

Planning and the Implementation of Goals

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Determining the factors that promote successful goal pursuit is one of the fundamental questions studied by self-regulation and motivation researchers (Gollwitzer & Moskowitz, 1996; Oettingen & Gollwitzer, 2001). A number of theories, and supporting empirical data, suggest that the type of goal chosen and the commitment to that goal are important determinants in whether an individual carries out the behaviors necessary for goal attainment (e.g., Ajzen, 1985; Atkinson, 1957; Carver, Chapter 2, this volume; Carver & Scheier, 1998). Within these models, choosing or accepting a goal or standard is the central act of willing in the pursuit of goals. We agree with this contention but will argue in this chapter that further acts of willing should facilitate goal implementation, in particular, when goal pursuit is confronted with implemental problems (e.g., difficulties with getting started because of a lack of good opportunities; sticking to an ongoing goal pursuit in the face of distractions, temptations, and competing goal pursuits). Such acts of willing can take the form of making plans that specify when, where, and how an instrumental goal-directed response is to be implemented. More specifically, the person may take control over goal implementation by making if-then plans (i.e., from implementation intentions) that specify an anticipated critical situation and link it to an instrumental goal-directed response.

IMPLEMENTATION INTENTIONS: STRATEGIC AUTOMATICITY IN GOAL PURSUIT

Gollwitzer (1993, 1996, 1999) has proposed a distinction between goal intentions and implementation intentions. Goal intentions (goals) have the structure of “I intend to reach Z!” whereby Z may relate to a certain outcome or behavior to which the individual

feels committed. Implementation intentions (plans) have the structure of "If situation *X* is encountered, then I will perform the goal-directed response *Y*!" Holding an implementation intention commits an individual to perform the specified goal-directed response once the critical situation is encountered. Both goal and implementation intentions are set in an act of willing: The former specifies the intention to meet a goal or standard; the latter refers to the intention to perform a plan. Commonly, implementation intentions are formed in the service of goal intentions, because they specify the where, when, and how of respective goal-directed responses. For instance, a possible implementation intention in the service of the goal intention to eat healthy food could link a suitable situational context (e.g., one's order is taken at a restaurant) to an appropriate behavior (e.g., asking for a low-fat meal). As a consequence, a strong mental link is established between the critical cue of the waiter taking the order and the goal-directed response of asking for a low-fat meal.

Why Implementation Intentions Are Expected to Facilitate Goal Implementation

The mental links created by implementation intentions are expected to facilitate goal attainment on the basis of psychological processes that relate to both the anticipated situation and the specified response. Because forming implementation intentions implies the selection of a critical future situation, it is assumed that the mental representation of the situation becomes highly activated and, hence, more accessible. This in turn should make it easier to detect the critical situation and readily attend to it, even when one is busy with other things. This heightened accessibility should also facilitate the recall of the critical situation. Moreover, because forming implementation intentions involves first a selection of an effective goal-directed behavior that is then linked to the selected critical situation, initiation of the intended response should become automated. Initiation should become swift and efficient, and should no longer require conscious intention once the critical situation is encountered.

Implementation Intentions: The Specified Situation

Several studies have provided support for the accessibility hypothesis by measuring how well participants' holding implementation intentions attended to, detected, and recalled the critical situation compared to participants who had only formed goal intentions (Gollwitzer, Bayer, Steller, & Bargh, 2002). One study, using a dichotic-listening paradigm, demonstrated that words describing the anticipated critical situation were highly disruptive to focused attention in implementation-intention participants compared to goal-intention participants (i.e., the shadowing performance of the attended materials decreased). In another study, using an embedded figures test (Gottschalldt, 1926), in which smaller *a*-figures are hidden within larger *b*-figures, enhanced detection of the hidden *a*-figures was observed with participants who had specified the *a*-figure in the if part of an implementation intention (i.e., had made plans on how to create a traffic sign from the *a*-figure). In a cued recall experiment, participants more effectively recalled the available situational opportunities to attain a set goal given that these opportunities had been specified in if-then links (i.e., in implementation intentions). Finally, Aarts, Dijksterhuis, and Midden (1999), using a lexical decision task, found that the formation of implementation intentions led to faster lexical decision times for those words that described the critical situation. Furthermore, the heightened accessibility of the critical situation (as measured

by faster lexical decision responses) mediated the beneficial effects of implementation intentions on goal attainment. The latter result implies that the goal-promoting effects of implementation intentions are based on the heightened accessibility of selected critical situational cues.

Implementation Intentions: The Specified Goal-Directed Behavior

The postulated automation of action initiation (also described as strategic delegation of control to situational cues; Gollwitzer, 1993, p. 173) has been supported by the results of various experiments that tested immediacy, efficiency, and the presence-absence of conscious intent. Gollwitzer and Brandstätter (1997, Study 3) demonstrated the immediacy of action initiation in a study in which participants had been induced to form implementation intentions that specified viable opportunities for presenting counterarguments to a series of racist remarks made by a confederate. Participants with implementation intentions initiated counterarguments sooner than the participants who had formed the mere goal intention to counterargue.

