Implementation Intentions

Strong Effects of Simple Plans

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When people encounter problems in translating their goals into action (e.g., failing to get started, becoming distracted, or falling into bad habits), they may strategically call on automatic processes in an attempt to secure goal attainment. This can be achieved by plans in the form of implementation intentions that link anticipated critical situations to goal-directed responses ("Whenever situation x arises, I will initiate the goal-directed response y!"). Implementation intentions delegate the control of goal-directed responses to anticipated situational cues, which (when actually encountered) elicit these responses automatically. A program of research demonstrates that implementation intentions further the attainment of goals, and it reveals the underlying processes.

Good resolutions are useless attempts to interfere with scientific laws. Their origin is pure vanity. Their result is absolutely nil.
—Oscar Wilde, *The Picture of Dorian Gray*

Good intentions have a bad reputation. People who form New Year's resolutions earn at best a sympathetic smile when they announce their heroic intentions (e.g., exercising regularly, avoiding unhealthy foods). Though the audience may concede that such resolutions are made with good will (Oscar Wilde is less trusting), they doubt their effectiveness. This suspicion is deeply rooted. Folklore tells us that "the road to hell is paved with good intentions."

Do good intentions deserve this bad reputation? As the many empirical studies based on Ajzen's (1985) theory of planned behavior demonstrate, there is no reason to assume that good intentions have nil effects or even negative effects on behavior. Quite to the contrary, strong intentions (e.g., "I strongly intend to do *x*") are reliably observed to be realized more often than weak intentions (see reviews by Ajzen, 1991; Conner & Armitage, in press; Godin & Kok, 1996). However, the correlations between intentions and behavior are modest; intentions account for only 20% to 30% of the variance in behavior. As well, the strength of the intention–behavior relation varies drastically with the type of behavior that is specified, and people's past behavior commonly turns out to be a better predictor than their intentions. Most interesting, the weak intention–behavior relation is largely due to people having good intentions but failing to act on them (Orbell & Sheeran, 1998).

In light of these findings, it seems unjustified for applied psychologists to advise people who are motivated to do good to refrain from forming good intentions, but

suggesting that good intentions are an effective self-regulatory tool is also unwarranted. What is needed is a theoretical and empirical analysis of how people's good intentions can be made more effective. Once this is known, forming good intentions and effective ways to implement them can be suggested to people who are motivated to change their behavior.

How good intentions can be implemented effectively has been analyzed in recent research on goal striving (for a review, see Gollwitzer & Moskowitz, 1996). Forming good intentions or setting goals is understood as committing oneself to reaching desired outcomes or to performing desired behaviors. For various reasons, people may often refrain from such binding goal commitments (e.g., Oettingen, in press), but even if people make goal commitments, the distance between goal setting and goal attainment is often long (Gollwitzer, 1990). Successful goal attainment requires that problems associated with getting started and persisting until the goal is reached are effectively solved.

The question of how goals, once set, can be made more effective therefore boils down to asking for the variables that determine effective goal pursuit. Some answers are suggested by recent research on goal striving. First, it matters how people frame their good intentions or goals. For instance, better performances are observed when people set themselves challenging, specific goals as compared with challenging but vague goals (so-called "do your best" goals; Locke & Latham, 1990). This goal-specificity effect is based on feedback and self-monitoring advantages, as is also true for the goal-proximity effect (proximal goals lead to better performances than distal goals; Bandura & Schunk, 1981). Goal attainment is also more likely when people frame their good intentions as learning goals (to learn how to perform a given task) rather than performance goals (to find out through task performance how capable one is; Dweck, 1996) or when they frame their intentions as

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promotion goals (focusing on the presence or absence of positive outcomes) rather than prevention goals (focusing on the presence or absence of negative outcomes; Higgins, 1997).

Second, successful goal pursuit also depends on self-regulatory skills in initiating goal-directed behaviors and bringing them to a successful ending. For instance, it matters whether one can shield an ongoing goal pursuit from distractions. Kuhl (1984) differentiated a number of control strategies that serve this purpose (e.g., emotion control, environment control). Through environment control, for example, the person prevents the derailing of an ongoing goal pursuit by removing competing temptations from the situation in which goal pursuit is to occur. How a person copes with conflicting goals is also important (Cantor & Blanton, 1996). People who manage to come up with creative integrations (e.g., the goal of studying and the goal of being with people are reconciled by the goal of studying in groups) are more likely to meet their goals.

Preparing Goal Pursuit

Goals can be attained in many different ways. This flexibility is a blessing when people have to cope with failures on their way to goal attainment, because they can usually switch to alternative routes (Wicklund & Gollwitzer, 1982). However, the flexibility of goal pursuit is a curse when it comes to swiftly acting on one's goals, because people have to decide how (i.e., when, where, and in what way) to implement their goals. Such decisions are based on determining which behaviors are the most instrumental to meeting one's goals and what situations are most favorable for performing them. The suitability of a given situation is particularly difficult to determine, because one has to compare it with other situations that may arise. Moreover, it has

to be decided which of the many goals the person holds is to be served by using the given situation.

