personal wish or desire that has been on your mind for quite some time. Should you go ahead and plan the execution of behaviors that will eventually lead to your desire? Or would planning only be a waste of time, as you already feel highly committed to act and ready to go? Would passively waiting for a good opportunity to get started not be sufficient? As planning might not add anything to the commitment implied by your decision, the time and effort devoted to planning might be unnecessary. The present chapter focuses on this issue: Does planning promote the willful implementation of a person's goals and thus provide volitional benefits?

My colleagues and I believe that planning helps to alleviate crucial volitional problems of goal achievement, such as being too easily distracted from a goal pursuit or giving up in the face of difficulties when increased effort and persistence are needed instead. The conceptual analysis of this question relies on ideas that have evolved around the model of action phases (Heckhausen & Gollwitzer, 1987). In particular, we use two different but related concepts to understand the processes by which planning unfolds its beneficial effects on goal achievement: "implemental mind-sets" (Gollwitzer, 1990) and "implementation intentions" (Gollwitzer, 1993).

THE STRUCTURE AND FUNCTIONS OF PLANS

Planning is a mental strategy that prepares the individual for future action. For instance, a person who faces the task of retrieving a book from the library can mentally prepare this activity by planning. Planning commonly precedes the execution of a course of action and thus anticipates future relevant situational contexts (e.g., the physical and organizational features of the library), as well as the course of action to be executed. The end result of this mental activity is a plan stored in memory. Such plans may differ on a variety of structural features, however. Plans may be either complete (i.e., they specify

each individual link of a course of action) or incomplete (i.e., some steps remain unspecified). These steps are filled by later planning or interspersed on-line into an individual's actual acting. Plans may vary in terms of their complexity (i.e., they may entail one, a few, or many different steps of action) or specificity (i.e., the anticipated situational contexts and the various actions to be executed are specified in detail or left rather vague). Moreover, some plans entail a number of choice points and can thus be modified flexibly in response to situational demands once the individual has started to act, whereas others entail one single, select course of action and thus cannot be easily modified when failure is encountered during the enactment of the plan. Also, plans may be linked to one another and organized in some temporal or hierarchical order; finally, plans may entail either well-practiced, reliable solutions or newly developed insights (for reviews, see Berger, 1988; Friedman, Scholnick, & Cocking, 1987).

As different as plans are, they all serve the same primary function: to facilitate the performance of the task or goal at hand. The person who plans prior to retrieving a book from the library does so in order to locate the book more effectively. The person confronted with the Tower of Hanoi problem plans before starting on the task in order to avoid unnecessary moves. The present examples highlight the cognitive aspects of task performance and show that planning can help people to deal successfully with the *intellectual* demands of the tasks to be accomplished. The analysis of this function of planning has been of major interest to cognitive psychologists (e.g., Hayes-Roth & Hayes-Roth, 1979; Mannes & Kintsch, 1991; Kreitler & Kreitler, 1987; Bruce & Newman, 1978) and researchers interested in artifical intelligence (Wilensky, 1983). Of central interest are questions of how plans are constructed (e.g., top-down or event-driven), what kinds of plans are constructed for different types of tasks (e.g., retrieving a book from the library vs. solving the Tower of Hanoi problem), and whether or not plans that are effectively constructed help to overcome the intellectual problems of achieving the task at hand.

Performing a task successfully, however, also requires overcoming volitional problems. Typical volitional problems include getting started with a task despite distractions, persisting at a task in spite of difficulties, and successfully resuming a task after a disruption. In the present chapter, it is demonstrated that planning also serves the function of alleviating these volitional problems of successful task performance. The volitional function of planning is explicated within the framework of a motivational–volitional theory of goal achievement, the model of action phases (Heckhausen & Gollwitzer, 1987; Gollwitzer, 1990).

THE MODEL OF ACTION PHASES

This model is based on the conceptual distinction between the motivational issue of goal setting and the volitional (willful) issue of goal striving (Lewin,

Dembo, Festinger, & Sears, 1944). It is assumed that the principles guiding goal selection and those guiding goal achievement are qualitatively different (Kuhl, 1984). The model provides a temporal perspective that starts with the awakening of a people's wishes prior to goal setting and continues to the evaluative thoughts people have once goal striving has led to some kind of outcome. The sequence of events within this comprehensive time frame is spelled out in four successive, discrete tasks that need to be accomplished in order to promote wish fulfillment (see Figure 13.1).

The first of these tasks, to be accomplished in the "predecisional" phase, consists of deliberating wishes and setting preferences. People cannot act on all of their wishes at once; some wishes may contradict each other, others are too difficult to implement, and life is simply too short to follow all of their wishes. They have to decide which of their many wishes they prefer to pursue. Preferences are established by employing the evaluative criteria of feasibility and desirability. A wish's feasibility is determined by reflecting on the chances that it can be realized (e.g., "Do I possess the necessary skills and talents, time, access to means, and opportunities?"). Desirability relates to the expected value of wish fulfillment (i.e., the likelihood of the positive and negative consequences of having achieved the desired wish, such as an anticipated positive or negative self-evaluation, evaluation through others, progress toward some important life goal, excitement of acting on the wish, and external costs or rewards). The perceived feasibility and desirability of a given wish are not fixed givens, but depend on whether the wish is scrutinized in the context of other complementary or contradicting wishes.

The model suggests that progress toward fulfilling a wish will not occur simply through judging a wish high in desirability and feasibility. Rather, progress demands a decision to act on a given wish. The model speaks of a transition from wishes and desires to binding goals, the latter being accompanied by a feeling of determination or obligation to fulfill the implied wish. Forming a goal commitment, however, is just a prerequisite for mak-
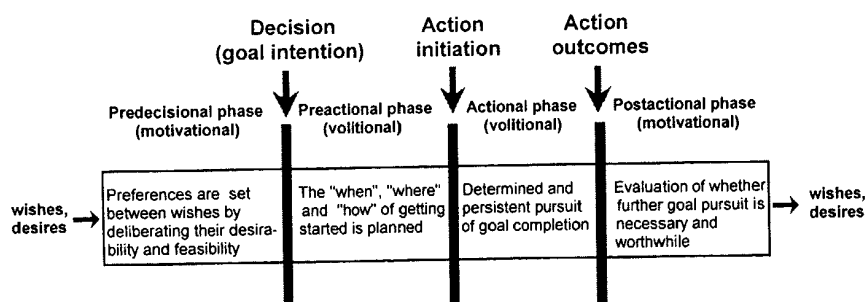

FIGURE 13.1. The model of action phases dissects the course of wish fulfillment into two motivational and two volitional phases. The boxes between the transition points (decision, action initiation, and action outcomes) describe the distinct tasks associated with each of the four phases (predecisional, preactional, actional, and postactional).

ing progress toward wish fulfillment. Once a decision has been made, the next task to be solved is promoting the initiation and successful execution of goal-directed actions. This may be quite simple when the necessary goal-directed actions are well practiced or routine. However, things may get rather tricky when people are still undecided about where and how to act. In such cases, the execution of goal-directed actions needs to be prepared. The model of action phases speaks of this period prior to the initiation of goal-directed action as the "preactional" phase. To advance further on the way from wishes to action, individuals reflect and decide on *when, where, how,* and *how long* to act, thus creating plans for action.

With the initiation of goal-directed behaviors, individuals enter the "actional" phase. The task associated with the actional phase is bringing goal-directed behaviors to a successful conclusion. For this purpose, it is necessary to respond readily to situational opportunities and demands. People should jump at all opportunities that allow progress toward their goals, and when difficulties and hindrances are encountered, they should readily increase their efforts. This responsiveness to situational opportunities and demands promotes goal achievement.

