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THE ROLE OF GOAL SETTING AND GOAL STRIVING IN MEDICAL ADHERENCE

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From a motivational–volitional perspective, a first prerequisite for medical adherence is that people walk away from a health care provider (or from medical instructions obtained elsewhere) with a strong intention (goal) to act on the advice or instructions given. Second, and equally important, people need to effectively translate their goals into action, not only right after the advice has been given but also weeks and months thereafter. What facilitates the setting of adherence goals, and what guarantees acting on them? In this chapter we try to answer both of these questions, starting with the issue of goal setting and continuing with the problem of goal implementation. More specifically, we outline self-regulatory strategies that help people set adherence goals and attain them.

SETTING MEDICAL ADHERENCE GOALS

Determinants of Goal Setting

Goal pursuit starts with setting goals for oneself or adopting goals assigned by others. Most theories of motivation (Ajzen, 1991; Atkinson, 1957; Bandura, 1997; Brehm & Self, 1989; Carver & Scheier, 1998; Gollwitzer, 1990; Locke & Latham, 1990; Vroom, 1964) suggest that people prefer to choose and adopt goals that are desirable and feasible. Desirability is determined by the estimated attractiveness of likely short-term and long-term consequences of goal attainment. Such consequences may pertain to anticipated self-evaluations, evaluations of significant others, progress toward some higher order goal, external rewards of having attained the goal, and the joy–pain associated with moving toward the goal (Heckhausen, 1977).

In the medical setting, perceived desirability of following doctors' or other health care providers' instructions has been discussed as pertaining to the personal value of health, the perceived personal vulnerability, the perceived severity of the experienced illness, the perceived benefits of the regimen, the costs of following the regimen, and so forth (Hochbaum, 1958; Rosenstock, 1974). Perceived desirability may also relate to people's beliefs about whether they should adhere to the suggested medical instructions (Ajzen & Fishbein, 1980). Finally, as Brownlee, Leventhal, and Leventhal (2000) pointed out, the weight of the various health-related beliefs in determining the desirability of following a given medical instruction is influenced by how a person mentally represents the illness, how the suggested regimen fits a person's self-concept, and how the physician or health care provider manages to communicate the information relevant to the various desirability-related beliefs. The effectiveness of communication in turn depends not only on how patients and providers relate to each other (e.g., trust) but also on features of the provided message (e.g., verbal instructions only vs. verbal instructions mixed with pictorial representations; Morrell, Park, & Poon, 1990).

Feasibility of a goal depends on people's judgments of their capabilities to perform relevant goal-directed behaviors (i.e., self-efficacy expectations; Bandura, 1997), their beliefs that these goal-directed behaviors will lead to the desired outcome (i.e., outcome expectations, Bandura, 1997; instrumentality beliefs, Vroom, 1964), the judged likelihood of attaining the desired outcome (i.e., general expectations; Oettingen, 1996), or desired outcomes in general (i.e., optimism; Scheier & Carver, 1987). These various feasibility-related beliefs are informed by a person's experiences in the past (e.g., by one's own performance, by observing performances of similar others, or by persuasion of respected others; Bandura, 1997).

Thus, in the medical setting perceived feasibility of a medical instruction should be codetermined by the perceived usefulness of the behavior and the experienced confidence in one's ability to perform the required behavior (Rogers, 1983), which in turn are based on one's past experiences. Again, the strength of these beliefs should be moderated by the person's illness representations, his or her self-concept, and the quality of patient–provider communication.

Goal theories (summaries by Gollwitzer & Moskowitz, 1996; Oettingen & Gollwitzer, 2001) implicitly assume that high perceived feasibility and desirability will assure that people set strong goals (i.e., form strong goal commitments). However, research exploring the psychological processes on which goal setting is based indicated that the way people approach the task of setting a goal makes a difference. For example, whether the goal-setting determinant of feasibility will take effect depends on the mode of self-regulatory thought with which the task of setting a goal is approached (Oettingen, 1996, 1999).

Self-Regulation of Goal Setting

Oettingen (1999) suggested that feasibility beliefs are considered in goal setting only when people experience a necessity to act. In other words, high expectations lead to setting binding goals when people face the question of whether they should try to reach a desired outcome. In a series of experiments (Oettingen, Pak, & Schnetter, 2001), it has been demonstrated that a necessity to act readily emerges when people first mentally elaborate the desired future but then switch to mentally elaborating the negative reality that stands in the way of realizing the desired future. Such mental contrasting of the desired future with impeding reality makes people think of whether they have a chance to close the gap between future and reality by overcoming present obstacles. If feasibility-related beliefs are high, such mental contrasting leads to strong goal commitments; if they are low, no respective goals are formed.