When people do not make such decisions ahead of time but only in situ, effective goal pursuit is hampered. In situ decisions primarily scrutinize the suitability of the present situation and the behaviors appropriate to the present situation. Anticipative decisions, to the contrary, are less restricted because they allow for incorporation of the whole array of possible opportunities and instrumental behaviors. A person thus can select the most effective behaviors and the most suitable opportunities. Moreover, good opportunities often present themselves only for a short time (e.g., when one wants to make one's point in a conversation, when medication has to be taken at a certain time of day). When goal pursuit is planned, goal-directed behaviors can be initiated immediately once a relevant situation is encountered.

Predeciding how to implement one's goals in a given situation should have additional advantages. Because effortful deliberations in situ are no longer required, action initiation should be efficient in the sense of demanding few cognitive resources. Action initiation may even occur without a conscious intent. This automatization of goal implementation through predeciding, however, not only should be useful to the swift seizing of good opportunities, but should also help a person protect goal pursuit from tempting distractions, bad habits, or competing goals. In the latter cases, the person would have to predecide only how to best escape these unwanted influences on behavior.

Goal Intentions Versus Implementation Intentions

Gollwitzer (1993) has conceptualized the predeciding of the when, where, and how of goal implementation in terms of forming implementation intentions that are distinguished from goal intentions. Goal intentions specify a certain end point that may be either a desired performance or an outcome. They are the type of intentions modern goal theories (Gollwitzer & Moskowitz, 1996) or Ajzen's (1985) theory of planned behavior are concerned with. Goal intentions have the structure of "I intend to reach x!" whereby the x can be a behavior or an outcome. By forming goal intentions, people translate their noncommital desires into binding goals. The consequence of having formed a goal intention is a sense of commitment that obligates the individual to realize the goal.

Implementation intentions are subordinate to goal intentions and specify the when, where, and how of responses leading to goal attainment. They have the structure of "When situation x arises, I will perform response y!" and thus link anticipated opportunities with goal-directed responses. It is not a person's self that is linked to a desired end state (as with goal intentions); rather, the person commits himself or herself to respond to a certain situation in a specific manner. Implementation intentions serve the purpose of promoting the attainment of the goal specified in the goal intention.

The processes on which the effects of implementation intentions are based relate to both the specified situations

and the intended behaviors. Because implementation intentions imply the selection of a suitable future situation (i.e., a good opportunity), it is assumed that the mental representation of this situation becomes highly activated and thus more easily accessible (in line with findings that decisions make decision-consistent information more easily accessible; e.g., Dellarosa & Bourne, 1984). This heightened accessibility should make it easier to detect the critical situation in the surrounding environment, to readily attend to it even when one is busy with other things, and to recall it more effectively when the question arises when and where one wanted to get started on one's goal pursuit.

However, implementation intentions also imply the selection of an effective goal-directed behavior, which is then linked to the chosen critical situation. This mental act is assumed to lead to the automatization of the intended goal-directed behavior once the critical situation is encountered. Action initiation becomes swift, efficient, and does not require conscious intent (i.e., it acquires features of automaticity; Bargh, 1997). This automaticity should be rooted in particularly effective memory retrieval processes in situ (such as when a person swiftly recalls the solution of an arithmetic task from memory; e.g., Logan, 1988) as a result of having mentally linked selected suitable situations and effective goal-directed behaviors ahead of time. Strong links may be achieved in one mental act (as suggested by research on stimulus–response translations; for a review, see Hommel, in press) but should additionally benefit from mental rehearsal (as suggested by research on process simulations; for a review, see Taylor, Pham, Rivkin, & Armor, 1998).

Gollwitzer (1993, 1996) summarized the functioning of implementation intentions by the metaphor of "passing the control of one's behavior on to the environment" (1993, p. 173). By forming implementation intentions, people can strategically switch from conscious and effortful control of their goal-directed behaviors (i.e., the effortful deliberations described above) to being automatically controlled by selected situational cues. For instance, people who have formed the goal intention to exercise regularly can furnish it with implementation intentions that specify when, where, and how they want to exercise. The implementation of their goal intention is thus placed under the direct control of situational cues and removed from conscious and effortful control.

Implementation Intentions and Action Initiation

Problems of goal attainment are manifold. One set of problems involves getting started. When people are highly absorbed in an ongoing activity, wrapped up in ruminations, gripped by an intense emotional experience, or simply tired, chances are high that they will not seize an available opportunity to act on their goals, simply because the opportunity fails to attract attention. Attention is focused on other things that have nothing to do with the intended goal. Even when people search for appropriate opportunities in a given situational context, they may not detect them, simply because they are not obvious at first

sight (e.g., when in a club offering social activities, people may fail to recognize available sports opportunities). Finally, the initiation of goal-directed actions becomes a problem when people let opportunities that present themselves only briefly slip past (e.g., when a migraine patient fails to take medication at the onset of symptoms).

