

Chapter 21

Flexible Tenacity in Goal Pursuit

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Goal-directed behavior possesses various observable features (Gollwitzer & Moskowitz, 1996). First and foremost, it is characterized by persistent striving until the goal is reached. Second, goal-directedness expresses itself in energization when situations or means that can be used to reach the goal are encountered. And third, goal-directed organisms show appropriateness: If one route to goal attainment is blocked, another course of action to the same goal is taken. Alternatively, if the goal changes, the goal-directed individual readily adapts to these changes by performing different actions.

It is the aspect of appropriateness that is scrutinized in the present chapter. We assume that goal pursuits, conscious as well as non-conscious (Gollwitzer & Bargh, 2005), possess much flexibility. But we want to carry this issue one step further. We raise the question of whether very tenacious goal pursuits do still possess the feature of appropriateness, or whether such determined goal pursuits are characterized by rigidity. The kind of height-

ened tenacity we analyze is not that of increased energization, which is experienced in the face of difficulty (Wright, 1996). Rather, we focus on the tenacity that originates from planning out an intended goal pursuit in advance. As research on implementation intentions (i.e., if-then plans) has observed (see summaries by Gollwitzer, 1999; Gollwitzer, Bayer, & McCulloch, 2005; Gollwitzer & Sheeran, 2006), individuals who furnish their goals with implementation intentions achieve higher goal attainment rates than individuals who act on the basis of mere goals (or goal intentions). The question we want to answer first in the present chapter is therefore the following: Are the benefits of forming implementation intentions associated with costs in terms of reduced flexibility (appropriateness)? Once we have found an answer to this first question, we turn in the second part of the chapter to the possibility of using implementation intentions to achieve flexible tenacity. The second question raised is thus quite different: Can forming an implementa-

tion intention be used as an effective self-regulatory strategy to protect a focal goal pursuit from disruptions (i.e., spontaneous attention responses to distractions, bad habits, and detrimental self-states such as emotional experiences) that reduce flexibility in achieving the goal? In order to find answers to both of these questions, we first present an overview of research on the effects of implementation intentions and the psychological mechanisms on which these rest.

PROMOTING GOAL ATTAINMENT BY FORMING IMPLEMENTATION INTENTIONS

An *implementation intention* is an if-then plan, in which an individual consciously specifies a goal-directed behavior to perform in response to an anticipated situational cue; an if-then plan is subordinate to its related goal intention (Gollwitzer, 1999). Whereas a goal intention specifies the desired event in the form of "I intend to perform Behavior X [e.g., to eat more vegetables] to reach Outcome X [e.g., to be slim]!", an implementation intention specifies an anticipated critical situation and a proper goal-directed response. Thus an implementation intention subordinate to the goal intention "to eat more vegetables" would follow the form "If Situation Y arises [e.g., I am handed a menu], then I will perform Behavior Z [e.g., look for a vegetarian meal]!" An implementation intention is therefore a consciously willed plan to enact a certain goal-relevant response in an expected situation. This response is initiated immediately and effortlessly upon contact with the specified situational cue without a second conscious act of will, just as a habitual response formed through repeated pairing with a critical situation is directly triggered by the situational cue. Unlike a habit, an implementation intention produces automaticity immediately through the willful act of creating an association between the critical situation and the goal-directed response. For this reason, implementation intentions are said to create *strategic automaticity* or *instant habits* (Gollwitzer, 1999; Gollwitzer & Schaal, 1998).

How Do Implementation Intentions Affect Goal-Directed Behavior?

Implementation intentions are expected to facilitate goal attainment on the basis of psychological processes that relate to both the antici-

pated situation specified in the if-component and the intended behavior specified in the then-component. Each of these processes is analyzed separately in the following discussion.

Mechanisms Related to the If-Component

Because forming implementation intentions requires the selection of a critical future situation (i.e., a viable opportunity), it is proposed that the mental representation of this situation becomes highly activated, and hence more accessible (Gollwitzer, 1999). This heightened accessibility should make it easier to detect the critical situation in the surrounding environment, attend to it even when one is busy with other things, and recall it.

The accessibility hypothesis (i.e., the mental representation of the situation specified in the if-part of the implementation intention becomes highly activated) was tested in studies measuring how well participants holding implementation intentions attended to and recalled the critical situation (Achtziger, Bayer, & Gollwitzer, 2007) as compared to participants who had only formed goal intentions. In a study using a dichotic-listening paradigm, it was observed that words describing the anticipated critical situation were highly disruptive to focused attention in implementation intention participants as compared to goal intention participants (i.e., the shadowing performance of the attended material decreased). This finding implies that opportunities to act, as specified in implementation intentions, will not easily escape people's attention even when they focus on other things (e.g., listening to a stimulating conversation). In a further study, the heightened accessibility hypothesis was tested via a cued-recall procedure. Research participants had to form implementation intentions specifying when, where, and how they wanted to play prepared games from numerous predesigned options. Immediately, or 48 hours later, participants were given a surprise task to recall all of the situational cues they had been provided. Those cues specified in implementation intentions were recalled better than nonspecified cues, whether recall was tested immediately or at a later point. A study by Steller (1992) provides additional evidence that implementation intentions lead to high accessibility of the critical situation. This study used an embedded-figures test (Gottschaltdt, 1926), where smaller a-figures were hidden within larger b-figures. Enhanced detection of the hid-

den a-figures was observed when participants 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).

Further support for the accessibility notion comes from Aarts, Dijksterhuis, and Midden (1999; see also Webb & Sheeran, 2004, 2007). In the Aarts and colleagues (1999) study, all participants were given information about expected situational cues in which to achieve a goal. In a subsequent lexical decision task, faster response times for cue words were observed in those individuals who formed implementation intentions with these cues. In addition, the faster lexical decision responses to these critical words (i.e., their heightened accessibility) mediated the beneficial effects of implementation intentions on goal attainment. These results imply that some of the goal-promoting effects of implementation intentions are based on the heightened accessibility of selected critical situational cues.