The final action phase is called "postactional." Here the task is to evaluate goal achievement. This is done by comparing what has been achieved to what was desired. Often reality does not live up to people's wishes and desires even when they are determined to act on them. They may have to admit that they simply did not perform as well as they had hoped or that the environment was not as supportive as they had expected, and that therefore they fell short of attaining their goals. But even if they do fully attain their goals, they may learn that their successes are not as sweet as they had hoped. In the postactional phase, people look back at the original deliberation of their respective wishes and desires. This triggers renewed deliberation and re-evaluation of their feasibility and desirability. As a consequence, individuals may reduce their standards of performance with respect to the goal at hand, but they may also start to consider other, competing wishes and desires that now appear comparatively more feasible and desirable. Apparently, the postactional phase directs individuals toward the past as well as the future; most importantly, it brings them back to where they started—their wishes and desires.

The central theme in the postactional phase (i.e., a primary concern for goal selection) is therefore the same as in the predecisional phase. Accordingly, the model describes both of these phases as motivational (i.e., goal-selection-oriented), whereas the preactional and actional phases in between are considered to be volitional in nature. In the latter two phases, the primary concern is to implement a chosen goal successfully (i.e., an orientation toward goal achievement).

In summary, the model of action phases attempts to delineate distinct tasks within the course of wish fulfillment. In temporal order, these tasks are as follows: setting preferences between or among wishes, making plans

for goal-directed actions, effectively executing goal-directed actions, and evaluating performances and outcomes. The model's primary objective is to identify the typical problems people encounter when attempting to translate their wishes and desires into reality. But the model has also stimulated two theoretical concepts that explain people's functioning at various stages of wish fulfillment. These are the concepts of "mind-set" and "implementation intention." Both are particularly useful for understanding the beneficial effects of planning on the implementation of goals.

The Concept of Mind-Set

The concept of "mind-set" was suggested by the Würzburg school of thought (Külpe, 1904; Watt, 1905). It was an attempt to explain the experimental observation that instructing subjects to solve a specific task creates a related cognitive set that furthers the solution of the task at hand, but hampers solving other, unrelated tasks. Apparently, when a person becomes involved with a given task, relevant cognitive procedures are activated and hence become more easily accessible. When this idea is applied to the model of action phases, it follows that different mind-sets (i.e., general cognitive orientations with distinct features) should emerge when a person addresses the different tasks associated with the various action phases. These mind-sets should be endowed with cognitive features that facilitate the respective tasks.

Elsewhere, I (Gollwitzer, 1990) have employed this idea to demonstrate that the task addressed in the predecisional phase (setting preferences between or among wishes) is indeed different from the task addressed in the preactional phase (planning the execution of goal-directed actions). In various studies, it was demonstrated that subjects who had been asked to deliberate a personal wish developed a different cognitive orientation (i.e., a "deliberative" mind-set) than subjects who had been induced to plan the execution of a personal goal (i.e., an "implemental" mind-set). Comparing the features of the deliberative versus the implemental mind-set, my colleagues and I observed the following: open-mindedness versus closed-mindedness with respect to processing available information (Heckhausen & Gollwitzer, 1987); cognitive tuning toward feasibility- and desirability-related issues versus cognitive tuning toward implementation-related issues (Gollwitzer, Heckhausen, & Steller, 1990); impartial analysis of desirability-related information versus partial analysis of this information (Beckmann & Gollwitzer, 1987); and accurate analysis of feasibility-related information versus a self-serving, optimistic analysis (Gollwitzer & Kinney, 1989). These findings support the assertion of the model of action phases that the predecisional and the preactional phases are qualitatively distinct.

These data, however, can also be utilized to find an answer to the question of the present chapter: Does planning have volitional benefits? We only have to delineate the crucial problems of implementation and then scrutinize the accumulated implemental mind-set findings in terms of whether the dis-

covered cognitive features potentially alleviate these problems. If the answer is positive, we can be assured that planning furthers the implementation of goal-directed actions, at least via the induction of implemental mind-sets.

The Concept of Implementation Intention

There should be more to planning than just creating the cognitive orientation of the implemental mind-set. People may strongly commit themselves to their specific plans, and this commitment may also trigger cognitive processes that help them perform goal-directed actions. These implementation-related commitments are not of primary concern to the model of action phases, as the model focuses on goal commitments (i.e., goal intentions). It postulates that progress toward goal attainment first of all requires a decision that transforms the deliberated wish or desire into a binding goal, which ends conflict among competing wishes and desires. Such a decision takes the format of "I intend to achieve X!" and therefore is best conceived of as a goal intention. The X specifies a desired end-state, which may be the execution of a concrete behavior or the attainment of a desired outcome. Accordingly, the consequence of having formed a goal intention is a feeling of commitment to achieve this end-state.

However, as long as the implementation of a chosen goal does not follow habitualized routes, an individual will have to make further decisions. This time the choice is between or among competing ways of realizing the goal. Such decisions take the format of "I intend to do X when situation Y is encountered!", and I have referred to them as "implementation intentions" (Gollwitzer, 1993). In an implementation intention, an anticipated future situation (opportunity) is linked to a certain goal-directed behavior. Holding implementation intentions commits the individual to perform certain goal-directed behaviors when the critical situation is actually encountered.

We discovered the concept of implementation intention in a study on the transition from weighing to willing (Gollwitzer, Heckhausen, & Ratajczak, 1990). In this study, subjects first had to name an unresolved personal problem of the following format: "Should I try to attain some desirable X or not?" We hoped that this would elicit unfulfilled wishes and desires. Indeed, subjects named problems such as "Should I move in with my boyfriend?", "Should I switch my major?", and "Should I go on a skiing vacation?" Then we asked subjects to indicate how far they felt from making a commitment to act on their wishes (i.e., forming a goal intention). All subjects were far from making a goal commitment. Finally, we had subjects think in various ways about the events associated with goal implementation. One group of subjects had to imagine the positive consequences that they expected to come true once their wish had been implemented. Another group had to simulate various possible ways of implementing their wishes. In a final group, subjects had to decide on one specific route of implementation.

When we assessed again how far subjects felt from making a goal com-

mitment, we discovered that only subjects in the final group had advanced significantly. Apparently, committing themselves to a certain way of implementing a wish strengthened these subjects' readiness to transform the wish into a binding goal. Mediational analyses revealed that this effect was not due to changes in the feasibility or desirability of the wishes and desires named; rather, it was attributable to how strongly subjects felt committed to when, where, and how they intended to implement their wishes and desires.

Subsequently, we (see Gollwitzer, 1993) explored whether implementation intentions could also promote the achievement of chosen projects (i.e., goal intentions). For this purpose, we asked college students prior to Christmas break to name projects they intended to achieve during vacation. Subjects indicated such projects as writing a seminar paper or settling a family conflict. When we asked subjects whether they had formed intentions on when and where to get started (i.e., implementation intentions), about two-thirds responded positively. After the Christmas vacation, we contacted the subjects and checked on project completion. Of the subjects who had formed implementation intentions, two out of three had carried out their projects. Subjects without implementation intentions mostly failed to complete their projects (only one-fourth were successful).

The findings of this latter study were corroborated in an analogous experiment. In this experiment all subjects were asked, again prior to Christmas break, to complete the same type of project. More specifically, subjects were requested to write a report on how they spent Christmas Eve. This report was to be written no later than 48 hours after the event and then sent to the experimenters, who were presumably conducting a demographic study on how people spend their Christmas holidays. Half of the subjects were randomly chosen and then instructed to form implementation intentions. They were handed a questionnaire that requested them to specify when and where during the 48 hours they intended to write the report. The other half of the subjects were not requested to pick a specific time and place for implementing this project. When we received subjects' reports after Christmas, we analyzed them in terms of the dates when they were written. It turned out that three-quarters of the implementation intention subjects wrote the report in the requested time period, whereas only one-third of the control subjects managed to do so. It would be tempting to explain this finding in terms of obedience to the authority of the experimenters; being aware of this problem, we granted subjects absolute anonymity.