Implementation intentions should be a very effective self-regulatory strategy when it comes to alleviating problems of getting started on one's goals. Starting to strive for a goal facilitates goal completion (Lewin, 1926). On the basis of this finding, Gollwitzer and Brandstätter (1997) conducted studies to demonstrate that goal intentions that are furnished with implementation intentions are more easily attained than mere goal intentions. In their first study, university students were asked prior to Christmas break to name two projects they intended to achieve during the upcoming vacation, one difficult to implement and the other easy to implement. For both types of projects, participants indicated such goals as writing a seminar paper, settling an ongoing family conflict, or engaging in sports activities. When participants were asked whether they had formed intentions on when and where to get started (i.e., implementation intentions), about two thirds—again, for both types of goals—responded positively.

Project completion was checked after Christmas vacation. For difficult-to-implement projects, two thirds of the participants who had formed implementation intentions had carried them out. Participants without implementation intentions, however, mostly failed to complete the projects. Only one fourth of these participants were successful. For the projects that were easy to implement, completion rate was very high (80%), regardless of whether participants had formed implementation intentions. Apparently, when action initiation is easy to begin with, automatization through implementation intentions does not produce an additional advantage. However, automatization through implementation intentions has a strong facilitating effect when action initiation is difficult.

These findings were corroborated in an analogous experiment in which the experimenters set participants a goal that was difficult to implement (Gollwitzer & Brandstätter, 1997, Study 2). Participants were requested, again prior to Christmas break, to write a report on how they spent Christmas Eve. This report was to be written no later than 48 hours after the event and then sent to the experimenters, who were supposedly studying how people spend their holidays in modern times. Half of the participants were instructed to form implementation intentions by indicating on a questionnaire exactly when and where they intended to write the report during the critical 48 hours. The other half of the participants were not requested to pick a specific time and place. When participants' reports arrived in the mail after Christmas, three fourths of the implementation intention participants had written the reports in the requested time period, whereas only one third of the control participants managed to do so.

Apparently, implementation intentions promote goal attainment by helping people get started. In the presented studies, participants' projects were difficult to attain, but

goal striving was not necessarily unpleasant. Do implementation intentions also further the attainment of goals that require unpleasant behaviors?

Implementation Intentions and Unpleasant Goal Pursuits

Health-promotion and disease-prevention enterprises (e.g., starting to exercise regularly, picking up a healthy diet) need an extra effort, because there are immediate costs and only long-term rewards (Gollwitzer & Oettingen, 1998). Thus, they allow for a critical test of the beneficial effects of implementation intentions, but implementation intentions seem to pass this test. Women who had set themselves the goal of performing a breast self-examination (BSE) during the next month (Orbell, Hodgkins, & Sheeran, 1997) greatly benefited from forming implementation intentions. Participants in this study were first asked to indicate how strongly they intended to perform a BSE during the next month, and some of the participants were requested to write down where and when they would want to perform the BSE during the next month. Of the participants who had reported strong goal intentions to perform a BSE during the next month, 100% did so if they had been induced to form additional implementation intentions. If no additional implementation intentions were formed, however, the strong goal intention alone produced only 53% goal completion.

Other health-promotion and disease-prevention goals also benefit from implementation intentions. Sheeran and Orbell (1999) analyzed whether the regular intake of a vitamin supplement is facilitated by implementation intentions. Participants who had been induced to commit themselves to when and where they would take a pill each day missed fewer pills than participants who had formed only the respective goal intentions (i.e., to take a pill each day). This was observed in two studies, one in which participants were asked to take the pills for two weeks and a second study in which participants were asked to take the pills for three weeks.

In a field study, Orbell and Sheeran (in press) assessed the motivation to resume functional activity among a sample of patients prior to joint replacement surgery and inquired whether people had formed implementation intentions. At a three-month follow-up, people who had formed implementation intentions were found to have initiated 18 out of 32 desired activities sooner than people who had not done so. This difference could not be accounted for by differences of motivation between the two groups as assessed by preoperative measures of attitude, perceived behavioral control, and normative beliefs.

An experiment by Milne, Orbell, and Sheeran (1999) investigated whether college students' participation in vigorous exercise (i.e., vigorous exercise for 20 minutes during the next week) can be increased by forming implementation intentions. A motivational intervention that focused on increasing self-efficacy to exercise, the perceived severity of and vulnerability to coronary heart disease, and the expectation that exercising will reduce the risk of coronary heart disease raised compliance from 29% to only 39%.

When this motivational intervention was complemented by the formation of implementation intentions, the compliance rate rose to 91%. Finally, Verplanken and Faes (in press) demonstrated that eating healthy foods (e.g., fruits and vegetables) can easily be increased if people are asked to form implementation intentions on what they will eat for the different meals of a given day.