The efficiency of action initiation was further explored in two experiments using a go/no-go task embedded as a secondary task in a dual-task paradigm (Brandstätter, Lengfelder, & Gollwitzer, 2001, Studies 3 and 4). Participants formed the goal intention to press a button as fast as possible, if numbers appeared on the computer screen, but not if letters were presented. Participants in the implementation-intention condition additionally made the plan to press the response button particularly fast if the number three was presented. Implementation-intention participants showed a substantial increase in speed of responding to the number three compared to the control group, regardless of whether the simultaneously demanded primary task (a memorization task in Study 3 and a tracking task in Study 4) was either easy or difficult to perform. Apparently, the immediacy of responding induced by implementation intentions is also efficient in the sense that it does not require much in the way of cognitive resources (i.e., can be performed even when demanding dual tasks have to be performed at the same time).

Two experiments by Bayer, Moskowitz, and Gollwitzer (2002) tested whether implementation intentions lead to action initiation even in the absence of conscious intent. In these experiments, the critical situation was presented subliminally, and immediacy of initiation of the goal-directed response was assessed. Results indicated that subliminal presentation of the critical situation led to a speed-up in responding in implementation-intention but not in goal-intention participants. These effects suggest that when planned via implementation intentions, the initiation of goal-directed behavior becomes triggered by the presence of the critical situational cue, without the need for further conscious intent.

Additional process mechanisms to the stimulus perception and response initiation processes documented in the findings described earlier have been explored. For instance, furnishing goals with implementation intentions might produce an increase in goal commitment, which in turn cause heightened goal attainment. However, this hypothesis has not received any empirical support. For instance, when Brandstätter and colleagues (2001, Study 1) analyzed whether heroin addicts suffering from withdrawal benefit from forming implementation intentions to submit a newly composed curriculum vitae before the end of the day, they also measured participants' commitment to do so. Whereas the majority of the implementation-intention participants succeeded in handing in the curriculum vitae in time, none of the goal-intention participants succeeded in this task. These two groups, however, did not differ in terms of their goal commitment ("I feel committed to compose a curriculum vitae," and "I have to complete this task"), measured after the

goal- and implementation-intention instructions had been administered. This finding was replicated with young adults who participated in a professional development workshop (Oettingen, Hönig, & Gollwitzer, 2000, Study 2), and analogous results were reported in research on the effects of implementation intentions on meeting health-promotion and disease-prevention goals (e.g., Orbell, Hodgkins, & Sheeran, 1997).

Implementation Intentions and Their Effects on Wanted Behavior

Given that implementation intentions facilitate attending to, detecting, and recalling viable opportunities to act toward goal attainment and, in addition, automate action initiation in the presence of such opportunities, people who form implementation intentions should show higher goal-attainment rates compared to people who do not furnish their goal intentions with implementation intentions. This hypothesis is supported by the results of a host of studies examining the attainment of various types of goal intentions (a recent meta-analysis by Gollwitzer & Sheeran, 2003, lists more than 80 studies demonstrating implementation-intention effects).

Types of Goals

Gollwitzer and Brandstätter (1997) analyzed the attainment of a goal intention that had to be acted on at an inconvenient time (e.g., writing a report about Christmas Eve during the subsequent Christmas holiday). Other studies have examined the effects of implementation intentions on goal-attainment rates with goal intentions that are somewhat unpleasant to perform. For instance, the goal intentions to perform health-protecting and -enhancing behaviors, such as regular breast examinations (Orbell et al., 1997), cervical cancer screening (Sheeran & Orbell, 2000), resumption of functional activity after joint replacement surgery (Orbell & Sheeran, 2000), and engaging in physical exercise (Milne, Orbell, & Sheeran, 2002), were all more frequently acted on when people had furnished these goals with implementation intentions. Moreover, implementation intentions were found to facilitate the attainment of goal intentions when it is easy to forget to act on them (e.g., regular intake of vitamin pills, Sheeran & Orbell, 1999; the signing of work sheets with the elderly, Chasteen, Park, & Schwarz, 2001).

Potential Moderators

The strength of the beneficial effects of implementation intentions depends on the presence or absence of several moderators. First, implementation-intention effects are more apparent the more difficult it is to initiate the goal-directed behavior. For instance, implementation intentions were more effective in completing difficult compared to easy goals (Gollwitzer & Brandstätter, 1997, Study 1). Moreover, forming implementation intentions was more beneficial to patients with frontal lobe damage, who typically have problems with executive control, than to college students (Lengfelder & Gollwitzer, 2001, Study 2).

Second, implementation intentions do not work when the respective goal intention is weak. Orbell and colleagues (1997) reported that the beneficial effects of implementation intentions on compliance in performing a breast examination were observed only in those women who strongly intended to perform breast self-examination (i.e., possessed a strong goal commitment). Similarly, results of another study (Gollwitzer, Bayer, et al., 2002, Study 3) suggest that the beneficial effects of implementation intentions on a per-

son's recall of specified situations can no longer be observed when the respective goal intention has been abandoned (i.e., the research participants were told that the assigned goal intention need no longer be reached, because it had been performed by some other person).

Third, implementation-intention effects require the activation of the respective superordinate goal intention (Bayer, Jaudas, & Gollwitzer, 2002; Sheeran, Webb, & Gollwitzer, 2002). One study (Bayer, Jaudas, et al., 2002), which used a task-switch paradigm, manipulated whether the assigned task goal was related or unrelated to the stimulus specified in the if part of the implementation intention. Implementation-intention effects were only observed when the task goal pertained to the formed implementation intention.