How does the heightened accessibility of the cue specified in the if-portion of the implementation intention affect overall goal pursuit (i.e., goal pursuit by planned and unplanned routes to the goal)? If the if-component increases the accessibility of the critical situation relative to the cues in the surrounding environment, implementation intentions should lead to gains in the use of the planned situational cue at the expense of alternative cues. Parks-Stamm, Gollwitzer, and Oettingen (2007, Study 1) tested this hypothesis by creating a paradigm in which implementation intentions affected primarily the if-process (i.e., the identification of a goal-relevant situation). It was found that individuals with implementation intentions recognized more of the planned situational cues, but fewer of the alternative cues. These results lend further support to the claim that the if-component of implementation intentions facilitates planned routes to the goal by increasing the accessibility of the specified cue.

Mechanisms Related to the Then-Component

It is also proposed that the mental act of linking a critical situation to an intended goal-directed behavior in the form of an if-then plan leads to automatic action initiation, in the sense that the planned response is immediate, is efficient, and does not require conscious intent once the critical situation is encountered. By forming implementation intentions, people can

strategically switch from conscious and effortful action initiation (guided by goal intentions) to having their goal-directed actions effortlessly elicited by the specified situational cues. This postulated automatization of action initiation (also described as the strategic delegation of control to situational cues) has been supported by the results of various experiments that tested immediacy, efficiency, and the presence or absence of conscious intent of the planned response.

Gollwitzer and Brandstätter (1997, Study 3) demonstrated the immediacy of action initiation in a study wherein participants were induced to form implementation intentions that specified a plan to present counterarguments to a series of racist remarks made by a confederate. Participants with implementation intentions initiated the counterargument more quickly than the participants who had formed the mere goal intention to counterargue. The efficiency of action initiation has also been explored (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 (a go/no-go task). Participants in the implementation intention condition also made the plan to press the response button particularly fast if the number 3 was presented. This go/no-go task was then embedded as a secondary task in a dual-task paradigm. Implementation intention participants showed a substantial increase over control participants in speed of responding to the number 3, 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 requires minimal cognitive resources (i.e., it can be performed even when a cognitively demanding activity is performed at the same time).

Bayer, Achtziger, Malzacher, Moskowitz, and Gollwitzer (2007) tested whether implementation intentions lead to action initiation without conscious intent once the critical situation is encountered. In these experiments, the critical situation was presented subliminally, and its facilitating influences on preparing for (Study 1) or performing (Study 2) the respective goal-directed behavior were assessed. In Study 1, the goal of asserting oneself against a rude experimenter was analyzed. Half of the

participants were encouraged to set the goal of "telling her off" by pointing to her rude behavior (goal intention condition), while the other half planned this in the form of an implementation intention. Afterward, faces of either the rude experimenter or a neutral person were presented subliminally (primes), and the activation of knowledge relevant to rudeness (target words such as *offensive*, *mean*, *conceited*) was measured via reading latencies. Results indicated that after the subliminal presentation of the critical primes, implementation intention participants, but not participants who only had formed goals, showed faster reading times for words related to rudeness.

In Study 2, participants were asked to classify a series of geometrical figures (e.g., circles, ellipses, triangles, and squares) into rounded versus angular objects by left- versus right-button press responses. All participants formed the goal intention to classify the figures as quickly and accurately as possible. Implementation intention participants were asked in addition to make the following plan: "And if I see a triangle, then I will press the respective button particularly fast!" Participants worked on a set of 240 figures, presented in succession on a computer screen. Some of the figures were preceded by the subliminal presentation of the critical figure (i.e., a triangle), whereas others were preceded by a control prime (i.e., the % sign). In accord with the results of Study 1, participants in the implementation intention condition had faster classification responses for angular figures when the triangle instead of the % sign was presented as a subliminal prime; no such effect was observed with goal intention participants. The subliminal priming effects observed in the experiments reported by Bayer and colleagues (2007) suggest that the goal-directed behavior specified in an implementation intention is triggered by the anticipated situational cue without the need for further conscious intent.

How does the automation of the response specified in the then-portion of the implementation intention affect overall goal pursuit? If the then-component makes the planned response more immediate and efficient, implementation intentions should allow increased responding to the planned response without impeding alternative responses. Parks-Stamm and colleagues (2007, Study 2) tested this hypothesis by creating a paradigm in which implementation intentions affected primarily the

then-process (i.e., the enactment of a goal-directed response). It was found that individuals with implementation intentions enacted more of the planned responses, without reductions in the enactment of alternative goal-directed responses. These results lend further support to the claim that the then-component of an implementation intention aids planned goal pursuit by automating the goal-directed response specified in the implementation intention.

Much like a habit, then, an implementation intention facilitates a planned response automatically when the anticipated situation is encountered. By creating strategic automaticity, implementation intentions allow attentional resources to be preserved for other goal-directed responses, mental activities, and concurrent goal pursuits. Forming an implementation intention to facilitate goal pursuit has been described as "passing the control of one's behavior on to the environment" (Gollwitzer, 1993, p. 173). After forming implementation intentions, one does not need to look consciously for an opportunity to act when one is busy with other thoughts, activities, or goal pursuits. A habit has been described as a final stage of goal pursuit in which one is no longer actively concerned about performing the specified goal-directed behavior or evaluating the outcomes of the behavior (Rothman, Hertel, Baldwin, & Bartels, Chapter 32, this volume). By forming an implementation intention, one can speed the attainment of this final stage in behavior adaptation. One can then effortlessly react to the anticipated situation with the predetermined behavior to work toward the goal automatically.

Implementation Intentions and Effective Goal Attainment

Perhaps the most challenging problem of meeting one's goals is getting started with goal striving, and there are at least three reasons why this is so difficult. The first reason has to do with remembering one's goal intention (Einstein & McDaniel, 1996). When acting on a given goal is not part of one's routine, or when one must postpone acting on it, one can easily forget to initiate goal-directed behavior. Dealing with many things at once or becoming preoccupied by a particular task can make this even more likely, especially when the given goal is new or unfamiliar. For example, after form-

ing the goal to begin performing breast self-examinations, 70% of inclined abstainers (i.e., those who had intended to perform the breast self-exams but did not) reported forgetting as the cause of their nonperformance (Milne, Orbell, & Sheeran, 2002; Orbell, Hodgkins, & Sheeran, 1997). Forgetting may also be responsible for the meta-analytic finding that the longer the time interval between measures of goal intentions and goal achievement, the less likely it is that intentions will be realized (Sheeran & Orbell, 1998). These findings suggest that remembering one's goal intentions can have negative outcomes for goal achievement.