Research on the effects of implementation intentions on health goal attainment recalls Leventhal's (Leventhal, Singer, & Jones, 1965; Leventhal, Watts, & Pagano, 1967) work on the conjoint effects of fear appeals and related recommendations on health promotion (to stop smoking) and health protection (taking tetanus inoculation shots) behaviors. Leventhal observed that high fear appeals facilitated these behaviors only when participants also received specific instructions on when, where, and how to perform them. Apparently, high fear appeals promote just the setting of goal intentions, whereas the instructions used by Leventhal promoted the formation of additional implementation intentions. In line with the findings on performing a BSE (Orbell et al., 1997), Leventhal's data suggest that strong goal intentions produce drastic changes in behavior only when they are accompanied by implementation intentions.

Implementation Intention Effects in Critical Populations

A different test of the power of implementation intentions is to analyze their effects in people who have problems with action control. One such group is *drug addicts during withdrawal*. Tiffany (1990) pointed out that during withdrawal, conscious self-instructions aimed at controlling the drug urge severely disturb the control of common, daily activities (e.g., being on time for meals). Accordingly, Remlinger (1997) conducted a study with hospitalized opiate addicts under withdrawal. To help the patients find work, the hospital administration asked all patients to compose a curriculum vitae before they were released. However, most patients forgot to comply with this request.

Remlinger (1997) used this problem to conduct an implementation intention study. She took a sample of patients who were still showing symptoms of withdrawal and built two groups. One group was asked in the morning to form the goal intention to write a short curriculum vitae before 5 p.m. and to add implementation intentions that specified when and where they would write it. Another group was requested to form the same goal intention but with irrelevant implementation intentions (i.e., they were asked to specify when they would eat lunch and where they would sit). At 5 p.m. none of the participants in the goal-intention-plus-irrelevant-implementation-intention condition had completed the task. However, 80% of the participants in the goal-intention-plus-relevant-implementation-intention condition handed in their curriculum vitae.

Schizophrenic patients also have pronounced problems with action control (Salzinger, 1973). These are due to deficiencies in relevant perceptual, attentional, and memory functioning (Braff, Saccuzzo, & Geyer, 1991), as well as in processes of executive control (Frith & Done, 1989; Kopp

& Rist, 1993). Because implementation intentions enhance perceptual, attentional, and memory functioning with respect to critical stimuli and facilitate executive control with respect to the critical behavior, schizophrenic patients should benefit in their action control from forming implementation intentions.

Schmitt (1997) had hospitalized schizophrenic patients perform a simple go/no-go task in which patients were asked to press a button when numbers appeared on a computer screen but not when letters appeared. In the control condition, participants were told to increase their speed of responding when a particular number (i.e., the number 3) appeared on the screen; to prepare themselves for this task, they were asked to write out the number 3 repeatedly on a sheet of paper. In the implementation intention condition, participants were told to increase their speed of responding whenever number 3 appeared on the screen. However, to prepare themselves for this task, they were asked to form the implementation intention "Whenever number 3 appears, I will respond particularly fast!" Both types of preparations led to an increase of speed in responding to the critical number. Forming implementation intentions, however, was much more effective. This suggests that implementation intentions are beneficial to schizophrenic patients who suffer various losses in the processes responsible for effective action control.

In a neuropsychological experiment by Lengfelder and Gollwitzer (1998), the effects of implementation intentions were studied with *frontal lobe patients*. The neuropsychological literature reports that patients with a frontal lobe injury have problems with the conscious control of behavior, whereas automatic behavior is not impaired (e.g., Cockburn, 1995; Craighero, Fadiga, Umilta, & Rizzolatti, 1996; Fuster, 1995; Shallice, 1982). Lengfelder and Gollwitzer asked a sample of frontal lobe patients to perform the go/no-go task described above as the primary task in a dual-task paradigm; the secondary task was a tracking task of variable difficulty. Even at a high difficulty level of the secondary task, implementation intentions sped up action initiation. Moreover, the effect of implementation intentions was stronger in frontal lobe patients than in a control group of university students, and it was particularly pronounced in patients who showed weak performances on the Tower of Hanoi problem, a classic measure of a person's potential for conscious action control. Apparently, people whose conscious control of action is impaired particularly benefit from forming implementation intentions, suggesting that implementation intention effects are primarily based on automatic processes.

Kimberg and Farah (1993) attempted a unified account of the cognitive impairments following frontal lobe damage by constructing a computer model simulating the patterns of impairment in tasks such as motor sequencing, the Stroop task, the Wisconsin Card Sort, and context memory tests. When the model assumed weakened associations among elements in working memory (e.g., "If condition x holds, then I perform action y"), it could successfully simulate the poor performances typical of frontal lobe patients. In light of this work, it makes sense that frontal

lobe patients who formed implementation intentions (i.e., "Whenever the number 3 appears, I will respond particularly fast") benefited more than university students. It also explains our finding that patients with particularly severe injuries (as indicated by very low scores on the Tower of Hanoi task) showed stronger implementation intention effects than patients with minor injuries.