Fourth, the strength of the implementation intention also matters. In one study, Gollwitzer, Bayer, and colleagues (2002, Study 3) varied the strength of the commitment to the implementation intention by telling the participants (after an extensive personality testing session) that they were the kind of people who would benefit from either strictly adhering to their plans (i.e., high commitment) or staying flexible (i.e., low commitment). The latter group showed weaker implementation-intention effects (i.e., cued recall performance for selected opportunities) than the former.

Finally, the strength of the mental link between the if and the then parts of an implementation intention should also affect how beneficial the formed implementation intentions turn out to be. For example, if a person takes much time and concentration encoding the if-then plan, or keeps repeating a formed if-then plan by using inner speech, stronger mental links should emerge, which in turn should produce stronger implementation-intention effects.

Implementation Intentions and the Control of the Unwanted Influences on an Ongoing Goal Pursuit

Research on implementation intentions has mostly focused on the self-regulatory issue of getting started with goals that one wants to achieve. However, once initiated, a goal pursuit still needs to be brought to a successful ending. People need to protect an ongoing goal from being thwarted by their attention to attractive distractions or their falling prey to conflicting bad habits (e.g., the goal of being fair may conflict with the habit of stereotyping and prejudging certain groups of people). Two major strategies in which implementation intentions can be used to control the "unwanted," potentially hampering the successful pursuit of wanted goals, include (1) directing one's implementation intentions toward the suppression of anticipated unwanted responses, and (2) blocking all kinds of (even nonanticipated) unwanted influences from inside or outside by directing one's implementation intentions toward spelling out the wanted ongoing goal pursuit.

Responding to Critical Situations with the Suppression of Anticipated Unwanted Responses

If, for instance, people want to avoid being unfriendly to a friend who is known to make outrageous requests, they can protect themselves from showing the unwanted unfriendly response by forming suppression-oriented implementation intentions, which can take different formats. A person might focus on reducing the intensity of the unwanted response by intending not to show the unwanted response: "And if my friend approaches me with an outrageous request, then I will not respond in an unfriendly manner!" But he or she

may also try to reduce the intensity of the unwanted response by specifying the initiation of the respective antagonistic response: "And if my friend approaches me with an outrageous request, then I will respond in a friendly manner!" Finally, suppression-oriented implementation intentions may focus a person away from the critical situation: "And if my friend approaches me with an outrageous request, then I'll ignore it!"

Two lines of experiments analyzed the effects of suppression-oriented implementation intentions. The first looked at the control of unwanted spontaneous attending to tempting distractions (Gollwitzer & Schaal, 1998). Participants had to perform a boring task (i.e., perform a series of simple arithmetic tasks), while being bombarded with attractive, distractive stimuli (e.g., video clips of award-winning commercials). Whereas control participants were asked to form a mere goal intention ("I will not let myself get distracted!"), experimental participants, in addition, formed one of two implementation intentions: "And if a distraction arises, then I'll ignore it!" or "And if a distraction arises, then I will increase my effort at the task at hand!" The ignore-implementation intention always helped participants to ward off the distractions (as assessed by their task performance), regardless of whether the motivation to perform the tedious task (assessed at the beginning of the task) was low or high. The increase-effort implementation intention, in contrast, was effective only when motivation to perform the tedious task was low. Apparently, when motivation is high to begin with, increase-effort implementation intentions may create overmotivation that hampers task performance. It seems appropriate, therefore, to advise motivated individuals who suffer from being distracted (e.g., ambitious students doing their homework) to resort to ignore-implementation intentions rather than to implementation intentions that focus on strengthening effort.

The second line of experiments analyzing suppression-oriented implementation intentions studied the control of the automatic activation of stereotypical beliefs and prejudicial evaluations (Gollwitzer, Achtziger, Schaal, & Hammelbeck, 2002; Gollwitzer & Schaal, 1998). In various priming studies that used short stimulus-onset asynchronies of less than 300 msec between primes (presentations of members of stigmatized groups) and targets (adjectives describing relevant stereotypical attributes or neutral positive-negative adjectives), research participants using implementation intentions inhibited the automatic activation of stereotypical beliefs and prejudicial evaluations about women, the elderly, the homeless, and soccer fans. The implementation intentions specified that they be confronted with a member of the critical group in the if part, with a "Then I won't stereotype" (or "Then I won't evaluate negatively") response, or a "Then I will ignore the group membership" response in the then part. Regardless of which format was used, both types of suppression-oriented implementation intentions were effective.

Blocking Detrimental Self-States and Adverse Situational Influences

In the research presented in the previous paragraph, implementation intentions specified a critical situation or problem in the if part, which was linked to a then part that described an attempt at suppressing the unwanted response. This type of self-regulation by implementation intentions implies that the person needs to anticipate both potential hindrances to achieving the goal and what kinds of unwanted responses these hindrances elicit. However, implementation intentions can also be used to protect oneself against the "unwanted" by taking a different approach. Instead of gearing one's implementation intentions toward anticipated potential hindrances and the unwanted responses triggered therewith, the person may form implementation intentions geared at stabilizing the goal pursuit at hand. We use, again, the example of a tired person who is approached by a

friend with an outrageous request and will likely respond in an unfriendly manner: If this person has in advance stipulated in an implementation intention what he or she will converse about with the friend, the critical interaction should simply run off as planned, and the self-state of being tired should fail to affect the person's response to outrageous requests in a negative, unwanted direction. As is evident from this example, the present self-regulatory strategy should be of special value whenever the influence of detrimental self-states (e.g., being tired and irritated) on derailing one's goal-directed behavior has to be controlled. This should be true regardless of whether such self-states and/or their influence on behavior reside in the person's consciousness.