Even if one remembers what one is supposed to do, a second problem needs to be solved in order to attain one's goal: seizing the opportunity at hand. This problem is especially acute when the opportunity to act is presented only briefly. In these circumstances, people may fail to initiate goal-directed responses because they fail to notice that a good time to get started has arrived, they are unsure how they should act when the moment presents itself, or they simply procrastinate in acting on it. For example, Oettingen, Hönig, and Gollwitzer (2000, Study 3) showed that failing to seize an available opportunity to act can occur even when people have formed strong goal intentions to perform a behavior at a particular time. Participants were provided with diskettes containing four concentration tasks, and formed goal intentions to perform these tasks on their computers at a particular time each Wednesday morning for the next 4 weeks. The program on the diskette recorded the times when participants started to work on the task from the clocks on participants' computers. Findings indicated that the mean deviation from the intended start time was 2 hours for each specified opportunity. Similar findings were obtained by Dholakia and Bagozzi (2003, Study 2), when participants' task was to evaluate a website that could be accessed only during a short time window. Here, only 37% of participants who formed a goal intention were successful at accomplishing the task. These two studies illustrate that people may not get started with goal pursuit because they fail to seize good opportunities to act.

There are also many instances where people remember their goal intentions (e.g., to order a low-fat meal) and recognize that an opportune moment is upon them (e.g., it is lunchtime at their usual restaurant), but nonetheless fail to

initiate goal-directed behaviors because they start to reflect anew on the desirability of the goal intention (i.e., they start to have second thoughts). This problem, which requires overcoming a temporary reluctance to act, is likely to arise when people have decided to pursue a goal that involves a tradeoff between attractive long-term consequences and less attractive short-term consequences (Mischel, 1996). For example, a strong goal intention to order low-fat meals is commonly formed on the basis of long-term deliberative thinking, according to which eating low-fat food is perceived as highly desirable; however, once the critical situation is confronted, short-term desirability considerations are triggered that occupy cognitive resources at the moment of action (e.g., the low-fat meal is perceived as tasteless at the critical juncture). Such dilemmas should get in the way of readily acting on the goal in the face of good opportunities (Loewenstein, Weber, Hsee, & Welch, 2001; Metcalfe & Mischel, 1999; Trafimow & Sheeran, 2004). Rothman and colleagues (Chapter 32, this volume) have also found that short-term factors can be more powerful for behavior change than more serious long-term considerations. For example, they found that quitting smoking is easier when individuals focus on their present cough than when they focus on their long-term elevated risk of cancer. Short-term concerns are powerful, and when they run counter to long-term wishes, they can keep individuals from acting on their desired goal pursuit.

Various studies suggest that these different difficulties with getting started on a goal pursuit can be solved effectively by forming implementation intentions. For instance, Gollwitzer and Brandstätter (1997, Study 2) analyzed a goal intention (i.e., writing a report about how one spent Christmas Eve) that had to be performed at a given time (i.e., during the subsequent Christmas holiday) when people are commonly busy with other things. Similarly, Oettingen and colleagues (2000, Study 3) observed that implementation intentions helped people to act on their task goals on time (e.g., at 10:00 A.M. every Wednesday over the next 4 weeks). 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 regular breast self-examinations (Orbell et al., 1997), receive regular cervical cancer screenings (Sheeran &

Orbell, 2000), resume functional activity after joint replacement surgery (Orbell & Sheeran, 2000), and engage in physical exercise (Milne et al., 2002) were all more frequently acted upon when people had furnished these goals with implementation intentions. Moreover, implementation intentions have been found to facilitate the attainment of goal intentions in cases where it is easy to forget to act on them (e.g., regular intake of vitamin pills—Sheeran & Orbell, 1999; the signing of worksheets by elderly persons—Chasteen, Park, & Schwarz, 2001).

The overall results of these studies clearly indicate that the rate of goal attainment is increased by forming an implementation intention in advance—that is, an if-then plan for how one intends to act on one's goal. The various cognitive mechanisms triggered by if-then plans highlight one's chosen opportunities to act and automate action initiation, making it easier to begin working toward one's goals. This conclusion is also supported by the finding that the beneficial effects of implementation intentions are commonly more apparent with difficult-to-implement goals than with easy goals. For instance, implementation intentions were more effective in helping people to complete difficult as compared to easy personal projects during Christmas break (Gollwitzer & Brandstätter, 1997, Study 1). Forming implementation intentions were also more beneficial to patients with frontal lobe lesions, who typically have severe problems with executive control, than to college students (Lengfelder & Gollwitzer, 2001, Study 2).

IS ACTION CONTROL BY IMPLEMENTATION INTENTIONS NECESSARILY RIGID?

Given that implementation intentions have strong effects on goal attainment, and that these effects are based on mechanisms that help to activate one situation at the expense of others and automate planned response initiation, we may wonder whether action control by if-then plans is associated with increased rigidity in keeping with the plan even when continued compliance is suboptimal. Do people with if-then plans behave rigidly in acting on their plans even when the superordinate goal is weak to begin with or has become weakened (i.e., do if-then plans ignore the strength of the goal intention)? Moreover, will people rigidly act on

their plans even if the specified situation is encountered in a context that forbids acting on the superordinate goal (i.e., when the present situation does not activate this goal)? Will people fail to act on their goals in alternative situations (i.e., situations other than the one specified in the if-component of the implementation intention), even if these alternative situations qualify as better opportunities to move toward the goal than the specified situation? And finally, will people stick to their plans even when evidence indicates failure? Below, we review research that has begun to explore these issues empirically.

The Goal Dependence of Implementation Intentions

Because implementation intentions are subordinate to goal intentions, they should operate in the service of meeting their superordinate goal intentions; they should not be mechanized as plans that influence behavior, regardless of the state of the superordinate goals. This means that implementation intentions should no longer affect behavior when the respective goals are not activated. In other words, implementation intentions should exhibit goal-dependent automaticity (Gollwitzer & Schaal, 1998), operating to bring about specified goal-directed responses only when the underlying goals are activated.