Impressed by the powerful effects of implementation intentions, we raised the question of how these effects come about. Our theory proposes (Gollwitzer, 1993) that implementation intentions are formed to alleviate the volitional problems of goal achievement. As soon as people anticipate such problems, they should form implementation intentions to protect themselves from falling prey to these problems. Because implementation intentions spell out plans that link situational cues to goal-directed behaviors, we

postulated that implementation intentions pass on the control of goal-directed behavior to environmental cues. On a more micro level of analysis, we hypothesized that the mental representation of the specified situational cues becomes highly activated, thus making these cues easily accessible. In addition, we hypothesized that linking situational cues to goal-directed behaviors will facilitate the initiation of these behaviors in the presence of these cues. This implies that once these cues are encountered, goal-directed behavior is initiated relatively swiftly and effortlessly; moreover, action initiation is triggered without conscious intent.

THE VOLITIONAL PROBLEMS OF GOAL ACHIEVEMENT

Problems of volition can be classified into two categories. The first set of problems involves getting started. For a number of reasons, people continue to miss good opportunities to act, and thus delay goal achievement. The second set of problems involves bringing started goal pursuits to successful completion. People often give up in the face of difficulties, fail to ward off distractions, and have trouble resuming the pursuit of their goals once disruptions have occurred. How can implementation intentions and implemental mind-sets alleviate such problems?

Getting Started: Positive Effects of Implementation Intentions

As postulated above (see also Gollwitzer, 1993), implementation intentions are expected to lead to heightened accessibility of the specified situational cues (i.e., good opportunities). This implies that implementation intentions are particularly helpful when opportunities to act are hard to detect, and when people find it difficult to attend to these opportunities. Finally, as the situation–behavior links are expected to facilitate action initiation, the benefits of implementation intentions should prevail in situations that require fast and efficient responding. In the following subsections, experimental studies are presented that demonstrate these beneficial effects of implementation intentions.

Perceptual Readiness

Good opportunities to act on a goal are lost when people do not recognize them. This may happen even when they are actively looking for a good opportunity to get started. Think of a situation, for example, where two people who are communicating with each other are searching for a good opportunity to influence the other (e.g., ask for a favor, make a compliment and ingratiate the other, retaliate, or aggress)—often with little success. Planning that links certain situational cues to specific behaviors serving these

interaction goals should facilitate goal pursuit, given that such linkages lead to a heightened cognitive accessibility of these cues.

Steller (1992) analyzed the perceptual readiness for situational cues specified in implementation intentions. She followed the postulate of the "New Look" research on perception (Bruner, 1957), which states that heightened accessibility of a concept induces a perceptual readiness that allows for the swift and easy recognition of relevant stimuli. Because implementation intentions are thought to furnish intended opportunities with heightened accessibility, increased perceptual readiness was expected for these opportunities—much as a person's expectations, need states, interests, and values produce an increase in perceptual readiness for relevant objects (e.g., Bruner, 1951; Bruner & Goodman, 1947; Bruner & Postman, 1948).

More specifically, Steller employed the so-called embedded figures test (Gottschaldt, 1926; Witkin, 1950). This test consists of complex geometrical figures (b-figures) that contain a smaller partial figure (a-figure). The a-figure is hidden within the b-figures according to Gestalt principles and is thus difficult to detect. Gottschaldt (1926) reported that even excessive familiarizing (over 300 trials) with the a-figure did not alleviate the difficulty of detecting it within the b-figures. Still, following the idea that implementation intentions would lead to heightened accessibility and thus better detection of the a-figure, Steller predicted that subjects who formed relevant implementation intentions would show enhanced detection performance. More specifically, subjects were requested to form implementation intentions on how to turn the a-figure into a new traffic sign. Subjects put down in writing how they intended to draw their traffic sign (i.e., they had to make a choice of color, etc.). The control subjects were requested to form the goal intention to draw a traffic sign, but were discouraged from forming implementation intentions on how they wanted to do that. To account for the possibility that implementation subjects' thinking about how to draw the sign without committing themselves to one specific behavioral route would produce heightened accessibility in and of itself, a second group of implementation intention subjects was asked to enhance their commitment to their plans of drawing the sign. That is, they were requested to mobilize maximal willpower for each detail of the plan by saying to themselves, "I will do it in exactly this way!" It was hoped that this procedure would induce highly mandated plans and would thus lead to the best detection performance of the three groups of subjects.

Before subjects were allowed to paint a paper model of their traffic sign, they were first asked to work on a visual search task consisting of b-figures that either contained the a-figure (the traffic sign) or not. Detection performance for the a-figure was highest in the intensified implementation intention condition and lowest in the goal intention condition, with the regular implementation intention condition in between. Assuming that the shape of the a-figure qualified as the situational cue for the intended actions speci-

fied in subjects' implementation intentions, this pattern of data suggests that the strength of commitment to plans spelled out in implementation intentions is positively related to the accessibility of the specified situational cues.

Disruption of Focused Attention

When people are highly absorbed in some ongoing activity, wrapped up in demanding ruminations, gripped by an intense emotional experience, or simply tired, chances are high that they do not seize an available good opportunity to act, simply because it fails to attract attention. The reason for this is that their attention is focused on other things that have nothing to do with the question of how to achieve the intended goal. Can implementation intentions disrupt focused attention?

The so-called dichotic listening task, in which words are presented to both ears simultaneously, can be used to study the disruption of focused attention. Subjects are instructed to repeat (i.e., shadow) the words presented to one ear (i.e., the attended channel) and to ignore the words presented to the other ear (i.e., the nonattended channel). Focusing attention on the shadowed ear becomes difficult when the words presented to the nonattended ear attract attention to themselves. This is the case for words that relate to temporarily or chronically active categories or schemas (e.g., Bargh, 1982; Johnston, 1978; Nielson & Sarason, 1981; for a review, see Johnston & Dark, 1986). Whether an item presented on the nonattended channel has the potential to attract attention, and thus to disrupt focused attention, can be assessed in two different ways: first, by checking whether shadowing becomes faulty and shadowing speed decreases while shadowing mistakes increase (see Dawson & Schell, 1982); second, by assessing whether subjects' performance on a subsidiary secondary task (e.g., quickly turning off a probing light that goes on at irregular intervals) deteriorates. It is assumed that the more attentional effort is required by the shadowing task, the less capacity remains to respond to a subsidiary probe stimulus (see Kahneman, 1973; Logan, 1979).

Assuming that opportunities specified in an implementation intention acquire heightened accessibility, I (with Marit Mertin and Birgit Steller) presented words related to such opportunities to the nonattended channel in a dichotic listening task. These words were obtained in the following manner. First, subjects had to name a project (i.e., a goal intention) that they wanted to complete in the near future. 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 intended to implement each of these steps. From these implementation intentions, we abstracted the critical words (i.e., the specified opportunities) for the dichotic listening task, which demanded the shadowing of several word blocks. On the nonattended channel, half of the simultaneously presented word blocks contained critical words; the other half contained neutral words.

The critical words turned out to be highly disruptive to focused atten-

tion. Not only did they reduce the subjects' speed in turning off the probing light, but they also worsened their shadowing performance (in terms of slowing down reading speed and increasing shadowing errors). When we applied a recognition test for the words presented on the nonattended channel, we observed a better recognition performance for critical than for noncritical words, which indicated shifts of attention to the nonattended channel. Thus it appeared that even when efforts to direct attention to the shadowing task were stepped up (as indicated by the reduced speed in turning off the probing light), the critical words still managed to attract attention (as indicated by a weak shadowing performance and a high recognition performance).

One has to keep in mind that in this research the critical opportunities were presented to subjects in terms of a verbal description only. When a person actually enters a situational context that entails these opportunities in reality, their potential to attract attention should be even stronger. This implies that opportunities specified in implementation intentions will not easily escape people's attention even when they are focusing on other things (e.g., worries, strong emotions, the conscious pursuit of other goals) besides the respective goal pursuit.

Behavioral Readiness

The potential to disrupt focused attention will certainly make it less likely that good opportunities remain unnoticed. But this will not protect people from letting slip those opportunities that present themselves only for a short moment. What is needed here is a swift initiation of the planned goal-directed behaviors. Implementation intentions not only specify when and where people plan to get started on goal achievement; they also lay down how this should be done, and thus also specify the intended goal-directed behavior. More importantly, they create a link between the situational context and the goal-directed behavior, and people feel committed to initiate this behavior once the situational cues are encountered. Does forming such linkages facilitate the initiation of the goal-directed behaviors, given the presence of the specified opportunity? If so, this would guarantee that people could effectively respond to good opportunities even if these present themselves for only a short moment.