Gollwitzer and Bayer (2000) tested this hypothesis in a series of experiments in which participants were asked to make plans (i.e., form implementation intentions) or not regarding their performance on an assigned task. Prior to beginning the task, participants' self-states were manipulated, so that the task at hand became more difficult (e.g., a state of self-definitional incompleteness prior to a task that required perspective taking; Gollwitzer & Wicklund, 1985; a good mood prior to a task that required evaluation of others nonstereotypically; Bless & Fiedler, 1995; and a state of ego depletion prior to solving difficult anagrams; Baumeister, 2000; Muraven, Tice, & Baumeister, 1998). The results suggested that the induced critical self-states negatively affected task performance only for those participants who had not planned out work on the task at hand via implementation intentions (i.e., had only set themselves the goal to come up with a great performance). In other words, implementation intentions that spelled out how to perform the task at hand were effective in protecting the individual from the negative effects associated with the induced detrimental self-states.

This research provides a new perspective on the psychology of self-regulation. Commonly, effective self-regulation is understood in terms of strengthening the self, so that the self can meet the challenge of being a powerful executive agent (Baumeister, Heather-ton, & Tice, 1994). Therefore, most research on goal-directed self-regulation focuses on strengthening the self in such a way that threats and irritations become less likely, or on restoring an already threatened or irritated self. It is important to recognize that all of these maneuvers focus on changing the self, so that it becomes a better executive. The findings of Gollwitzer and Bayer (2000) suggest a perspective on goal-directed self-regulation that focuses on facilitating action control without changing the self. It assumes that action control becomes easier if a person's behavior is directly controlled by situational cues, and that forming implementation intentions achieves such direct action control. As this mode of action control circumvents the self, it no longer matters whether the self is threatened or secure, agitated or calm, because the self is effectively disconnected from its influence on behavior. The research by Gollwitzer and Bayer supports this line of reasoning by demonstrating that task performance (i.e., taking the perspective of another person, judging people in a nonstereotypical manner, solving difficult anagrams) does not suffer any impairment because of the respective detrimental self-states (e.g., self-definitional incompleteness, mood, and ego depletion) if performing these tasks has been planned in advance via implementation intentions.

People's goal pursuits, however, are threatened not only by detrimental self-states but also by adverse situational contexts. Many situations have negative effects on goal attainment, unbeknownst to the person who is striving for the goal. A prime example is the social loafing phenomenon, in which people show reduced effort in the face of work settings that produce a reduction of accountability (i.e., performance outcomes can no longer be checked at an individual level). Because people are commonly not aware of this phenomenon, they cannot form implementation intentions that specify a social-loafing

situation as critical, thereby rendering an implementation intention that focuses on suppressing the social-loafing response as an unviable self-regulatory strategy. As an alternative, however, people may resort to forming implementation intentions that stipulate how the intended task is to be performed, thus effectively blocking any negative situational influences.

Supporting this contention, when Endress (2001) performed a social-loafing experiment that used a brainstorming task (i.e., participants had to find as many different uses for a common knife as possible), she observed that implementation intentions ("And if I have found one solution, then I will immediately try to find a different solution!") but not goal intentions ("I will try to find as many different solutions as possible!") protected participants from social-loafing effects. Findings reported by Trötschel and Gollwitzer (2003) also support the notion that goal pursuits planned by forming implementation intentions become invulnerable to adverse situational influences. In their experiments on the self-regulation of negotiation behavior, loss-framed negotiation settings failed to unfold their negative effects on fair and cooperative negotiation outcomes when the negotiators had in advance planned out their goal intentions to be fair and cooperative with if-then plans. Similarly, Gollwitzer (1998) reported on experiments in which competing goal intentions (i.e., goal intentions contrary to an ongoing goal pursuit) were activated outside of a person's awareness with goal-priming procedures (Bargh, 1990; Bargh, Gollwitzer, Lee-Chai, Barndollar, & Trötschel, 2001). In these studies, furnishing the ongoing goal pursuit with implementation intentions protected it from the intrusive influences of the primed competing goals.

It appears, then, that the self-regulatory strategy of planning out goal pursuit in advance via implementation intentions allows the person to reap the desired positive outcomes, without having to change the environment from an adverse to a facilitative one. This is very convenient, because such environmental change is often very cumbersome (e.g., it takes the costly interventions of mediators to change the loss frames adopted by conflicting parties into gain frames), or not under the person's control. Moreover, people are often not aware of the adverse influences of the current environment (e.g., a deindividuated work setting or a loss-framed negotiation setting), or they do not know what kind of alternative environmental setting is actually facilitative (e.g., an individualized work setting or a gain-framed negotiation setting). In these situations, the self-regulatory strategy of specifying critical situations in the if part of an implementation intention and linking them to a coping response in the then part does not qualify as a viable alternative self-regulatory strategy. Rather, people need to resort to the strategy of planning out goal pursuit in advance, via implementation intentions, thereby protecting it from adverse situational influences.