Sheeran, Webb, and Gollwitzer (2005, Study 2) investigated the impact of an implementation intention when the underlying goal was activated or not activated. All participants were given the task to be accurate in solving geometric puzzles. In a scrambled-sentences implicit priming procedure, they were exposed to words that activated a speed goal or to neutral words. An implementation intention then spelled out an if-then plan for how to be fast in solving the puzzles. Only when the superordinate goal of being fast was activated did this plan positively affect people's speed of solving the puzzles. This suggests that an implementation intention does not compulsorily affect behavior any time the critical situation specified in the if-part of the implementation intention is encountered. Rather, an implementation intention leads to action initiation only when the corresponding superordinate goal is also in a state of high activation. This implies that people do not have to worry that if-then plans will make them act on specified cues even

if they appear in inappropriate contexts. For instance, imagine that Anne is a student with a goal to read a book in the library, who has formed an implementation intention to sit down immediately and read upon contact with that book. If Anne then finds the anticipated book in a bookstore, she need not worry that her plan will overtake her. She should still be able to carry the book to the register, buy it, and take it home to read.

If implementation intentions respect the activation state of their superordinate goals, they should also be sensitive to the immediate presence or absence of the superordinate goals. Seehausen, Bayer, and Gollwitzer (1994) found that when participants were told that they no longer needed to reach the goal at hand, the effect of the respective implementation intention disappeared. Once a person was no longer striving for the goal, the common implementation intention effect of enhanced memory for the critical situation specified in the if-part of the implementation intention could not be observed any longer. The implication of this finding is that an implementation intention should also loosen its grip on a person's behavior when the superordinate goal has been reached. People who plan out their goal pursuits in advance in the form of if-then statements thus do not have to worry about becoming restless strivers who will continually show goal-directed behaviors whenever the specified critical cues are encountered. Rather, this automatism will come to a halt as soon as the respective goal has been reached by one's own effort, has been achieved through the efforts of others, or has become obsolete for some other reason (e.g., one has disengaged from the goal because it is no longer desirable or feasible).

Finally, sensitivity of implementation intention effects to the superordinate goal also implies that the strength of the superordinate goal should moderate these effects. Implementation intention effects do indeed seem to reflect the strength of their respective goal intentions. For instance, Orbell and colleagues (1997) found that forming implementation intentions that specified when and where participants planned to perform a breast self-exam in the coming month resulted in an increased occurrence only in those participants who entertained a strong goal intention to perform a breast self-exam. Following up on this finding, Sheeran and colleagues (2005, Study 1) investigated the sensitivity of implementation intentions to the

strength of the goal intention to engage in independent study (i.e., the number of hours per week a college student wanted to engage in this activity). They found a significant interaction between goal intention strength (i.e., number of intended study hours) and the effect of implementation intentions. When the goal intention was weak, the presence or absence of implementation intentions did not predict behavior; when it was moderate, implementation intentions increased their predictive validity; and when the goal intention was strong, the prediction of behavior by implementation intentions increased even more. Thus implementation intentions improved goal achievement more when the respective goal intention was stronger.

In sum, the reported findings strongly suggest that the automaticity created by implementation intentions is of the goal-dependent kind (Bargh, 1989). Implementation intentions are formed strategically (by an act of will) to enhance the attainment of their respective goals. It makes sense, therefore, that such an intention is sensitive not only to the state of activation of its superordinate goal, but also to whether a person still holds the goal and how strongly the person intends to reach the goal.

Taking Advantage of Alternative Opportunities

If implementation intentions allow for flexibility, they should enable individuals to take advantage of viable alternative opportunities. This question was explored first by Häfner (2000) in an experiment where participants were instructed to work on a word-rating task at a computer. Participants were also asked to help another research assistant by filling out a questionnaire at the end of the experiment. All participants accepted this second goal ("Yes, I'll complete this questionnaire!"), and participants in the implementation intention condition additionally furnished this goal with an implementation intention ("Yes, I'll complete the questionnaire. And when the experiment is over, then I'll fill out the questionnaire!"). During the word-rating task, a bogus computer crash was staged. The experimenter informed participants that the computer was experiencing a known software problem, and asked them to wait about 5 minutes until the computer technician could come by to fix the problem. This unexpected break provided a good

opportunity to fill out the questionnaire lying on the table next to the computer monitor. Significantly more participants in the goal intention condition used this unexpected opportunity than in the implementation intention condition (57% vs. 34%), demonstrating that the implementation intention hampered participants in their goal striving by binding them in their behavior to the specified opportunity. However, in a concluding questionnaire, even though 98% of participants responded that they noticed that the computer breakdown offered a good opportunity to complete the questionnaire, 38% reported that they felt that they were not allowed to complete it during that time (i.e., they felt an obligation toward the experimenter to wait until the end of the experiment). A new analysis excluding these latter participants revealed that within this sample, there was no longer a difference between the goal intention condition and the implementation intention condition. Apparently, it was not the implementation intention itself that led participants to miss the opportunity, but rather the feeling of obligation to achieve the goal at the time they agreed upon beforehand.

Jaudas and Gollwitzer (2004) therefore developed a choice reaction paradigm to get around the confound of social obligation. This paradigm consisted of two blocks of more than 100 trials each; in each trial a pair of objects was presented, and participants had to choose the one associated with the most points. In the first block, the cue (i.e., the original object) specified in the implementation intention was the best available object to act toward the goal. However, in the second block, an unexpected better alternative (i.e., a new object) was presented along with the original object specified in the implementation intention. This study tested whether participants would be able to make use of the new object, even if they had formed an implementation intention on the original object. Could participants with implementation intentions demonstrate flexibility by dropping their old plan (which was no longer functional) in order to take advantage of this new alternative?

More specifically, participants first memorized the value points associated with five different objects. Each score was between 10 and 50 points, with the flower icon worth the maximum 50 points. For each trial, two icons were presented on the computer screen side by side. The participant's goal was to maximize points

points as quickly as possible within a given time frame. Participants were awarded the score of the selected object, plus up to 10 additional speed points depending on their response latency. Participants in the goal intention condition committed themselves to the goal: "I will try to get as many points as possible!" Those in the implementation intention condition additionally adopted an if-then plan: "And if the flower icon appears, then I will quickly snatch the 50 points!" Because participants in the goal-only condition also learned that the flower icon was the most valuable object, the implementation intention did not provide any additional information, but simply phrased the planned responding to the flower icon in terms of an if-then statement.