Brandstätter (1992, Study 1) explored this question in an experiment in which subjects were requested to take a convincing counterposition on racist remarks made by a confederate presented on videotape. All subjects readily agreed to do so. Subjects were then 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 that they considered to be suitable (i.e., good opportunities) for a counterargument. To induce implementation intentions, one group of subjects was requested to form intentions that linked the marked situational cues to specific counterarguments. Control subjects did not form such implementation intentions, but were encouraged to think

of good counterarguments to be delivered later in writing. In a third viewing of the video, the subjects were finally allowed to stop the videotape at any point and deliver their counterarguments on audiotape.

Without subjects' being aware of it, a computer recorded the marks they had made on the videotape and also the times at which they started to speak. Implementation intention subjects managed to place their counterarguments within a narrowly defined critical time period surrounding the points previously marked more frequently than control subjects. One has to keep in mind that all subjects intended to achieve the goal of taking a convincing counterposition to a racist view. Still, good opportunities elicited goal-directed behaviors (i.e., presentations of 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.

It should be highly beneficial if this "speed-up" effect remains active even when people are busy with other things. This should allow people to seize short-lived opportunities even when there is a high cognitive load from being involved with other demanding tasks. Following the logic of the dual-task paradigm (e.g., Kahneman & Treisman, 1984; Posner, 1978; Shiffrin & Schneider, 1977), Brandstätter (1992, Study 2) explored whether the "speed-up" effect originating from an implementation intention is effortless in the sense that it does not put much cognitive load on limited processing resources, and thus persists even when the cognitive demands of the primary task in a pair of tasks are high. In this study, subjects were asked to work simultaneously on two tasks, which were both presented on a computer monitor in two adjacent windows. The primary task consisted of working on meaningless syllables and was presented to each subject at low and high difficulty levels. The secondary task was to press a button as quickly as possible when numbers rather than letters were shown.

Half of the subjects were instructed to respond as quickly as possible to a specific number; the other half (the control group) were asked to familiarize themselves with this critical number by repeatedly writing it on a sheet of paper. Both groups of subjects were asked to do this for the purpose of speeding up their responses to this number. Implementation intention subjects showed a marked acceleration to the critical number, and this "speed-up" effect was not affected by the level of difficulty of the primary task. For control subjects, no acceleration in responding to the critical number was observed. Reaction times to critical and noncritical numbers did not differ, and they corresponded to the reaction times for noncritical numbers in the implementation intention condition.

Why do implementation intentions lead to fast and effortless initiation of goal-directed behaviors? It seems possible that the commitment (or willpower) people attach to the situation–behavior contingencies that they proclaim in their implementation intentions creates very strong links, which

normally can only be attained through frequent and consistent situation–response pairings. As this latter procedure leads to the automatic, direct environmental control of behavior (Bargh, 1992, 1994), one could argue that implementation intentions also achieve this effect. In other words, implementation intentions may be conscious mental acts that set up contingencies, which will then lead to the automatic, environmental control of behavior.

One feature of automatic control of behavior is high efficiency (i.e., the behavior is excuted fast and effortlessly), and Brandstätter's (1992) studies clearly suggest that implementation intentions lead to this type of action initiation. One further feature of automatic control of behavior, however, is that it is triggered without any conscious intent once the critical situational context is encountered. Could it be that implementation intentions also manage to bring about this latter feature of automatic action control? Malzacher (1992) explored whether the opportunity specified in an implementation intention prompts supportive cognitive processes without conscious intent. The processes considered were the automatic activation of knowledge that is instrumental to the effective initiation of the intended action and the automatic inhibition of knowledge that potentially disturbs the initiation of actions. Malzacher employed a retaliation paradigm modeled after that of Zillman and Cantor (1976). The intended action consisted of responding to an insult in the form of a complaint spoken directly to the transgressor. Accordingly, facilitative knowledge entailed attributes to be ascribed to an unfriendly person, whereas inhibitory knowledge entailed attributes one would ascribe to a friendly person.

Subjects who were insulted by a first experimenter were then induced to form the following implementation intention: "As soon as I see this person again, I'll tell her what an unfriendly person she is!" In an allegedly independent second study run by another experimenter, subjects had to read a series of successively presented adjectives as quickly as possible from a screen. The adjectives were either positive or negative words, all suitable for describing people. Shortly (about 100 milliseconds) before each adjective, either a neutral face or the face of the unfriendly experimenter was subliminally presented (presentation time was less than 10 milliseconds on average, and the faces were pattern-masked). Negative adjectives presented directly after the face of the unfriendly experimenter tended to be read faster than those presented directly after the neutral face, and positive adjectives were read much more slowly after the unfriendly experimenter's face than after the neutral face. This pattern of data was not observed in a first control group of subjects, who were not insulted, or in a second control group of subjects, who formed goal intentions to retaliate as a response to the experienced insult but did not furnish these with implementation intentions. Apparently, the situational cue specified in an implementation intention directly elicits, without conscious intent, cognitive processes (in this case, the activation of relevant knowledge and the inhibition of irrele-

vant knowledge) that facilitate the initiation of the intended action. The mere formation of a goal intention is not sufficient to produce this effect.

In summary, it has been observed that the situational cues specified in implementation intentions lead to fast and effortless responding (Brandstätter, 1992, Studies 1 and 2). Even prior to the individual's becoming aware of these cues, they manage to trigger cognitive processes that support the initiation of the intended actions (Malzacher, 1992). The findings on heightened behavioral readiness as a consequence of implementation intentions suggest that people can switch from the effortful, conscious control of goal-directed action to automatic environmental control—simply by forming implementation intentions. A recent dissertation by Lengfelder (1994) supports this conclusion. Lengfelder discovered that frontal lobe patients can also benefit from implementation intentions. More specifically, the "speed-up" effect reported above (Brandstätter, 1992, Study 2) was also observed with frontal lobe patients. Because these patients are known to be deficient in the conscious control of action, this finding adds to the proposition that implementation intentions induce direct, automatic action control.

The automatic action control associated with implementation intentions has an interesting implication that pertains to the control of unwanted habitual responses. When certain behaviors, goals, and cognitive concepts are repeatedly and consistently instigated in the same situational context, they fall under the direct control of the respective situational cues (Bargh & Gollwitzer, 1994). If people want to inhibit these behaviors, goals, and cognitive concepts, they may turn to implementation intentions. If these intentions link the critical situational cues to antagonistic behaviors, goals, and concepts, they can start a race between the (unwanted) habitual response and the intended alternative (antagonistic) response. This race should be won by the intended antagonistic response when the link created by the implementation intention is stronger then the link established through repeated and consistent pairing of the critical situational cues and the (now unwanted) original response. We are currently exploring this line of thought by studying the inhibiting effects of implementation intentions on the suppression of habitual behaviors and the so-called automatic activation of stereotypes (e.g., gender or professional stereotypes).

Getting Started: Positive Effects of Implemental Mind-Sets

The effects of implementation intentions are very specific. They only relate to the particular situations and behaviors implied. These situations will be more easily recognized and more readily attended to, and the behaviors will be executed more efficiently. But forming implementation intentions also has some general effects. As pointed out above, intensive involvement with the planning of the implementation of one's goals creates a so-called implemental mind-set. The features of the implemental mind-set also help people to get started on their goals, because these features alleviate one very

crucial problem of getting started. Often people fail to act on a given goal even though the present situational context would allow it, only because they experience doubts about either the feasibility or the desirability of the goal. Numerous mind-set experiments suggest that various aspects of the cognitive orientation of the implemental mind-set suppress such doubts.