Potential Costs of Using Implementation Intentions

Given the many benefits of forming implementation intentions, a question of any possible costs arises. Three issues come to mind when we consider this possibility. First, action control by implementation intentions may be characterized by rigidity and may hurt performance that requires flexibility. Second, forming implementation intentions may be a very costly self-regulatory strategy, if it produces a high degree of ego depletion and, consequently, handicaps needed self-regulatory resources. Third, even though implementation intentions can successfully suppress unwanted thoughts, feelings, and actions in a given context, these very thoughts, feelings, and actions may rebound in a temporally subsequent, different context.

With respect to rigidity, it is still an open question whether implementation-intention participants refrain from using alternative good opportunities to act toward the goal by insisting on acting only when the critical situation specified in the if part of the implementation intention is encountered. Even though implementation-intention participants may feel that they have to stick to their plans, they may very well recognize such alternative opportunities quickly. The strategic automaticity created by implementation intentions should free cognitive capacities, thus allowing effective processing of information about alternative opportunities.

The assumption that implementation intentions delegate the control of behavior to situational cues implies that the self is not implicated when behavior is controlled via implementation intentions. As a consequence, the self should not become depleted when task performance is regulated by implementation intentions (for reviews of the ego-depletion model, see Schmeichel & Baumeister, Chapter 5, and Vohs & Ciarocco, Chapter 20, this volume). Empirical data have supported the assertion that individuals who use implementation intentions to self-regulate in one task do not show reduced self-regulatory capacity in a later task. Whether the initial self-regulating task was controlling emotions while watching a humorous movie (Gollwitzer & Bayer, 2000), or performing a Stroop task (Webb & Sheeran, 2003, Study 1), implementation intentions successfully preserved self-regulatory resources, as demonstrated by participants' greater persistence on subsequent difficult or unsolvable tasks.

To test whether suppression-oriented implementation intentions create rebound effects, Gollwitzer, Trotschel, and Sumner (2002) conducted two experiments following research paradigms developed by Macrae, Bodenhausen, Milne, and Jetten (1994). In both studies, participants first had to suppress the expression of stereotypes in a first-impression formation task that focused on a particular member of a stereotyped group (i.e., homeless people). Rebound was measured either in terms of subsequent expression of stereotypes in a task that demanded the evaluation of the group of homeless people in general (Study 1), or a lexical decision task that assessed the accessibility of homeless stereotypes (Study 2). Participants who had been assigned the mere goal of controlling stereotypical thoughts, while forming an impression of the given homeless person, were more stereotypical in their judgments of homeless people in general (Study 1) and showed a higher accessibility of homeless stereotypes (Study 2) than participants who had been asked to furnish this lofty goal with relevant if-then plans. Rather than causing rebound effects, implementation intentions appear to be effective in preventing them.

Although implementation intentions seem to achieve their effects without costs in terms of rigidity, ego depletion, or rebound, this does not mean that forming implementation intentions is a foolproof self-regulatory strategy. In everyday life, people may not succeed in forming effective implementation intentions for various reasons. For instance, a person may link a critical situation to a behavior or outcome that turns out to be outside of his or her control (e.g., if a person who has the goal to eat healthy plans to ask for a vegetarian meal, but the restaurant he frequents does not offer such meals). The same is true for implementation intentions that specify opportunities that hardly ever arise (e.g., if a person who plans to ask for a vegetarian meal, when the waiter in a restaurant takes her order, mostly cooks for herself at home) or behaviors that have zero instrumentality with respect to reaching the goal (e.g., if a person with the goal of eating healthy plans to ask for a vegetarian meal does not know that most restaurants add fatty cheese to make it tasty).

Finally, there is the question of how concretely people should specify the if and then parts of their implementation intentions. If the goal is to eat healthy, one can form an im-

plementation intention that holds either this very behavior in the then part or a more concrete operationalization of it. The latter seems appropriate whenever a whole array of specific operationalizations is possible, because as planning in advance which type of goal-directed behavior is to be executed, once the critical situation is encountered, prevents disruptive deliberation in situ (with respect to choosing one behavior over another). An analogous argument applies to the specification of situations in the if part of an implementation intention. People should specify the situation in the if part to such a degree that a given situation no longer raises the question of whether it qualifies as the critical situation.

Summary

In this section, we have argued that forming plans that specify when, where, and how an instrumental, goal-directed response is to be implemented facilitates the control of goal-directed action. Specifically, we have suggested that making if-then plans (i.e., forming implementation intentions) that specify an anticipated critical situation and link it to an instrumental, goal-directed response is an effective self-regulatory strategy. Empirical data suggest that if-then plans facilitate goal attainment through heightened accessibility of the anticipated critical situation, making it easier to detect and attend to. The cognitive link formed between this critical situation and goal-directed response in the implementation intention also allows such preselected behavior to “run off as planned” when the critical situation is encountered. This strategic automatization of goal-directed action enables individuals to respond quickly, under cognitive load, and even without conscious intent; thus, individuals can capitalize on available goal opportunities in an effective manner.