Remembering to perform future actions has been demonstrated to be age sensitive (Park, in press). The *elderly* have problems with prospective memories that are time based (e.g., "Take medication at 5 p.m.") as well as event based ("Take medication at breakfast"). Failure in prospective memory is due to a neglect of specifying situational cues ahead of time and to absent-mindedness at the time when the critical action has to be performed (Schacter, 1999). Moreover, the automatic components of memory are age invariant, whereas young adults show substantial superiority to old adults on the controlled components of memory (Jacoby, Jennings, & Hay, 1996). Accordingly, to instruct the elderly to mentally link intended behaviors to critical situational cues (i.e., to form implementation intentions) should improve their prospective memory, because forming implementation intentions requires people to specify critical cues ahead of time, and it elicits the intended behavior in an automatic fashion once the critical cues are encountered.

The Mediation of Implementation Intention Effects

Implementation intentions are hypothesized to trigger numerous psychological processes that facilitate action initiation. These processes may relate to either the anticipated situation or the initiation of the goal-directed behavior.

The Specified Situation

Implementation intentions are hypothesized to cause the mental representation of the anticipated situation (Gollwitzer, 1993, 1996) to become highly activated and thus easily accessible. This has perceptual, attentional, and mnemonic consequences that help to overcome problems of action initiation. To assess the perceptual processes triggered by implementation intentions, an experiment by Steller (1992) used the Embedded Figures Test (Gottschaldt, 1926; Witkin, 1950). This test consists of complex geometrical figures (b figures) that contain a small partial figure (a figure) that is hidden in the b figures according to Gestalt principles and is thus difficult to detect. Supporting the hypothesis that implementation intentions lead to heightened accessibility and thus to better detection of the a figure, participants showed enhanced detection performance when they had formed implementation intentions that used the a figure as the critical cue.

In a dichotic-listening experiment (see Gollwitzer, 1996), it was observed that critical words describing the anticipated situational cues were highly disruptive to focused attention. Participants' performance of shadowing (i.e., efficient repeating of the words presented to the attended channel) was severely hampered when critical

words were presented to the nonattended channel. Apparently, even when efforts are made to direct attention to the shadowing task, critical words still attract attention, as is indicated by weakened shadowing performance. In dichotic-listening research, the critical situational cues are presented to participants as verbal descriptions only. In real life, when a person enters a situational context that entails such critical cues not just as words, their potential to attract attention and thus to disrupt focused attention should even be stronger.

In a study by Seehausen, Bayer, and Gollwitzer (1994), participants had to form implementation intentions specifying when, where, and how they wanted to play games prepared by the experimenter. Numerous predesigned options were provided, and participants simply had to choose from these options. Participants were either immediately or 48 hours later incidentally requested to recall all of the options provided. Options specified in implementation intentions were recalled more effectively than nonspecified options both immediately after the experiment and 48 hours later. Apparently, the heightened activation of the specified opportunities persists over time and makes these critical situations more easily accessible for people who have formed implementation intentions.

Further support for the notion that implementation intentions lead to heightened activation of specified situational cues has recently been provided by Aarts, Dijksterhuis, and Midden (in press). In this study, all participants were asked to form the goal intention of collecting a free food coupon. Only implementation intention participants, however, specified when, where, and how they intended to collect their coupon. Not only did implementation intention participants collect the coupons more successfully than goal intention participants, they were also faster in a lexical-decision task to recognize words describing the critical situational cues. Most interesting, the faster lexical-decision responses to these critical words (i.e., their heightened accessibility) mediated the effect of implementation intentions on goal completion. This implies that the facilitating effects of implementation intentions on the initiation of goal-directed behaviors greatly depend on effectively detecting, readily attending to, and successfully remembering the critical situational cues.

The Specified Goal-Directed Behavior

Implementation intentions are also said (Gollwitzer, 1993, 1996) to benefit action initiation through processes of automatization in the sense that action initiation becomes immediate, efficient, and does not require conscious intent. In one experiment (Gollwitzer & Brandstätter, 1997, Study 3), participants were asked to form implementation intentions that specified good opportunities for presenting counterarguments to a series of racist remarks made by a confederate. Implementation intention participants initiated their counterarguments more immediately when good opportunities arose than did goal intention only participants. In a further experiment (Brandstätter, 1992, Study 2), the go/no-go task described above was used as a secondary task in a dual-task paradigm. No matter whether the primary task was easy or difficult to perform (and thus cognitive load was low or high), the speed-up effect of implementation intentions for the critical number 3 was similarly high. Apparently, the immediacy of responding as induced by implementation intentions is effortless in that it does not put much load on limited cognitive resources and thus persists even when the cognitive demand of the primary task in a pair of tasks is high. In everyday life, implementation intentions should therefore allow people to make use of a good opportunity that presents itself only shortly, even when they are busy with other things.