In the first block of trials, only the five icons (objects) introduced at the beginning of the experiment were presented. When faced with a choice between the flower and the other icons, participants in the implementation intention condition chose the flower icon faster than participants in the goal-only group, while there were no differences concerning the other icons. As there were no differences in error rates, participants in the implementation condition ended up earning more points than the goal intention participants. This effect was in line with the expectation that forming an implementation intention would facilitate task goal attainment, but what about associated costs in terms of rigidity when a new and better (i.e., a more valuable) object was presented?

Participants were informed that in the second block of trials new icons might appear, including a book icon worth 60 points. This new icon (object) was then paired exclusively with the flower icon. To succeed in these trials, participants had to select the new book icon over the flower icon. A costs-in-rigidity hypothesis would predict that implementation intention participants who had previously specified the flower icon in their plan should find it difficult to select the book icon, because the presentation of the flower icon would initiate an antagonistic selection response that required much effort to be controlled, leading to higher error rates and longer reaction times.

However, contrary to this pessimistic prediction, no differences were observed between the implementation intention participants and the goal intention participants when the (old) flower icon and the (new) book icon were presented together. Furthermore, when the flower

four other old icons, participants in the implementation intention group still performed better than those in the goal intention group. Implementation intentions thus flexibly guided participants' task goal pursuit of making as many points as possible: When the flower icon was presented in combination with the new, more valuable icon, implementation intention participants managed to select the more valuable new icon (i.e., experienced no costs); when the flower icon was presented with one of the other four old icons, implementation intention participants effectively selected the flower icon (i.e., accrued benefits).

It appears, then, that the automaticity of responding associated with implementation intentions is high in terms of controllability, which is not surprising if one keeps in mind that implementation intentions operate in the service of their respective superordinate goals (in the present case, the earning of as many points as possible). These findings also support a theoretical conclusion drawn by Bargh (1994): Action control processes need not be conceived of as either automatic (i.e., possessing all of the four features of being unintentional, nonconscious, relatively effortless, and uncontrollable) or controlled (i.e., possessing none of these four features); rather, action control processes may possess any of these attributes to a greater or lesser degree. It is possible that action control by implementation intentions is highly efficient (i.e., it is effortless), but at the same time does not lack controllability (i.e., it still flexibly serves the respective superordinate goals).

Flexible Modification of Ineffective Plans

As any other means to a given goal pursuit, plans may be faulty and thus fail to help people to move toward the goal at hand. Based on this consideration, Jaudas, Achtziger, and Gollwitzer (2006) focused on a different angle from which the theme of rigidity–flexibility of action control by if–then plans could be addressed. Jaudas and colleagues wondered whether people would be responsive to feedback that their if–then plans did not promote goal attainment, but instead hampered goal progress. If negative feedback on the instrumentality of an if–then plan was ignored by implementation intention participants, this would support the hypothesis that if–then plans favor rigid action control. If if–then plans allow for flexible action control, however, negative instrumentality feedback

should instigate disengagement from the respective plans.

In a first study on this theme, participants played a computer game in which they had to navigate a figure (symbolizing a person) through 10 different mazes. The mazes were seen from a top view, and the figure was controlled by pressing one of four buttons, thus moving it left, right, up, or down. Participants were informed that in order to facilitate task performance, a green arrow would appear at some junctions suggesting a shortcut. In the goal intention condition, the participants' task goal was to find the shortest possible way through the various mazes (“I will try to find the shortest way through the mazes!”). In the implementation intention condition, participants had to add the following if–then plan: “And if the green arrow shows up, then I’ll quickly press the respective button!”

In fact, the green arrow pointed to the shortest way in only 3 out of the 10 mazes. The plan adopted by the implementation intention participants actually had low instrumentality, so in order to perform well, implementation intention participants needed to disengage from their if–then plan. The study also manipulated whether participants received performance feedback about the instrumentality of their chosen paths. The dependent variable was the mean number of mazes in which participants actually found the shortest ways.

The results revealed an interesting interaction between implementation intentions and feedback. When no feedback was given on participants' performance, goal intention participants showed an advantage over implementation intention participants; the performance of implementation intention participants without performance feedback suffered because of the faulty if–then plan. However, when implementation intention participants received feedback and thus learned that following their if–then plan had little instrumentality in terms of finding the shortest ways, these participants performed as well as the goal intention participants. Apparently, the implementation intention participants disengaged from the if–then plan when they were provided evidence that this plan hindered rather than furthered task goal attainment.

Summary

Concerns that gains produced by implementation intentions may be associated with costs in

terms of increased rigidity of goal pursuit seem mostly unfounded. First, action control by an implementation intention reflects the quality of the superordinate goal, and this extends to its level of situational activation, the original strength of the goal, and the degree to which the goal is still held. Second, specifying a good opportunity to act in an implementation intention does not make a person oblivious to alternative better opportunities. The latter are used as effectively as they are by people who strive on the basis of mere goals. Most interestingly, this flexibility seems to come without any costs in terms of quickly using the originally specified opportunity when it arises. Third, people seem to be very responsive to the instrumentality of their if-then plans. If these plans are counterproductive, it is possible to disengage from them to operate on the respective goal intentions alone.

GAINING FLEXIBILITY BY FORMING IMPLEMENTATION INTENTIONS

People set themselves goals to change a given status quo into a more desired future state, and these envisioned goals subsequently guide their thoughts, feelings, and actions toward goal attainment (Gollwitzer & Moskowitz, 1996). However, more often than not goal pursuit is disrupted when people spontaneously attend to distractive stimuli, fall prey to bad habits, or succumb to the negative influences of intrusive self-states (e.g., being upset). How can an individual avoid getting derailed by such disruptions, thus demonstrating flexible tenacity in pursuing the focal goal? We suggest that implementation intentions can be used to achieve this end. Over the years, we have explored the various ways in which implementation intentions may prevent people from compulsorily giving in to these disruptions.