The success of such a strategy is evident in the numerous studies that document the beneficial effects of implementation intentions in helping people meet their goals. The effectiveness of implementation intentions, however, is moderated by a number of factors. If-then plans seem to be more effective with difficult rather than easy goal pursuits, when commitment to the respective goal intention is high rather than low, the goal intention is simultaneously activated with the implementation intention, commitment to the implementation intention is high rather than low, and the mental link between the if and then parts of the plan is strong rather than weak. People should also adjust the type of implementation intention formed to the self-regulation problem at hand. Although suppression-oriented implementation intentions are viable when certain distractions, temptations, and unwanted responses are anticipated, plans that bolster the ongoing goal pursuit are needed in situations in which goal pursuit is threatened by detrimental self-states and adverse situational influences of which the individual is not aware.

Finally, we reviewed potential costs of using implementation intentions. It is not clear yet whether forming if-then plans locks individuals into a specific course of action. Whether implementation intentions allow for flexible goal pursuit (e.g., to take advantage of goal opportunities other than the one specified) is still an open question. It is clear, however, that implementation intentions do not drain self-regulatory resources (i.e., produce ego depletion), and that suppression-oriented implementation intentions are not associated with rebound. Thus, forming implementation intentions is suggested as an effective and quite cost-free self-regulatory strategy. Through a simple act of willing, linking an anticipated critical situation with a goal-directed response, individuals are able to further their goal pursuits in a pretty dramatic fashion.

IMPLEMENTAL MINDSETS: ACTIVATION OF INSTRUMENTAL COGNITIVE PROCEDURES

The concept of implementation intentions grew out of a more comprehensive approach to goal setting and goal striving: the model of action phases (Gollwitzer, 1990; Gollwitzer & Bayer, 1999; Heckhausen & Gollwitzer, 1987). The model of action phases sees successful goal pursuit as solving a series of successive tasks: deliberating wishes (potential goals) and choosing between them, planning and initiating goal-directed actions, bringing goal pursuit to a successful end, and evaluating its outcome. The task notion implies that people can self-regulate goal pursuit by developing the respective mindsets, thus facilitating task completion (Gollwitzer, 1990). Whereas the act of choosing goals activates cognitive procedures that facilitate decision making (i.e., deliberative mindset), the act of planning activates those processes that support the implementation of goals (i.e., implemental mindset).

When participants are asked to plan the implementation of a set goal, an implemental mindset with the following attributes is expected to develop (Gollwitzer & Bayer, 1999): Participants should become closed-minded to distracting, goal-irrelevant information, while processing information related to goal implementation more effectively (e.g., information on the sequencing of actions). Moreover, to maintain commitment to a chosen goal, desirability-related information should be processed in a partial manner, favoring pros over cons, and feasibility-related information should be analyzed in a manner that favors illusory optimism. Self-perception of possessing important personal attributes (e.g., cheerfulness, smartness, social sensitivity) should be strengthened, whereas perceived vulnerability to both controllable and uncontrollable risks should be lowered (e.g., developing an addiction to prescription drugs or losing a partner to an early death, respectively). Thus, the implemental mindset facilitates goal attainment by focusing individuals on implementation-related information and prevents the waning of commitment to the chosen goal.

Cognitive Features of the Implemental Mindset

The *cognitive tuning* of the implemental mindset toward implementation-related information hypothesis has found support in thought-sampling studies. Postdecisional participants report more implementation-related thoughts (e.g., "I will get started with X and then do Y") than do predecisional participants (Heckhausen & Gollwitzer, 1987; Puca & Schmalt, 2001; Taylor & Gollwitzer, 1995, Study 3). Even stronger evidence that implemental issues are highly accessible and intensively processed in the implemental compared to the deliberative mindset has been offered by Gollwitzer, Heckhausen, and Steller (1990). They primed an implemental mindset by having participants plan the implementation of a chosen personal project (e.g., "I intend to move from home!"), whereas they activated a deliberative mindset by having participants deliberate on unresolved personal concerns (e.g., "Shall I move from home or not?"). Participants were then presented with three unfinished fairy tales and, in the guise of a creativity test, asked to complete the stories in whatever manner that they wanted. Participants who had been planning were more likely to have the protagonists in the fairy tales plan how to carry out a chosen goal rather than deliberate on the choice of a goal (and the reverse was true for participants who had been deliberating). In a second study, participants viewed slides while deliberating over a task choice, or immediately after having made such a decision

and while preparing its implementation. On each slide, an image of a person was presented, along with sentences containing information about goal deliberation or goal implementation. After viewing the slides and completing a brief distracter task, participants were given a cued recall test of the presented information. Planning participants had better recall of the implementation items than the deliberation items (and the reverse was true for deliberating participants).

Experiments testing the hypothesis of *closed-mindedness* in the implemental mindset have demonstrated that implemental participants have shorter noun spans (an indicator of low processing speed; Dempster, 1985) than do deliberative participants, when the noun span test contains words irrelevant to participants' implemental or deliberative concerns (Heckhausen & Gollwitzer; 1987, Study 2). This suggests that the implemental mindset leads to slower encoding of nonrelevant information than does the deliberative mindset. Moreover, Beckmann and Gollwitzer (1987) observed that among planning individuals (compared to deliberative individuals), not only does information that is not relevant to one's goal receive less processing, but information that is directly relevant also receives enhanced processing. Finally, a third set of studies by Gollwitzer and his colleagues (reported by Gollwitzer & Bayer, 1999) used modified Müller-Lyer illusions to demonstrate that planning participants' attention is more centrally focused than that of deliberative participants; the latter also attend to peripheral information.