The goal-directed behavior specified in an implementation intention is triggered without conscious intent once the critical situational context is encountered. Malzacher (1992) used a retaliation paradigm, modeled on Zillmann and Cantor's (1976) research, in which participants formed the goal intention to respond to an insult coming from the experimenter by complaining directly to her. Some participants, in addition, formed implementation intentions: As soon as they saw the experimenter again, they would tell her what an unfriendly person she was. In a subsequent, supposedly unrelated experiment, participants were asked to read a series of positive or negative descriptive adjectives as quickly as possible from a screen. Shortly (about 100 ms) before the presentation of each adjective, either a neutral face or the unfriendly experimenter's face was subliminally presented (presentation time was less than 10 ms). This way of presenting the respective faces and the subsequent adjectives precludes that conscious processes affected participants' speed of reading the adjectives. Implementation intention participants tended to read negative adjectives presented after the face of the unfriendly experimenter faster than those presented after the neutral face, whereas they read positive adjectives presented after the face of the unfriendly experimenter much slower than those presented after the neutral face. This data pattern was not found in goal intention only participants. Apparently, the situational cues specified in an implementation intention elicit cognitive processes without conscious intent (in this case, the activation of relevant knowledge and the inhibition of irrelevant knowledge), and these processes facilitate the initiation of the intended behavior. In everyday life, therefore, one can expect people who have formed implementation intentions to initiate the intended goal-directed response when the critical situation is encountered in the same manner as people start driving when the traffic light changes from red to green—no conscious intent to press the gas pedal is needed.

In summary, the presented experiments suggest that implementation intentions automatize action initiation. Once the critical situation is presented, the intended goal-directed behavior is initiated immediately, efficiently (i.e., other things can be done at the same time), and without a conscious intent. Other studies also suggest that implementation intentions lead to automated action initiation. For instance, in the BSE study by Orbell et al. (1997), habit was the best predictor of performing a BSE for participants who did not form implementation intentions, whereas the predictive power of habit was zero when participants had

formed implementation intentions. Moreover, in a recent experiment by Aarts and Dijksterhuis (1999), the speed-up effects on action initiation achieved by behaving repeatedly and consistently in a given situation (i.e., habit formation) were easily matched by forming implementation intentions that mentally linked the behavior to the respective situation. Being able to replace or mimic the effects of habit by forming implementation intentions suggests that the latter are also associated with automatic action initiation.

The automaticity associated with implementation intentions, however, differs from that created by habits in how it originates. In the case of implementation intentions, automatic action initiation stems from one mental act of pairing a desired goal-directed behavior with a critical situation, whereas behavioral practice (i.e., repeatedly and consistently behaving in a certain situation) is at the root of the automatic action initiation associated with habits. The strategic act of will implied in forming implementation intentions, however, is as effective in automatizing action initiation as the repeated and consistent practice implied in habits. Apparently, implementation intentions create instant habits. This is further supported by Orbell et al.'s (1997) observation that implementation intention participants performed a BSE in the exact situation and at the exact time (in all but one case) they had specified.

The Strength of Implementation Intention Effects

As demonstrated with different types of behavioral responses and different samples, implementation intentions formed in the service of goal intentions have beneficial effects on goal attainment over and above goal intentions alone. However, what makes for strong or weak implementation intention effects?

First, the strength of commitment to the formed implementation intention matters. In Seehausen et al.'s (1994) study, the strength of commitment to an implementation intention was varied by telling participants that they were the kind of people who would benefit from either rigidly adhering to their plans (i.e., high commitment) or staying flexible (i.e., low commitment). The latter group was observed to show weaker implementation intention effects than the former. Steller (1992) enhanced commitment to an implementation intention by asking participants to additionally tell themselves, "I strongly intend to follow the specified plan!" This instruction also enhanced implementation intention effects.

Second, the strength of commitment to the goal intention for which implementation intentions are formed should also matter. From a functional point of view, implementation intentions should not be effective when the goal intention on which they are based is weak or has been completed or abandoned. In this case, implementation intentions should not have their typical effects on action initiation, because this would jeopardize the pursuit of other still-existing goals. Indeed, Orbell et al. (1997) reported that the beneficial effects of implementation intentions on compliance in performing a BSE were observed only with those women who strongly intended to perform

a BSE during the next month, suggesting that implementation intentions do not work when goal intentions are weak. The observations by Leventhal et al. (1965, 1967) that the combination of strong fear appeals (which should lead to strong goal intentions) and specific recommendations (which should lead to implementation intentions) make people change their health behaviors also support this assumption. Finally, the experiment by Seehausen et al. (1994) addressed the issue of goal intentions that have been abandoned. When participants were told that the goal no longer had to be reached, the effect of forming implementation intentions did not vanish immediately but was completely gone after 48 hours.

But how long do implementation intention effects last if the person holds on to the respective goal intention? Because implementation intentions spell out a distinct procedure of how to behave in the face of certain stimuli, their effects should show temporal stability. Mental procedures (Smith, 1994) are known to persist over time surprisingly well even if they are based on little practice (Kolers, 1976). Indeed, implementation intentions unfold their effects even if much time has passed between the formation of the implementation intention and the encounter of the critical situation. In Seehausen et al.'s (1994) study, the effects of implementation intentions could still be observed 48 hours after they had been formed (given that the goal intention was still in place), and in Sheeran and Orbell's (1999) study on taking vitamin pills, implementation intention effects lasted over a period of three weeks.