Positive Illusions

We (Gollwitzer & Kinney, 1989) put one group of our university student subjects into an implemental mind-set by asking them to plan the implementation of a decision they had already made (e.g., to move from home). More specifically, subjects had to divide this project into five steps, and to list when, where, and how they intended to initiate goal-directed actions for each of these steps. The second group of subjects was put into a deliberative mindset. These subjects were asked to contemplate the pros and cons of making a major change in their lives (e.g., to move from home). Subsequent to the mind-set manipulations, subjects participated in an ostensibly unrelated task that required them to estimate their degree of personal control. The final group of subjects, the control group, immediately started to work on this task.

The task was modeled after Alloy and Abramson's (1979) contingency learning paradigm and requested subjects to turn on a target light by either pressing or not pressing a button. Although light onset was noncontingent to subjects' behavior (i.e., pressing or not pressing the button), implemental mind-set subjects inferred that they had successfully exerted personal control over the light task when light onset was frequent, whereas subjects in the deliberative mind-set condition did not succumb to this illusion of control. Implemental mind-set subjects' illusion of control tended to be even stronger than that of control subjects.

We (Taylor & Gollwitzer, 1995) recently extended this research by encompassing other indications of positive illusions. The same type of mindset manipulation was used as in the Gollwitzer and Kinney (1989) study. Subsequently, subjects had to fill out various questionnaires. On one questionnaire, subjects rated themselves in comparison to the average college student of their age and gender on a series of 21 qualities and skills (e.g., cheerfulness, academic ability). Another questionnaire assessed how likely it was that they or the average college student of their age would encounter various controllable risks (e.g., divorce) or uncontrollable risks (e.g., losing a partner to an early death). Implemental mind-set subjects described their own personal qualities and skills more positively than they did those of the average college student, and they did this to a larger degree than both deliberative mind-set and control subjects did. The same pattern of data emerged for perceived invulnerability to both controllable and uncontrollable risks. Finally, implemental mind-set subjects reported themselves to be in a better mood than both deliberative mind-set and control subjects. The differences

in mood did not account, however, for the differences in self-perception and perceived invulnerability to risks.

All of these findings suggest that implemental mind-set subjects are very certain about the feasibility of their goals. They believe themselves to be very capable, rather invulnerable to controllable as well as uncontrollable risks, and in control over (uncontrollable) action outcomes. This rampant optimism associated with the implemental mind-set should relieve a planning person's mind from any doubts about being able to reach a desired goal, and thus should favor the efficient initiation of goal-directed actions. As has been shown over and over again, optimism about the feasibility of goals leads to more successful goal achievement than pessimism (for reviews, see Carver & Scheier, 1989; Bandura, 1991; Taylor & Brown, 1988; Seligman, 1990).

Unequivocal Behavioral Orientation

When it comes to acting on a chosen goal, people need to concern themselves with issues of how to achieve the goal. This implies that the question of whether the goal is indeed attractive should be settled for good. Deliberating the desirability of the chosen goal anew would only hamper the efficient initiation of goal-directed actions as doubts about the goal's desirability are raised. Does the implemental mind-set direct a person's thoughts away from the deliberative issue of estimating the expected value of the goal to the implementational issues of when, where, and how to act on the goal?

We (Gollwitzer, Heckhausen, & Steller, 1990) reported two experiments in which deliberative and implemental mind-set subjects' readiness to process expected-value-related information as compared to implementation-related information was studied. In the first study, subjects were presented with the beginnings of three different fairy tales and were asked to continue these tales with three sentences each. Implementational themes were more frequently observed in the sentences of implemental mind-set subjects than in those of deliberative mind-set subjects, with those of control subjects in between. The opposite was found for deliberative themes. In the second study, subjects' recall performance for information on the expected value as compared to information on the implementation of goals was assessed. Implemental and deliberative mind-set subjects showed better recall for the congruent information than for the incongruent, with the control subjects again in between.

These data strongly suggest that implemental mind-sets favor the processing of information relevant to executing a person's goals, and hamper the processing of expected-value-related (i.e., deliberative) information. Planning apparently orients people toward issues of implementation as processing of implementation-related information becomes easier, whereas the opposite is true for expected-value-related information. But there is a second principle serving this end. As researchers on cognitive dissonance have observed, postdecisional (pre-actional) subjects' perception of the attractiveness of the

chosen alternative increases, whereas the attractiveness of the nonchosen alternative decreases (Brehm, 1956). Some dissonance researchers have interpreted this finding as an attempt to arrive at an "unequivocal behavioral orientation" that precludes further deliberation of the choice alternatives (Jones & Gerard, 1967; Wicklund & Frey, 1981). Recent findings (Taylor & Gollwitzer, 1995, Study 3) support this view. When subjects who had started to plan the execution of a choice (e.g., to switch their major) were asked to deliberate its expected value, they did not think about pros and cons to an equal degree, but strongly favored pros over cons. In addition, they thought more about implementation-related issues than about the expected value of their choices. Apparently planning protects people from returning to the deliberation of a chosen goal by focusing them on both the pros of their choice and the implied implementational issues.

Completion of Goal Pursuit: Positive Effects of Implemental Mind-Sets and Implementation Intentions

Volitional problems are not only associated with getting started. When the first steps toward goal achievement are implemented successfully, further volitional obstacles may be encountered. First, people may have to step up their efforts when unexpected increases in task difficulty threaten successful task performance. Second, they may have to ward off distractions. Because most situations allow for more than one goal pursuit, people need to prevent the primary goal pursuit from getting derailed. Third, if they fail at these two problems, a further volitional problem presents itself: The interrupted goal pursuit needs to be resumed. Can planning possibly alleviate these volitional problems?

Effort Mobilization

Energization theory (see Wright, Chapter 19, this volume) holds that as perceived task difficulty increases, so does a person's effort (i.e., actual motivation)—at least up to a point. This cutoff point is reached when the person no longer sees further effort mobilization as worthwhile. In other words, this cutoff point describes a person's potential motivation and is reached rather early with unattractive tasks, but much later with attractive tasks. When this line of thought is combined with the observation that implemental mind-set subjects feel very positive about the expected value of their goals and are very optimistic about actually attaining them, it follows that people in an implemental mind-set should reach the cutoff point comparatively later. As a consequence, people in an implemental mind-set should show high persistence in the face of difficulties.

But effort mobilization may also be achieved via implementation intentions. If a person anticipates the critical difficulty and links it to a behavioral response that implies heightened effort, the initiation of this behavior should

be facilitated once the difficulty is encountered. In other words, an implemen-
tation intention that links an anticipated difficulty with a behavioral response
associated with high effort should lead to effort mobilization in the presence
of this difficulty (see the study by Schaal, 1993, described later).

Warding Off Distractions

Kuhl (for reviews, see Kuhl & Beckmann, 1985, 1994) has applied his theory
of action control to the issue of warding off distractions. The theory distin-
guishes a number of different mental strategies (e.g., attention control, emo-
tion control), which are assumed to effectively shield a person's ongoing goal
pursuit from distractions stemming from potential alternative pursuits.
Action-oriented people are found to use these strategies more effectively than
state-oriented people, as the latter tend to become wrapped up in rumina-
tive thoughts about past failures and desired successes or in the delibera-
tion of a decision.

Can planning also strengthen a person's shielding of an ongoing goal
pursuit? We conducted a number of mind-set studies to explore this issue
(see Gollwitzer, 1991, Ch. 4). In the first study, deliberative and implemen-
tal mind-set subjects were asked to memorize a coherent story consisting of
several sentences that were each presented centrally on an individual slide.
At the upper left and lower right corner of each slide, we placed single two-
syllable nouns. Recognition performance for these peripherally presented
nouns was worse for implemental than for deliberative mind-set subjects,
indicating that planning leads to more closed-mindedness in the sense of
concentrating on the task at hand (i.e., memorizing the centrally presented
sentences).

Follow-up studies (see Gollwitzer, 1991, Ch. 7) employed a modified
Müller–Lyer illusion. The classic figure was redrawn so that a narrow field
of attention (i.e., only exploring the center of the figure) produced differ-
ent illusions than a broader field of attention (i.e., also exploring the periph-
ery of the figure). Each subject was placed into a deliberative as well as an
implemental mind-set, and after each mind-set manipulation a series of modi-
fied Müller–Lyer figures was presented on slides. The implemental mind-
set produced more illusions associated with a narrow field of attention than
the deliberative mind-set did.