Empirical results have also strongly supported the hypothesis that implemental mindset participants make *biased inferences* to maintain the positive evaluation of the chosen goal, thus sustaining high goal commitment. A first line of research analyzed the biased processing of feasibility-related information. Gollwitzer and Kinney (1989) had deliberative and implemental participants perform a contingency learning task. In this task, designed by Alloy and Abramson (1979), participants were asked to estimate the degree to which they could influence the presentation of a stimulus light by a button press response. The frequency of the onset of the light was not contingent on participants' responses, because target-light onset occurred with the same frequency when participants pressed or did not press the button (i.e., noncontingent to the button press response). High perceptions of control commonly occurred when noncontingent target-light onset was frequent. Gollwitzer and Kinney (1989) observed that this illusion of control was particularly pronounced in implemental participants and less so in deliberative participants. Taylor and Gollwitzer (1995) extended these findings by analyzing participants' perceived vulnerability to controllable and uncontrollable risks, and positivity of self-perception, compared to the average college student. Again, implemental mindset participants were more positive-illusionary than deliberative mindset participants, and this occurred even when increases in positive mood were accounted for. More recently, Gagné and Lydon (2001) observed that implemental mindset individuals are more optimistic in their forecasts of the survival of their romantic relationships than are deliberative mindset individuals. Moreover, Puca (2001) tested deliberative and implemental participants' realism versus optimism in terms of either choosing test materials of different difficulty (Study 1) or predicting their own future task performance (Study 2). Implemental participants preferred more difficult tasks and overestimated their probability of success more than did deliberative participants. Implemental participants also referred less to their past performance when selecting levels of difficulty or predicting future performance than did deliberative participants.

Differences between implemental and deliberative mindset participants in the biased processing of desirability-related information have recently been provided by Harmon-Jones and Harmon-Jones (2002, Study 2). They tested the effects of mindsets on the

postdecisional spreading of choice alternatives, a classic route to postdecisional dissonance reduction (Brehm & Cohen, 1962). After participants have made a choice between two options, the chosen option is evaluated more positively, whereas the nonchosen option is evaluated more negatively. Harmon-Jones and Harmon-Jones found that, compared to a neutral control group, the implemental mindset participants increased postdecisional spreading of alternatives, whereas deliberative mindset participants reduced it.

Implemental Mindsets and Goal Implementation

Traditionally, implemental mindsets have been analyzed primarily in terms of their cognitive features, without direct testing of these features' effects on actual implementation of goals. In one early exception, Pösl (1994) found that participants in the implemental mindset were faster to initiate goal-directed behavior than those in the deliberative mindset. The speed of action initiation, however, was moderated by how much conflict the participants experienced (i.e., whether they had a choice to perform behavior *A* or *B*, or needed to perform only one of these). Participants benefited from the implemental mindset only when they experienced behavioral conflict. Apparently, the closed-mindedness associated with the implemental mindset prevented planning individuals from deliberating on behavioral alternatives, thus facilitating action initiation when two options were provided.

There is also recent evidence that the implemental mindset generates greater persistence in goal-directed behavior. Brandstätter and Frank (2002) found that participants in the implemental mindset persisted longer at an unsolvable puzzle task (Study 1) and a self-paced computer task (Study 2). Similar to the findings of Pösl (1994), the impact of the implemental mindset on persistence was evident only in situations of behavioral conflict. When the perceived feasibility and desirability of the tasks were in opposition (i.e., one was high, while the other was low), participants in the implemental mindset persisted longer than did those in the deliberative mindset. This suggests that the mindset associated with planning can benefit the individual not only by facilitating action initiation but also by generating greater persistence in the face of obstacles. Most importantly, persistence in the implemental mindset was not found to be executed in a rigid fashion. Brandstätter and Frank (2002, Study 3) observed that whenever a task was perceived as impossible, or when persistence was not beneficial, individuals in the implemental mindset disengaged much more quickly than did individuals in the deliberative mindset. Thus, persistence instigated by the implemental mindset seems flexible and adaptive, and not stubborn and self-defeating.

Finally, Armor and Taylor (2003) have reported on an experiment demonstrating that an implemental mindset, compared to a deliberative mindset, facilitates better task performance (a scavenger hunt to be performed on campus), and that this effect is mediated by the cognitive features of the implemental mindset (e.g., enhanced self-efficacy, optimistic outcome expectations, perception of the task as easy). This is the first study to demonstrate that the postulated cognitive features of the implemental mindset facilitate goal implementation. These results suggest that optimistic expectations associated with the implemental mindset do indeed lead to more effective self-regulation and better outcomes. Despite being optimistic, such expectations do become fulfilled. Participants' performance predictions, however, were for an immediate, imminent task. Armor and Taylor have suggested that the temporal distance of the predicted performance event may moderate the accuracy of judgments in the two mindsets, particularly the implemental

mindset. This assumption is supported by actual performance data collected in both the Gagné and Lydon (2001) and the Puca (2001) studies reported earlier. Whereas in the Gagné and Lydon studies, long-term relationship survival was not affected by the implemental mindset participants' optimistic predictions, in the Puca research (Study 1), immediate task performance was higher in implemental mindset compared to deliberative mindset participants. It appears, then, that whenever actual goal implementation is assessed further and further away from the induction of the implemental mindset, the positive effects of its various cognitive features on goal implementation can no longer be observed.