Protecting an Ongoing Goal Pursuit From Intrusions

The problem of getting started is just one of many problems that need to be tackled to ensure goal attainment. Once a person has initiated goal-directed actions, goal pursuit needs to be brought to a successful ending. Even when a person focuses on completing a certain goal, goal pursuit can be thwarted by attending to attractive distractions, falling prey to conflicting habits (e.g., the goal of being fair to others may conflict with the habit of stereotyping and prejudicing women), or giving in to other goals (e.g., a career goal can conflict with an interpersonal goal).

Implementation Intentions and Resistance to Distractions

Shielding an ongoing goal pursuit from distractions becomes an issue when concentrating on an ongoing goal pursuit is hampered. Accordingly, in research on this theme, participants are asked to perform a task that is somewhat boring but demands much concentration. In the process of performing the task, participants are then distracted at random intervals by being presented with attractive stimuli. Patterson and Mischel (1976), for example, had children sort numerous pegs into a large peg board placed on a desk, while attractive toys were shown in a nearby box dressed up as a clown. Similarly, Schaal and Gollwitzer (1999) had college students perform a series of self-paced arithmetic problems, while distracting clips of

award winning commercials were interspersed at random intervals.

Simple goal intentions ("I will not let myself get distracted!") were less effective in protecting participants from these distractions (measured as level of performance on the task at hand) than goal intentions that are furnished-with implementation intentions. However, it matters whether implementation intentions are phrased as distraction-inhibiting ("Whenever the distraction arises, I will ignore it!") or as task-facilitating ("Whenever the distraction arises, I will increase my efforts at the task at hand!") implementation intentions. Whereas distraction-inhibiting implementation intentions generally help to ward off distractions, task-facilitating implementation intentions do this only when motivation to perform the tedious task is low or medium. When motivation is high, task-facilitating implementation intentions do not help to escape distractions. Forming task-facilitating implementation intentions may create overmotivation under such circumstances and thus undermine performance (Schaal & Gollwitzer, 1999).

The differential effects of task-facilitating versus distraction-inhibiting implementation intentions suggest that willful attempts to escape distractions are more effective the less they aim at the expenditure of effort. Task-facilitating implementation intentions that focused on energization of task activity were inferior to distraction-inhibiting implementation intentions that focused on simply ignoring the critical stimuli. Effective willing, therefore, seems more closely associated with "cold" skillful cognitive strategies than with the "hot" determined mobilization of effort. It seems appropriate, therefore, to advise individuals who suffer from being distracted (e.g., students doing their homework) to resort to forming implementation intentions that focus on the ignoring of distractions, rather than on stepping up efforts.

Implementation Intentions and the Inhibition of Unwanted Habitual Responses

Goal pursuit is often thwarted simply because the critical stimulus is captured by a habitual response. For instance, even though a person has formed the goal intention to eat healthy food, a critical stimulus (e.g., the dessert menu is served) might elicit the habitual response before the person has a chance to serve the new goal to eat healthy. Implementation intentions that specify the critical stimulus (i.e., the dessert menu) and link it to a response in line with the new goal (e.g., to order fruits) should block the automatic initiation of the habitual response (e.g., to order a cheesecake).

Such inhibition of unwanted habitual responses should hold true not only for behavioral but also for emotional and cognitive responses. For instance, a person who has formed the goal of responding constructively to the demands of another person (e.g., partner, employer) may protect this goal by forming implementation intentions to respond constructively and not emotionally (e.g., with anger). Similarly, people who have set themselves the goal of judging others in a nonstereotypical and nonprejudicial manner may shield this goal from the intrusion of auto-

matic stereotypical beliefs and prejudicial feelings by forming respective implementation intentions.

Recent findings suggest that forming implementation intentions indeed inhibits the automatic activation of stereotypical beliefs and prejudicial feelings (Gollwitzer, Schaal, Moskowitz, Hammelbeck, & Wasel, 1999). When participants had furnished the goal intention to judge the elderly in a nonstereotypical manner with respective implementation intentions ("Whenever I see an old person, I tell myself: Don't stereotype!"), the typical automatic activation of stereotypical beliefs (assessed through pronunciation speed in a semantic-priming paradigm) was no longer observed. Implementation intentions were also found to effectively suppress the automatic activation of the gender stereotype. When experimental participants who had formed the goal intention to judge an introduced woman in a nonstereotypical way were asked to form an additional implementation intention ("Whenever I see this person, I will ignore her gender!"), no automatic activation of stereotypical beliefs about this woman (assessed through the latency of color-naming responses in a primed Stroop task) was observed. Finally, implementation intentions were observed to suppress the automatic activation of prejudicial feelings in a study on homeless people. When participants' goal intentions to judge the homeless in a nonprejudicial manner were furnished with respective implementation intentions ("Whenever I see a homeless person, I tell myself: No prejudice!" or "Whenever I see a homeless person, I ignore that he is homeless"), the automatic negative evaluation of the homeless (assessed in an affect priming paradigm) vanished.