The results of these studies suggest that planning creates a certain closed-
mindedness, which is based on a narrowed field of attention. This effect of
planning, transported via the implemental mind-set, should facilitate ward-
ing off all kinds of distractions (even unanticipated distractions); the goal
that is currently pursued commonly takes center stage, whereas distractions
originate from the periphery. But planning can also aim directly at particu-
lar anticipated distractions. Implementation intentions that specify a feared
distraction as the situational cue to which a protective response is linked
should provide an effective strategy for escaping these distractions.

Patterson and Mischel (1976) thought of this possibility some time ago when they equipped children with plans to help them escape the temptations of "Mr. Clown Box." The children were trying to put as many pegs into a pegboard as possible in order to get permission to play with some attractive toys. However, a box dressed up as a clown was challenging the children's devotion to the pegboard task. Mr. Clown Box spoke to the children (e.g., asked them to disrupt their task and press his nose) and displayed various distractive stimuli (e.g., attractive toys in an illuminated window). The experimenter told children to form specific plans to escape the clown's distractions. Two different types of plans were formed: temptation-inhibiting plans ("When Mr. Clown Box says to look at him and play with him, then I just won't look at him, and say, 'I'm not going to look at Mr. Clown Box!' ") and task-facilitating plans ("When Mr. Clown Box says to look at him and play with him, then I just look at my pegboard and say, 'I'm going to look at my work.' "). As it turned out, the temptation-inhibiting plan facilitated children's pegboard performance (in terms of amount of pegboard work completed), compared to that of control children who were not equipped with plans. Furthermore, children with a temptation-inhibiting plan performed better than children with a task-facilitating plan, who were no more effective than children with no plans at all.

Apparently, people have to be cautious with respect to the specification of the behavioral side of their implementation intentions when it comes to warding off distractions. This was also observed in a recent experiment by Schaal (1993). University students were placed in front of a computer terminal and asked to solve as many of the arithmetic problems presented as possible. These problems were simple, but demanded much attention. For 15 minutes a series of problems was presented in a self-paced procedure (i.e., when one problem was answered, the next was offered). On top of the terminal a TV screen was mounted, showing very attractive, award-winning commercials in random intervals. Subjects were requested to form implementation intentions to protect themselves from these distractions. The implementation intentions were either disruption-inhibiting ("As soon as a commercial comes on, I will ignore it!") or task-facilitating ("As soon as a commercial comes on, I will concentrate on my work!"). The control subjects solely set the goal not to let themselves be distracted from working on the arithmetic problems (i.e., they formed a goal intention).

Subjects with distraction-inhibiting implementation intentions worked harder than control subjects (i.e., they answered more arithmetic problems), and subjects with task-facilitating implementation intentions were in between. As in the Patterson and Mischel (1976) study, the way in which the behavioral aspect of the plan was phrased mattered. Future research will have to find out why the distraction-inhibiting phrase ("When . . . , I will ignore the distraction!") is superior to the task-facilitating phrase ("When . . . , I will attend to my task!"), as well as when the task-facilitating phrase achieves an effect and when it does not.

Resumption of Disrupted Goal Pursuits

Following Lewin's (1926) tension system theory of intention, Ovsiankina (1928) and others (Mahler, 1933; Lissner, 1933) observed in their experiments that the resumption rate of an interrupted task was close to perfect, with the exception of cases where substitute completion occurred (i.e., a similar alternative task was performed instead). Ovsiankina and others inferred from these studies that people are rather effective in resuming interrupted tasks. However, if one considers delay instead of rate of resumption, a less positive picture presents itself. People often take a lifetime to return to a disrupted goal pursuit. Focusing on the delay of resumption thus suggests that people are rather ineffective in resuming interrupted goal pursuits.

My colleagues and I believe that *un*delayed resumption implies warding off distractions stemming from other unfinished business. Accordingly, we hypothesized that an implemental mind-set should facilitate quick resumption of a disrupted task in the presence of other unfinished tasks. To test this line of thought, Pösel (1994) ran an experiment in which university students were requested (by a first experimenter) to name various personal projects that still demanded action. These projects had to be such that a first implementational step could be effectively initiated by writing a letter. Once subjects had named their projects, two equally important projects were selected, and subjects were asked to start writing a letter for each project by putting the addresses of the recipients on two separate sheets of papers. At this point subjects were interrupted and led to a different room, where a second experimenter placed them into either a deliberative or an implemental mind-set; control subjects were requested to solve simple arithmetic problems.

When subjects returned to the first experimenter, she led them to a table with either both incomplete letters sitting on it (i.e., the conflict condition) or only one of them (i.e., the no-conflict condition). Then she timed both when subjects grabbed a letter and when they actually started writing. There was no difference among groups in terms of grabbing a letter, although subjects in all three groups took longer in the conflict condition than in the no-conflict condition. However, an interesting interaction effect was observed with respect to when subjects actually started to write (i.e., put the pencil on the sheet of paper). Conflict between letters slowed down deliberative mind-set subjects as well as control subjects, but not implemental mind-set subjects. The latter started writing as fast in the conflict condition as they did in the no-conflict condition. In other words, implemental mind-set subjects in the conflict condition resumed work on the incomplete letter at hand as if there were no second incomplete letter sitting on the table. This pattern of data suggests that an implemental mind-set does not create a general urge to complete unfinished business. Rather, it helps subjects to shield the resumption of an interrupted task from competing unfinished business. This finding parallels the observations reported in the subsection on warding off

distractions, suggesting that implemental mind-set subjects are characterized by a narrowed field of attention.

It seems plausible to assume, however, that the implemental mind-set aids efficient resumption of a disrupted project not only via the attentional mechanism discovered in the Pösel (1994) experiment. When individuals have doubts either about the feasibility or the desirability of resumption, the implemental mind-set's positive illusions and unequivocal behavioral orientation, respectively, should destroy these doubts and thus facilitate resumption. Finally, effective resumption should also be favored by implementation intentions that link critical situations to behaviors that qualify as effective resumptions.

CONCLUSION AND PROSPECTS FOR FUTURE RESEARCH

At the beginning of the present chapter, the following question has been raised: Given that a person feels highly committed to a goal, is planning how to achieve this goal just a waste of time? Analysis of this question strongly suggests that people can derive additional volitional benefits from planning. First, initiating goal-directed behaviors is facilitated, because planning creates a perceptual readiness for and guides people's attention toward relevant opportunities and means. In addition, it sets up a special behavioral readiness to respond effectively once these opportunities and means are encountered. Finally, the illusionary optimism and the unequivocal behavoiral orientation associated with planning suppress dysfunctional doubts about the goal's feasibility and desirability. Second, bringing initiated goal pursuits to successful completion is facilitated, because planning helps to mobilize effort in the face of difficulties and to ward off distractions. Moreover, if disruptions to goal-directed actions occur, planning furthers undelayed resumption.

The experiments discussed in the present chapter have demonstrated that many of the beneficial effects of planning are based on the cognitive features of the *implemental mind-set*. But what makes an implemental mind-set particularly powerful? Mind-sets are general cognitive orientations that originate when people become involved with solving a given task. Powerful mind-sets are rather stable over time and generalize across situations. The task that leads to the implemental mind-set is planning the execution of behaviors that lead to efficient goal achievement. Accordingly, we may assume that the more involved a person becomes with this task, the more pronounced the implemental mind-set is.