Blocking Spontaneous Attention Responses

The distraction of attention from a current goal pursuit can be successfully suppressed by using implementation intentions. In two studies, Gollwitzer and Schaal (1998) used implementation intentions to control the spontaneous diversion of attention from a primary task. Participants were instructed to concentrate on a boring mathematical task on a computer and to ignore the distracting commercials that

would appear in a separate computer window. These award-winning commercials featured sound, music, beautiful people, and interesting activities; they were designed by professionals to be ultimately distracting. The performance of three groups on the arithmetic problems was compared: a goal intention group ("I will not let myself get distracted by the commercials!") and two implementation intention groups. Participants in the implementation intention groups were asked to form either a task-facilitating implementation intention to achieve their goal ("If I hear or see the commercials, then I will increase my efforts on the math task!") or a distraction-inhibiting implementation intention ("If I hear or see the commercials, then I will ignore them!"). When participants were highly motivated to do well on the task at hand, distraction-inhibiting implementation intentions consistently facilitated task performance. Thus implementation intentions designed to ignore the attractive distractions enabled participants to succeed in their primary task beyond even the strong intention not to be distracted. This is one way implementation intentions can be used as a tool to protect goal striving from outside forces that can reduce flexibility in achieving desired goals.

The Suppression of Habitual Responses

Habitual responses acquired through consistent repetition may at times conflict with people's consciously chosen goals and thus may also derail goal pursuit. This is particularly true when people have set change goals, to overcome their usual ways of doing things. Can implementation intentions halt the habitual response (e.g., ordering tasty but unhealthy food in a restaurant) in favor of the effective pursuit of the newly set change goal (e.g., following a healthy diet)? Verplanken and Faes (1999) found that habitual eating behaviors and implementation intentions had an independent effect on subsequent healthy eating. That is, regardless of whether the old unhealthy eating habits were weak or strong, implementation intentions improved an individual's diet.

Suppressing a Habitual Motor Response

A critical test of whether implementation intentions can halt habitual behaviors has recently been performed by Cohen, Bayer, Jaudas, and Gollwitzer (in press, Study 2). This study used

the *Simon task*, which takes advantage of a strong habitual response: Stimuli presented on the left side of a person are responded to by the left arm more effectively than stimuli presented on the right side, and vice versa. In the Simon task, tones are presented that simultaneously feature relevant (pitch) and irrelevant (location) attributes. For example, the participants must indicate whether a tone's pitch is low or high by pressing a key with their left or right hand, respectively. In this example, responses to low-pitch tones presented on the left side (and high-pitch tones presented on the right side) are typically faster than responses to high-pitch tones presented on the left side and low-pitch tones presented on the right side. This congruence effect on response times is termed the *Simon effect*.

The Simon effect is a robust phenomenon, which can be replicated for different stimuli and in different modalities (for an overview, see Lu & Proctor, 1995); it is commonly explained by so-called *two-route models*. One of the most frequently cited two-route models is the *dimensional overlap model* (Kornblum, Hasbroucq, & Osman, 1990). According to this model, the stimulus attributes (relevant and irrelevant) are processed along two different routes. The processing of the spatial location is habitual and thus immediately activates a respective response. The relevant stimulus attribute is processed by the slower, more controlled processes instigated by the task goal. If processing along both routes activates the same response, one finds shorter reaction times. On the other hand, when the responses activated by the two routes are different (or incongruent), then this results in a conflict that produces longer reaction times. This "race" between information processing along the habitual and task goal routes is supported by experiments investigating the temporal relationship between coding of the irrelevant stimulus attribute and coding of the relevant attribute (e.g., De Jong, Liang, & Lauber, 1994; Hommel, 1994).

Cohen and colleagues (in press, Study 2) attempted to help people achieve their task goal (i.e., classifying low and high tones) in the noncorresponding trials by automating the slower, controlled information-processing route with implementation intentions. Participants were asked to decide whether the pitch of the tone was low or high by pressing a left or a right key on the computer keyboard. The tones were presented by external loudspeakers

placed at participants' left and right sides. Participants in the control group formed the following goal: "I'll respond to the tones by pressing the respective buttons as fast as possible!" Participants in the implementation intention condition fostered their pursuit of this goal with an additional implementation intention: "And if I hear the high tone on the left side, then I'll quickly press the right button!" This critical situation specified in the implementation intention was one of the two possible incongruent combinations of response type and spatial location.

The results were as follows: In the control (mere task goal) condition, the Simon effect was replicated for both incongruent combinations. In contrast, in the implementation intention condition, the Simon effect was found only for one incongruent combination; for the incongruent combination specified in the implementation intention, the Simon effect was eliminated. These results provide further evidence that implementation intentions can help to control unwanted habitual (automatic) responses, and in the present case this was achieved by vesting the slower but wanted response with heightened efficiency. Even a response so unquestionably habitual as responding to stimuli presented on one side with the matching hand failed to intrude on the task goal when it was furnished with a guiding implementation intention.

Suppression of Chronic Fears

Not only do behaviors become habitual through consistent repetition; cognitions and emotions can be subjected to habitual control by this process as well. The pursuit of goals may thus not only be hampered by antagonistic behavioral habits, but also by antagonistic habitual ways of processing and evaluating information. Thus the question arises whether implementation intentions can be used to help people attain change goals that are geared toward overcoming these habitual cognitive and emotional responses.

The fearful responses to a frightening stimulus are a special case in point. When these responses are overly intense, as in individuals with phobias, the effective down-regulation of fear becomes important. Such individuals may form the change goal to stay calm in the face of threatening stimuli, and furnish this goal with respective implementation intentions. But do

such if-then plans facilitate goal attainment? Schweiger Gallo, Keil, McCulloch, Rockstroh, and Gollwitzer (2006, Studies 2 & 3) investigated whether the emotional responses to spiders in participants with a spider phobia (arachnophobia) could be controlled by forming implementation intentions. Participants with arachnophobia were recruited to view images of spiders from the International Affective Picture System. There were three conditions: a control condition, a goal intention condition ("I will not get frightened!"), and an implementation intention condition ("And if I see a spider, then I will stay calm and relaxed!").

Immediately following the presentation of the spiders, valence, arousal, and dominance ratings were taken with the Self-Assessment Manikin scales. Spiders were presented for 100 milliseconds, followed by a random pattern mask; participants then made their evaluations within a time frame of 2 seconds (a short enough response window to prevent excessive deliberation). Whereas no differences between the control condition and the goal condition were observed, participants in the implementation intention condition reported feeling less negative, less aroused, and less out of control than participants in either of these other groups when viewing the spider pictures.