These data imply that forming implementation intentions can be used as an effective self-regulatory tool whenever goal pursuit is threatened by the intrusion of unwanted habitual thoughts and feelings. For interpersonal interactions geared at attaining certain task goals (e.g., teachers attempting to instruct students effectively and evaluate them in a fair way, employers wanting to hire qualified job applicants and train employees effectively) this self-regulatory tool comes in handy, because more often than not unwanted stereotypical thoughts and prejudicial feelings interfere with successful goal attainment.

The intrusion of unwanted habitual behaviors into an ongoing goal pursuit has been analyzed in recent studies (Gollwitzer, 1998) that referred to auto-motive theory. Auto-motive theory holds that if a goal is activated and acted on repeatedly and consistently in a given situation, this situation acquires the potential to trigger the critical goal pursuit without conscious intent (Bargh, 1990). If, for instance, a person has repeatedly and consistently chosen social gatherings (e.g., parties) to discuss work problems, the contextual cues associated with parties will sooner or later directly trigger behavior serving this goal outside of awareness. In support of auto-motive theory, it can be demonstrated by using so-called goal-priming procedures that habitual goal-directed behaviors can be activated outside of awareness (Bargh & Chartrand, 1999, this issue).

To test whether forming implementation intentions can protect an ongoing goal pursuit from becoming de-

railed by a directly activated competing habitual goal pursuit, two experiments were conducted (Gollwitzer, 1998). Both studies showed that when a set goal (e.g., driving a car with a certain speed through the race course of a driving simulator) is furnished with implementation intentions, antagonistic habitual goal pursuits activated outside of awareness by priming procedures (i.e., being fast or being slow) no longer intrude on striving for the set goal (i.e., no longer affected driving speed).

These findings suggest that people can successfully protect the pursuit of a set goal from directly activated antagonistic goal pursuits by forming implementation intentions. For instance, a person who habitually submits to the goal of using parties to discuss work problems can fight this bad habit. Prior to entering a party, the person only has to set the antagonistic goal to socialize and furnish it with respective implementation intentions. As a consequence, the critical situation should fail to trigger the habitual response of talking about work.

Conclusion

Goals or resolutions stand a better chance of being realized when they are furnished with implementation intentions that link anticipated suitable opportunities to intended goal-directed behaviors. Implementation intentions delegate the control of goal-directed behaviors to specified anticipated environmental stimuli. This deliberate self-regulatory strategy makes use of the automatic control of action. As numerous experiments demonstrate, such strategically obtained automaticity helps people to effectively meet their goals in the face of problems with initiating goal-directed actions, tempting distractions, bad habits, and competing goals. Implementation intentions, however, need to be based on strong goal intentions. As well, certain types of implementation intentions work better than others, and people need to be committed to their implementation intentions.

In many modern societies, behavior is no longer ruled by shared habits and goals that are followed by most people most of the time (Oettingen, 1997). Accordingly, people are frequently confronted with situations where they cannot rely on their habits and automatically activated goals. This is when action control through the formation of implementation intentions is most valuable. Modern times also promote the setting of fuzzy and conflicting goals (Karoly, 1998). Strategic automatization of goal-directed behaviors through forming implementation intentions should help to ameliorate the action initiation problems associated with fuzzy and conflicting goals.

The self-regulatory strategy of forming implementation intentions has many benefits, but where are the costs? For one, successful goal pursuit requires not only tenacity but also flexibility (Mischel, Cantor, & Feldman, 1996). Having decided to pursue the implementation of a goal by performing a specified behavior in a certain situation may reduce a person's openness to suitable alternatives. However, this reduction in flexibility is not critical. First, people can always stop the effects of implementation intentions by deliberately giving up their commitment to the respective

goal intention or the implementation intention itself. Second, when people have formed implementation intentions and have thus delegated control of their goal-directed actions to the environment, cognitive capacities become available that can be used for recognizing alternatives. Rigidity as a result of implementation intentions is to be expected, however, when the specified situation is actually encountered, but this type of rigidity is functional, because it protects an ongoing goal pursuit from intrusions.

We do not know yet whether people are aware of the effectiveness of implementation intentions. Nearly all of the studies reported are experimental, where participants were requested to form implementation intentions. In the correlational study conducted by Gollwitzer and Brandstätter (1997, Study 1), two thirds of the participants reported having formed implementation intentions on their own, which at least suggests that implementation intentions are a popular self-regulatory tool. Given its easy application and its reliably strong effects on alleviating critical problems of goal pursuit, it seems justified to advise people to furnish their good resolutions with implementation intentions. Once people have formed implementation intentions, goal-directed behavior will be triggered automatically when the specified situation is encountered.

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