In our mind-set studies, my colleagues and I requested subjects to think of the five most important implementational steps of their goal, and then to commit themselves to plans specifying, when, where, and how they intended to execute these steps (i.e., the subjects were asked to form implementation intentions). Can other forms of planning also lead to an implemental mind-set? The task of planning can also be approached with a more hesi-

tant, reflective attitude, as is entailed in mental simulations that explore possible routes to achieving one's goal (see Taylor & Pham's conceptualization of process simulation, Chapter 10, this volume; Taylor & Schneider, 1989). Such mental simulations should not be accompanied with the strong sense of commitment typically attached to the plans specified in implementation intentions. However, mental simulations can be applied repeatedly (see Taylor & Pham, Chapter 10, this volume), which should bring out one particular route to implementation. When this very same route is reiterated in numerous mental simulations, strong links between certain situational cues and goal-directed behaviors should emerge. Accordingly, the mental strategy of repeated simulation of the same implementational route should also result in firm plans. In other words, there may be two different types of planning—one based on the repeated simulation of a specific course of implementation, and the other based on the willful acts of forming implementation intentions—both of which possess the potential to induce strong implemental mind-sets.

The amount of involvement with the task of planning should, however, be affected not only by the planning strategies employed. The features of the planning task at hand should also matter. Some goals simply do not need much planning. When the implementation of the goal is determined from the outside (i.e., when other people determine how it is done), or when there exists one well-practiced implementational routine (e.g., when a person is driving to work), no thorough planning should be needed, and therefore no strong implemental mind-set should emerge. But even with goals that demand intensive planning, we should expect differences in the amount of planning activity. More important goals should induce a stronger motivation to plan thoroughly. Furthermore, some people may generally be more prone to planning than others (e.g., Kuhl's action-oriented individuals).

The experiments discussed in the present chapter have also demonstrated that many of the beneficial effects of planning are based on the various cognitive processes originating from *implementation intentions*. What makes for particularly powerful implemetation intentions? Because implementation intentions link situational cues to behvavioral responses, the strength of an implementation intention should depend on the quality of the link between these situational cues and the intended goal-directed behaviors. Strong links should lead to more powerful effects of implementation intentions. As these links are established by an act of will ("I intend to do X when I encounter the situation Y!") and induce a commitment to act in the specified way, more intensive willing ("I really intend to ...") should lead to stronger commitments and thus to more effective implementation intentions.

In a recent study (Seehausen, Bayer, & Gollwitzer, 1994), we systematically varied people's readiness to commit themselves to the plans spelled out in their implementation intentions. Prior to the experiment, subjects were told (based on their performance on a ficticious personality test) that when it came to achieving goals they would either benefit from firmly commit-

ting themselves to fixed plans or suffer unnecessary rigidity from doing so. In a subsequent experiment, subjects first chose a goal (task) and were then asked to form several relevant implementation intentions. Either immediately after a short distraction task or 48 hours later, subjects were asked to recall the situational cues they had specified in their implementation intentions. This was done to assess a classic effect of implementation intentions — the heightened accessibility of the specified situational cues (see the section on perceptual readiness, above). Subjects who believed that committing themselves strongly to their plans would facilitate goal achievement recalled more of these situational cues than subjects who thought that strong commitments would be a hindrance. This pattern of results was the same regardless of whether the recall test was applied immediately or after a 48-hour delay. Data from the study by Steller (1992; reported above) parallel these findings. Subjects who intensified their implementation intentions by "really" wanting to draw the new traffic sign as planned showed the strongest effects (i.e., the highest perceptual readiness for the traffic sign).

Apparently, the strength of the links specified in implementation intentions is dependent on the amount of willing or commitment a person manages to mobilize. This triggers the question of whether the commitment to the superordinate goal intention, in the service of which implementation intentions are formed, also feeds into the strength of a person's implementation intentions. Does a person's readiness to form and hold strong links require a vital goal commitment? Findings of the Seehausen et al. (1994) study support this view. When subjects were told that the goal would no longer have to be implemented, as other subjects had already taken on this task, the recall effect of having committed themselves strongly to implementational plans (i.e., having formed strong implementation intentions) was weakened immediately after the distraction task and completely wiped out 48 hours later.

In summary, the issue of the strength of implementation intentions seems first and foremost an issue of commitment. Feeling strongly about achieving the superordinate goal appears to be the prerequisite for powerful implementation intentions. On the basis of such strong goal commitments, forming and holding highly mandated links between situational cues and goal-directed behaviors produce strong implementation intention effects. As a consequence, the types of variables known to induce strong goal commitments (e.g., high desirability), as well as the variables that induce the formation of highly mandated plans (e.g., fears of missing an anticipated good opportunity to act), qualify as determinants of the strength of implementation intentions.

REFERENCES

Alloy, L. B., & Abramson, L. Y. (1979). Judgments of contingency in depressed and nondepressed students: Sadder but wiser? *Journal of Experimental Psychology: General, 108,* 441–485.

Bandura, A. (1991). Self-regulation of motivation through anticipatory and self-reactive mechanisms. In R. Dienstbier (Ed.), *Nebraska Symposium on Motivation* (Vol. 38, pp. 69–164). Lincoln: University of Nebraska Press.

Bargh, J. A. (1982). Attention and automaticity in the processing of self-relevant information. *Journal of Personality and Social Psychology, 43,* 425–436.

Bargh, J. A. (1992). Being unaware of the stimulus versus unaware of its interpretation: Does subliminality *per se* matter to social psychology? In R. Bornstein & T. Pittman (Eds.), *Perception without awareness* (pp. 236–255). New York: Guilford Press.

Bargh, J. A. (1994). The four horsemen of automaticity: Awareness, intention, efficiency, and control in social cognition. In R. S. Wyer, Jr., & T. K. Srull (Eds.), *Handbook of social cognition* (2nd ed.). Hillsdale, NJ: Erlbaum.

Bargh, J. A., & Gollwitzer, P. M. (1994). Environmental control of goal-directed action: Automatic and strategic contingencies between situations and behavior. In W. D. Spaulding (Ed.), *Nebraska Symposium on Motivation: Vol. 41. Integrative views of motivation, cognition, and emotion* (pp. 71–124). Lincoln: University of Nebraska Press.

Beckmann, J., & Gollwitzer, P. M. (1987). Deliberative versus implemental states of mind: The issue of impartiality in pre- and postdecisional information processing. *Social Cognition, 5,* 259–279.

Berger, C. R. (1988). Planning, affect, and social action generation. In L. Donohew, H. Sypher, & E. T. Higgins (Eds.), *Communication, social cognition, and affect* (pp. 93–116). Hillsdale, NJ: Erlbaum.

Brehm, J. W. (1956). Postdecision changes in the desirability of alternatives. *Journal of Abnormal and Social Psychology, 52,* 384–389.

Brandstätter, V. (1992). *Der Einfluß von Vorsätzen auf die Handlungsinitiierung. Ein Beitrag zur willenspsychologischen Frage der Realisierung von Absichten.* Frankfurt: Peter Lang.

Bruce, B., & Newman, D. (1978). Interacting plans. *Cognitive Science, 2,* 195–233.

Bruner, J. S. (1951). Personality dynamics and the process of perceiving. In R. R. Blake & G. V. Ramsey (Eds.), *Perception: An approach to personality* (pp. 121–147). New York: Ronald Press.

Bruner, J. S. (1957). On perceptual readiness. *Psychological Review, 64,* 123–152.

Bruner, J. S., & Goodman, C. C. (1947). Value and need as organizing factors in perception. *Journal of Abnormal and Social Psychology, 42,* 33–44.

Bruner, J. S., & Postman, L. (1948). Symbolic value as an organizing factor in perception. *Journal of Social Psychology, 27,* 203–208.

Carver, C. S., & Scheier, M. F. (1989). Expectancies and coping: From test anxiety to pessimism. In R. Schwarzer, H. M. van der Ploeg, & C. D. Spielberger (Eds.), *Advances in test anxiety research* (Vol. 6, pp. 3–11). Amsterdam: Swets & Zeitlinger.

Dawson, M. E., & Schell, A. M. (1982). Electrodermal responses to attended and nonattended significant stimuli during dichotic listening. *Journal of Experimental Psychology: Human Perception and Performance, 8,* 315–324.

Friedman, S. L., Scholnick, E. K., & Cocking, R. R. (Eds.). (1987). *Blueprints for thinking: The role of planning in cognitive development.* Cambridge, England: Cambridge University Press.