Summary

In this section, we have argued that becoming involved with planning the implementation of a chosen goal induces an implemental mindset that uniquely tunes a person to process information related to the implementation of goals. The activated cognitive procedures activated also guarantee that the individual stays focused (closed-minded), by disregarding irrelevant and peripheral information. Moreover, they ensure that biased inferences are made on the basis of encoded information in the direction of positive illusionary evaluations of the feasibility and desirability of the chosen goal. It is the sum total of the cognitive orientation of the implemental mindset that facilitates persistence in goal pursuit and successful goal attainment.

RESEARCH ON PLANNING THE IMPLEMENTATION OF GOALS: PROSPECTS

In all of the research reported on implementation intentions and implemental mindsets, people have been asked to plan the implementation of a set goal. But when do people start planning by themselves, without being told to do so? Many factors seem to determine whether a person starts making plans for goal implementation. The first group of factors relate to the ease of goal implementation. If a given goal has been implemented consistently and repeatedly in the past, and the respective opportunity structure of the person's environment, as well as his or her capabilities to perform the required actions, has not changed, there is no necessity to plan goal implementation. The person can rely on the direct instigation of his or her habitual ways of implementing the goal by using opportunities seized in the past. Planning becomes an issue (i.e., becomes instrumental to effective goal implementation) when the way to the goal needs to be newly developed, because no established ways exist, or needs to be reinvented, because hindrances and barriers are anticipated. These hindrances and barriers may be located inside or outside the person. For instance, a person who sets herself the goal to change her diet toward less fat intake may start to plan how to implement this goal, because she either cannot resort to established habits of meeting this goal, or because the environment (e.g., she moved to a new country) or her physical condition (e.g., she has developed an allergy to certain low-fat foods) has changed, thus making useless habits she has already developed to meet this goal.

However, there are also cognitive and motivational prerequisites to planning. On the cognitive side, the potential obstacles need to be accessible, and this is also true for potential good opportunities to act, and for possible instrumental goal-directed responses. Finally, procedures relevant to effective planning need to be in an activated state (e.g., linking opportunities to instrumental responses in an if-then structure; sorting out steps

to goal attainment in a temporal sequence). Supporting this line of thought, Pham and Taylor (1999; Taylor, Pham, Rivkin, & Amor, 1998) have demonstrated that mentally simulating one's way to the goal is a strong facilitator in forming relevant plans. Recent research by Grant-Pillow, Oettingen, and Gollwitzer (2003) has focused on the activation of cognitive procedures implicated in planning. In one study, placing participants in an implemental mindset with respect to a personal goal in one domain (i.e., leisure) facilitated the formation of strong implementation intentions in other domains (i.e., strong links between the specified critical situations and selected goal-directed responses were formed for achievement, interpersonal, and health goals). In a further study, people who chronically formed such strong links were observed to progress comparatively more effectively toward set achievement goals. These findings suggest that high situational (Study 1) or chronic (Study 2) accessibility of the cognitive procedures associated with making if-then plans facilitate the formation of implementation intentions.

The mere heightened accessibility of relevant knowledge (e.g., obstacles, opportunities, instrumental responses) and procedures (e.g., linking situations to responses in an if-then format) does not yet make a planner, however. Research by Oettingen (2000; Oettingen, Pak, & Schnetter, 2001) suggests that motivation to use activated knowledge and procedures for the construction of effective plans is also necessary. In one study, all participants were asked to name an unresolved interpersonal problem (e.g., "getting to know someone I like"; "improve the relationship to my partner"), and to indicate their expectations of successfully resolving it. Then, one group of participants had to dwell on obstacles that might impede successful solution of the problem. The other group of participants first had to elaborate mentally the positive future of having successfully solved the problem, then contrast these positive thoughts with thoughts about hindrances and obstacles impeding the positive future. Participants' readiness to plan how to solve the interpersonal problem was then assessed by providing them a choice either to spell out their plans or to reflect loosely on solving the problem at hand. Participants who were confident about solving their problem, who mentally contrasted the desired future with impeding hindrances, produced more plans than did participants who dwelled only on these hindrances and obstacles. Apparently, thinking about, or even intensively dwelling on, obstacles and hindrances does not make a planner either. Perceiving obstacles as standing in the way of the desired future motivates a person to engage in planning the implementation of a desired future.

In summary, people's readiness to plan seems to be guided intricately by the interplay of many different factors. Some of these factors reside in features of the goal pursuit at hand (e.g., goal implementation requires a person to be innovative or to change habitual ways). Other factors refer to the accessibility of relevant knowledge (about opportunities, obstacles, and instrumental goal-directed responses) and procedures (temporal sequencing, if-then linking). Finally, motivational factors determine whether the individual feels a need for plans and wants to go through the pain of forming them.

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