Suppressing Habitual Stereotypical and Prejudicial Responses

The use of stereotypes in impression formation can be controlled effectively by effortful correctional strategies (Bodenhausen & Macrae, 1998; Brewer, 1988; Devine, 1989; Fiske & Neuberg, 1990). However, the activation of stereotypes carries features of automaticity, due to a long history of being repeatedly activated in the presence of members of the particular group (Bargh, 1999; Devine, 1989). Accordingly, stereotype activation should be more difficult to control than stereotype use, and the question arises as to whether people who have the goal of judging others fairly can protect themselves from the automatic activation of stereotypes by adding implementation intentions focused on the suppression of the "bad habit" of stereotyping others. If one applies a horse race metaphor, it seems possible that the response specified in the then-part of a fairness-oriented implementation intention can win out over the automatic activation of stereotypical beliefs.

Findings of priming studies using short SOAs (less than 300 milliseconds) suggest that forming implementation intentions does indeed inhibit the automatic activation of stereotypical beliefs (Gollwitzer & Schaal, 1998). When participants furnished their goal intentions of judging elderly people in a nonstereotypical manner with an implementation intention ("And if I see an old person, then I tell myself: Don't stereotype!"), the typical automatic activation of stereotypical beliefs (assessed through pronunciation speed in a semantic priming paradigm) was even reversed. Implementation intentions were also found to effectively suppress the automatic activation of gender stereotypes in a study where participants had to play the role of a personal manager in a simulated hiring situation. When participants had formed the goal intention to judge women applicants in a nonstereotypical way and furnished this goal intention with an implementation ("And if I see this person, then I will ignore her gender!"), no automatic activation of stereotypical beliefs about this particular woman (assessed through response latencies in a Stroop task using stereotypical words) was observed.

Implementation intentions were also observed to suppress the automatic activation of prejudicial feelings in a study on perceptions of homeless persons. When participants' goal intentions to judge homeless individuals in a nonprejudicial manner were furnished with implementation intentions ("And if I see a homeless person, then I will tell myself: No prejudice!" or "And if I see a homeless person, then I will ignore the fact that the person is homeless!"), automatic negative evaluation effects (assessed in an affect priming paradigm) vanished.

In Europe, one interesting stereotype concerns a certain group of individuals (primarily men) associated with negative attributes such as being disruptive and overly zealous: soccer fans. Recent work by Ahtziger (2002) on prejudicial feelings toward soccer fans indicates that implementation intentions (e.g., "If I see a soccer fan, then I will not evaluate him negatively!") can block such negative feelings in a very flexible manner. In this study, a sequential priming paradigm was used, in which pictures of soccer fans served as primes and relevant person attributes (e.g., *rowdy*, *comradely*) served as targets that had to be read as quickly as possible. Half of the depicted soccer fans (primes) were cued with a signal tone, and the

participants were told that the implementation intention would only apply to those soccer fans cued with the signal tone. Implementation intention effects (i.e., relevant positive attributes were read faster than negative attributes) were only observed when the depiction of soccer fans was accompanied with a signal tone.

In sum, it seems that the pursuit of goals to be nonstereotypical in one's judgments and nonprejudicial in one's evaluations of certain others can be protected from being derailed by habitual thoughts and feelings toward these persons. One only needs to form implementation intentions that are geared toward suppressing these habitual responses. Apparently, the horse race between the activation of the habitual response and the goal-directed response (i.e., to be fair toward others) is won by the latter, if this response is specified in the then-part of an implementation intention.

Blocking the Influence of Intrusive Self-States

Goal pursuit becomes difficult when action control is hampered by a person's ongoing self-states, such as the activation of cognitive procedures or the experience of motivations and emotions that do not correspond with acting on the focal goal. We have recently explored whether spelling out the pursuit of the focal goal in advance by forming implementation intentions effectively protects the focal goal pursuit from getting derailed by such negative internal influences. Our hypothesis was that goal pursuits preprogrammed by implementation intentions should no longer be disrupted by the negative influences of adverse self-states, as the if-then preprogrammed persons are acting on automatic pilot.

Task Sets

An easy-to-use paradigm to investigate the negative influence of activated adverse cognitive procedures on the performance of a focal task goal is the so-called *task switch paradigm*, in which participants repeatedly switch between simple but different cognitive tasks. When participants have to switch from one task to the next, they exhibit an increase in reaction times, labeled a *switch cost*. In other words, initially the immediately preceding task has a negative influence on pursuing the new task. The observation of such switch costs is a very robust

finding that can be easily obtained in diverse experimental settings. In fact, it seems to be almost impossible to eliminate switch costs. For this reason, several theories have been advanced about the origins of switch costs, involving task sets, procedural priming, and memory retrieval (for a summary, see Kluwe, Lüer, & Röesler, 2003). The interesting question from the perspective of the present chapter is whether implementation intentions can be used to reduce switch costs.

In a recent experiment on this theme, Cohen and colleagues (in press, Study 1) used an alternating-run paradigm (Rogers & Monsell, 1995) in which participants switched between two simple cognitive tasks in a predictable sequence. In this study, a square separated into four smaller squares was presented on the computer screen. On each trial, a letter-number pair was presented in the center of one of the four squares (e.g., 7K). When the stimuli were presented in the two upper positions, participants had to decide whether the letter was a consonant or a vowel by pressing the respective button (thereby ignoring the number). When the stimuli were presented in the two lower positions, participants had to decide whether the number was odd or even (thereby ignoring the letter). The pairs predictably appeared in a clockwise pattern, resulting in the sequence AABBAABB . . . (i.e., A-switch, A-repetition, B-switch, B-repetition). Participants in the goal intention condition set themselves the following goal: "I will classify the letters and digits as fast as possible without making mistakes!" Participants in the implementation intention condition were also instructed to form this implementation intention: "And if an E appears in the upper row, then I'll quickly press the respective button!"

The results were as expected: Forming implementation intentions led to reduced reaction times for the critical stimulus (E). This benefit in reaction time was observed not only in the repetition trials, but also in the switch trials. Furthermore, results showed no cost in reaction times to numbers when these numbers were presented with the critical letter E. In sum, planning out the performance of a task goal (such as classifying letters) in advance by forming an implementation intention protects this goal from interferences stemming from the activation of procedures from an immediately preceding antagonistic task goal. As the ease of switching between task goals is a benchmark

for flexibility in goal pursuit, forming implementation intentions qualifies as a very effective self-regulatory means to achieve flexibility in goal pursuit.