Gollwitzer, P. M. (1990). Action phases and mind-sets. In E. T. Higgins & R. M. Sorrentino (Eds.), *Handbook of motivation and cognition: Foundations of social behavior* (Vol. 2, pp. 53–92). New York: Guilford Press.

Gollwitzer, P. M. (1991). *Abwägen und Planen: Bewußtseinslagen in verschiedenen Hand-lungsphasen.* Göttingen: Hogrefe.

Gollwitzer, P. M. (1993). Goal achievement: The role of intentions. In W. Stroebe & M. Hewstone (Eds.), *European review of social psychology* (Vol. 4, pp. 141–185). Chichester, England: Wiley.

Gollwitzer, P. M., Heckhausen, H., & Ratajczak, H. (1990). From weighing to willing: Approaching a change decision through pre- or postdecisional mentation. *Organizational Behavior and Human Decision Processes, 45,* 41–65.

Gollwitzer, P. M., Heckhausen, H., & Steller, B. (1990). Deliberative vs. implemental mind-sets: Cognitive tuning toward congruous thoughts and information. *Journal of Personality and Social Psychology, 59,* 1119–1127.

Gollwitzer, P. M., & Kinney, R. F. (1989). Effects of deliberative and implemental mind-sets on the illusion of control. *Journal of Personality and Social Psychology, 56,* 531–542.

Gottschaldt, K. (1926). Über den Einfluß der Erfahrung auf die Wahrnehmung von Figuren: I. Über den Einfluß gehäufter Einprägung von Figuren auf ihre Sicht-barkeit in umfassenden Konfigurationen. *Psychologische Forschung, 8,* 261–317.

Hayes-Roth, B., & Hayes-Roth, F. (1979). A cognitive model of planning. *Cognitive Science, 3,* 275–310.

Heckhausen, H., & Gollwitzer, P. M. (1987). Thought contents and cognitive functioning in motivational versus volitional states of mind. *Motivation and Emotion, 11,* 101–120.

Johnston, W. A. (1978). The intrusiveness of familiar nontarget information. *Memory and Cognition, 6,* 38–42.

Johnston, W. A., & Dark, V. J. (1986). Selective attention. *Annual Review of Psychology, 37,* 43–75.

Jones, E. E., & Gerard, H. B. (1967). *Foundations of social psychology.* New York: Wiley.

Kahneman, D. (1973). *Attention and effort.* Englewood Cliffs, NJ: Prentice-Hall.

Kahnemann, D., & Treisman, A. M. (1984). Changing views of attention and automaticity. In R. Parasuraman, R. Davies, & J. Beatty (Eds.), *Varieties of attention* (pp. 29–61). New York: Academic Press.

Kreitler, S., & Kreitler, H. (1987). Conceptions and processes of planning. In S. L. Friedman, E. K. Scholnick, & R. R. Cocking (Eds.), *Blueprints for thinking: The role of planning in cognitive development* (pp. 205–272). Cambridge, England: Cambridge University Press.

Kuhl, J. (1984). Volitional aspects of achievement motivation and learned helplessness: Toward a comprehensive theory of action control. In B. A. Maher & W. B. Maher (Eds.), *Progress in experimental personality research* (pp. 99–171). New York: Academic Press.

Kuhl, J., & Beckmann, J. (Eds.). (1985). *Action control: From cognition to behavior.* Berlin: Springer-Verlag.

Kuhl, J., & Beckmann, J. (Eds.). (1994). *Volition and personality.* Toronto: Hogrefe.

Külpe, O. (1904). Versuch über Abstraktion. In F. Schumann (Ed.), *Bericht über den 1. Kongre β für experimentelle Psychologie* (pp. 56–71). Leipzig: Barth.

Lengfelder, A. (1994). *Die Bedeutung des Frontalhirns beim Abwägen und Planen.* Unpublished doctoral dissertation, Ludwig-Maximilians-Universität, München.

Lewin, K. (1926). Vorsatz, Wille und Bedürfnis. *Psychologische Forschung, 7,* 330–385.

Lewin, K., Dembo, T., Festinger, L.A., & Sears, P.S. (1944). Level of aspiration. In J. M. Hunt (Ed.), *Personality and the behavior disorders* (pp. 333–378). New York: Ronald Press.

Lissner, K. (1933). Die Entspannung von Bedürfnissen durch Ersatzhandlungen. *Psychologische Forschung, 18*, 218–250.

Logan, G. D. (1979). On the use of a concurrent memory load to measure attention and automaticity. *Journal of Experimental Psychology: Human Perception and Performance, 5*, 189–207.

Mahler, W. (1933). Ersatzhandlungen verschiedenen Realitätsgrades. *Psychologische Forschung, 18*, 27–89.

Malzacher, J. T. (1992). *Erleichtern Vorsätze die Handungsinitiierung? Zur Aktivierung der Vornahmehandlung.* Unpublished doctoral dissertation, Ludwig-Maximilians-Universität, München.

Mannes, S. M., & Kintsch, W. (1991). Routine computing tasks: Planning as understanding. *Cognitive Science, 15*, 305–342.

Nielsen, S. L., & Sarason, I. G. (1981). Emotion, personality, and selective attention. *Journal of Personality and Social Psychology, 41*, 945–960.

Ovsiankina, M. (1928). Die Wiederaufnahme unterbrochener Handlungen. *Psychologische Forschung, 11*, 302–379.

Patterson, C. J., & Mischel, W. (1976). Effects of temptation-inhibiting and task-facilitating plans on self-control. *Journal of Personality and Social Psychology, 33*, 209–217.

Pösel, I. (1994). *Wiederaufnahme unterbrochener Handlungen: Effekte der Bewußtseinslagen des Abwägens und Planens.* Unpublished master's thesis, Universität Regensburg.

Posner, M. I. (1978). *Chronometric explorations of mind.* Hillsdale, NJ: Erlbaum.

Schaal, B. (1993). *Impulskontrolle: Wie Vorsätze beherrschtes Handeln erleichtern.* Unpublished master's thesis, Ludwigs-Maximilians-Universität, München.

Seehausen, R., Bayer, U., & Gollwitzer, P. M. (1994, September). *Experimentelle Arbeiten zur vorsätzlichen Handlungsregulation.* Paper presented at the biannual meeting of the German Psychological Association, Hamburg.

Seligman, M. E. P. (1990). *Learned optimism.* New York: Knopf.

Shiffrin, R. M., & Schneider, W. (1977). Controlled and automatic human information processing: II. Perceptual learning, automatic attending, and a general theory. *Psychological Review, 84*, 127–190.

Steller, B. (1992). *Vorsätze und die Wahrnehmung günstiger Gelegenheiten.* München: Tuduv Verlagsgesellschaft.

Taylor, S. E., & Brown, J. D. (1988). Illusion and well-being: A social psychological perspective on mental health. *Psychological Bulletin, 103*, 193–210.

Taylor, S. E., & Gollwitzer, P. M. (1995). The effects of mind-sets on positive illusions. *Journal of Personality and Social Psychology, 69*, 213–226.

Taylor, S. E., & Schneider, S. K. (1989). Coping and the simulation of events. *Social Cognition, 7*, 176–196.

Watt, H. J. (1905). Experimentelle Beiträge zu einer Theorie des Denkens. *Archiv für die gesamte Psychologie, 4*, 289–436.

Wicklund, R. A., & Frey, D. (1981). Cognitive consistency: Motivational versus non-motivational perspectives. In J. P. Forgas (Ed.), *Social cognition: Perspectives on everyday understanding* (pp. 141–163). London: Academic Press.

Wilensky, R. (1983). *Planning and understanding.* Reading, MA: Addison-Wesley.

Witkin, H. A. (1950). Individual differences in ease of perception of embedded figures. *Journal of Personality, 19*, 1–15.

Zillmann, D., & Cantor, J. R. (1976). Effect of timing of information about mitigating circumstances on emotional responses to provocation and retaliatory behavior. *Journal of Experimental Social Psychology, 12*, 38–55.