Self-Definitional Incompleteness

One self-state that is detrimental to the pursuit of the social goal of demonstrating interpersonal sensitivity is *self-definitional incompleteness*. According to self-completion theory (Wicklund & Gollwitzer, 1982), individuals committed to an aspired-to identity (e.g., lawyer, musician) experience incompleteness when they receive negative feedback concerning their possession of a symbol of this identity. This state of incompleteness in turn motivates them to strive to regain a sense of completeness by talking or behaving in accordance with that coveted identity—a behavior pattern known as *self-symbolizing*. Self-symbolizing behavior can be antagonistic with the goal of being sensitive to the interests of others if these interests do not square with the orientation toward winning back self-definitional completeness (Gollwitzer & Wicklund, 1985).

In a self-completion experiment, Gollwitzer and Bayer (2000) either induced self-definitional incompleteness in male law students highly committed to becoming lawyers or left their sense of self-definitional completeness untouched. Then the law students were told that they would have a chance to get to know another person (i.e., a female student named Nadja), and they were assigned the interpersonal goal to take the other student's perspective during the upcoming conversation. Half of the participants formed the additional implementation intention: "And if my partner expresses a preference for a specific conversation topic, then I will turn the conversation around to it!" All participants finally read the potential conversation partner's chosen topics of interest, and were asked to list their own conversation preferences. The participants who had not formed implementation intentions showed the classic self-completion effect, in that the incomplete more than the complete participants preferred to talk about law- and lawyer-related issues (in spite of their partner's opposing preference to talk about vacations and movies). However, among those who had formed implementation intentions, this effect was completely eliminated: Incomplete as well as complete individuals were equally uninterested in law as a conversation topic. Apparently, the

goal of taking the other person's perspective stayed unaffected by the self-state of incompleteness when acting on this goal was spelled out in advance by an implementation intention.

Moods

A self-state known to impede the pursuit of egalitarian fairness-oriented goals is being in a positive mood. Research has demonstrated that a good mood can cause an individual to rely more heavily on general knowledge structures and heuristics, and thus the person may be more likely to stereotype others (e.g., Bless & Fiedler, 1995; Park & Banaji, 2000). Gollwitzer and Bayer (2000, Experiment 3) explored whether the pursuit of an egalitarian goal could be guaranteed even during a good mood when acting on the egalitarian goal was controlled by an appropriate implementation intention. Participants watched either a humorous video or an informational documentary, in order to put them in a positive or a neutral mood, respectively. One-third of the participants were not instructed to form a goal concerning a subsequent task involving person judgment. A second group set themselves the goal to make a nonstereotypical judgment, and the final group additionally furnished this goal with an implementation intention ("And if I start to evaluate a depicted character, then I will ignore the character's gender!").

All participants were then presented with a set of photographs and asked to choose a description of the depicted woman's actions from a list of presented options. These descriptions were selected beforehand to vary in stereotypicality. The control condition did show a significant effect of mood, such that participants in a good mood exhibited a higher level of stereotyping than those in a neutral mood. The goal-only condition showed similar results, indicating that being in a good mood severely hampered the attainment of the egalitarian goal. However, in the implementation intention condition, there was no effect of mood on the stereotypicality of the judgments made. Implementation intentions apparently managed to protect the goal to be egalitarian from the negative influences of being in a good mood.

Ego Depletion

Another self-state that impedes one's ability to act on one's goals is *ego depletion* (e.g.,

Muraven & Baumeister, 2000; Muraven, Tice, & Baumeister, 1998). Ego depletion is a state experienced when one has drained one's regulatory resources by exercising self-control in a demanding first task. Muraven and colleagues showed in three studies that engaging in much self-regulation while performing a first task resulted in decreased performance on a second task that also required much self-regulation in order to be successful. For example, suppressing an emotional response while watching a movie subsequently resulted in less persistence in holding a handgrip; suppressing a prohibited thought resulted in less persistence in trying to solve difficult anagrams; and thought suppression resulted in a decreased ability to regulate one's emotions.

Webb and Sheeran (2003, Study 2) showed that implementation intentions could eliminate the effect of ego depletion on the performance of a subsequent task goal. After an ego-depleting first task, participants were asked to perform a demanding Stroop task. Half of the participants formed implementation intentions for the Stroop task, whereas the other half did not. Those with implementation intentions did not show an effect of ego depletion in their Stroop task performance; their Stroop performance was no different from that of the individuals who had not experienced the first ego-depleting task. These findings suggest that using implementation intentions to plan one's performance of a demanding task effectively protects meeting the task goal of performing well from the detrimental self-state of ego depletion. In other words, the performance-suppressing effect of ego depletion fails to unfold if the task is controlled by implementation intentions. The ability of implementation intentions to facilitate even tasks that are difficult to perform because of automatic interference (as is the case with the Stroop task) speaks to the power of self-regulation by if-then plans.

SUMMARY AND CONCLUSION

Even though the self-regulation of goal pursuit by implementation intentions facilitates goal attainment, these benefits are not earned by paying a price in terms of reduced flexibility. People stay sensitive to the state of the goal, and this extends to the degree of situational activation of the goal, the degree to which a person is still striving for the goal, and the strength of the goal. Moreover, people are still able to

seize alternative good opportunities to move toward attaining the goal. Finally, they readily disengage from if-then plans when these plans fail to be instrumental to goal attainment. All of these findings suggest that rigidity is not the price that must be paid for the more determined goal striving associated with implementation intentions.

Interestingly, implementation intentions can even be used to avoid rigidity in terms of readily giving in to spontaneous attentional responses to distractive stimuli, habitual responses, and detrimental self-states (e.g., activated disruptive cognitive procedures, the experience of disruptive emotional and motivational states). When a given focal goal pursuit is spelled out in advance by an if-then plan, such detrimental self-states no longer present a hindrance to the attainment of the focal goal. It appears, then, that furnishing goals with if-then plans not only allows for flexibility in the sense of staying sensitive to the state of the goals, alternative opportunities to act, and the instrumentality of the plans formed. By forming implementation intentions, people can also emancipate their goal pursuits from becoming easy prey to adverse self-states.

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