In a typical study (Oettingen et al., 2001, Study 4), male freshmen enrolled in vocational schools first judged the probability of improving in mathematics, the most important subject in their 1st year of study. Participants then generated positive aspects of improving in mathematics (e.g., pride, career prospects) and negative aspects of impeding reality (e.g., being distracted, being disinterested). They then were divided into three groups to form mental elaborations of these aspects. In the positive fantasy/negative reality contrast group, participants mentally elaborated positive aspects of improving in math and negative aspects of reality standing in its way, in alternating order, beginning with a positive aspect. In the positive fantasy

or indulging group, participants mentally elaborated only the positive aspects of improving in math; in the negative reality or dwelling group, participants mentally elaborated only the negative aspects of impeding reality. When participants' commitment toward the goal of improving in mathematics was assessed (in terms of effort in class and course grades as rated by the teacher), strength of goal commitment was in line with perceived feasibility in the mental contrast group but not in the indulging and dwelling groups. No matter whether perceived feasibility was low or high, goal commitment was at a medium level in the latter two groups. Apparently, mental contrasting makes people set binding goals for themselves if expectations of success are high but refrain from setting binding goals if expectations of success are low. Indulging and dwelling, however, cause people to be weakly pulled by the positive future or pushed by the negative reality, respectively, independent of expectations.

A series of further experiments using fantasy themes of different life domains replicated this pattern of results (Oettingen, 2000, Study 2; Oettingen, Hönig, & Gollwitzer, 2000; Oettingen et al., 2001, Studies 1–4). For instance, in young adults, mental contrasting has been found to create expectancy-dependent goals to solve interpersonal conflicts, to get to know an attractive person, to combine work and family life, and to study abroad, whereas indulging and dwelling failed to do so. In school settings, mental contrasting facilitated the expectancy-dependent setting of goals to excel in learning a foreign language. In all of these studies, cognitive, affective, and behavioral aspects of goal commitment were measured by means of self-report or observations by independent raters. Mental contrasting created expectancy-dependent goal commitments, irrespective of whether the desired future was self-set or assigned, and related to short-term or long-term projects (up to 6 months). Moreover, mental contrasting turned out to be an easy-to-apply self-regulatory strategy, as described effects were obtained even when participants elaborated the desired future and current impeding reality only very briefly (i.e., were asked to imagine only one positive aspect of the desired future and just one respective obstacle; Oettingen et al., 2000, Study 1). In all of these studies, indulging in a positive future or dwelling on the negative reality created goal commitments of only medium strength that were independent of perceived feasibility.

Mental Contrasting Changes Health Behavior

Mental contrasting has also succeeded in creating strong health-promoting goals, for example, the goal of reducing cigarette consumption in college students who smoke (Oettingen, Mayer, & Thorpe, 2006). To measure expectations, research participants were first asked to indicate how likely it is that they will reduce their cigarette consumption. Thereafter,

they listed positive aspects of a future of reduced smoking (e.g., pretty skin, increased physical fitness, heightened self-respect) and aspects of present reality that stand in the way of attaining such a positive future (e.g., peer pressure, parties, stress). Like in the study on improving in mathematics, participants in the mental contrast group had to alternate in their mental elaborations between two positive aspects of a future with less smoking and two negative aspects of impeding reality. In the positive future-only control group, participants had to only mentally elaborate four positive aspects of the future, and in the negative reality control group, participants had to only mentally elaborate four negative aspects of impeding reality.

After participants had completed these different types of mental elaboration, they were handed a diary containing an hourly calendar for the next 14 days in which they were requested to record each cigarette smoked. Contrasting participants with high expectations smoked less than 7 cigarettes per day, whereas comparable high expectations control participants (those who elaborated only the future or elaborated only the negative reality) smoked more than 10 cigarettes per day. This finding implies that in light of high expectations of success, mental contrasting is a very useful self-regulatory tool to set strong goals. Physicians or health care providers who opt to maximize medical adherence (e.g., to eat low-fat foods) in their patients should therefore try to follow a two-step strategy. First, they should attempt to enhance feasibility-related beliefs by strengthening their relevant determinants (e.g., pointing to successful past performances or to successful performances of similar others, providing easy-to-process and useful information on how to successfully select low-fat food). Second, to make such feasibility-focused interventions behaviorally relevant, physicians should ask their patients to mentally contrast positive aspects of a desired future (e.g., slim and healthy body, looking nice and feeling well) with present impeding reality (e.g., old habits of eating foods high in fat, loving tasty foods, higher costs of low-fat foods), so that present reality is experienced as an obstacle to the desired future, thus creating a necessity to act. It is not enough to put participants' minds on positive consequences of adherence only or solely on obstacles of present reality. The latter two strategies instill goal commitment of just moderate strength by a pull or push mechanism, respectively. They do not capitalize on the induction of high expectations of success.

Mental Contrasting Changes Patient–Provider Communication

The importance of mental contrasting in medical contexts has also been demonstrated in a study geared at setting goals to improve the quality of patient–provider communication (Oettingen, Hagenah, et al., 2006, Study 1). More specifically, pediatric nurses had to indicate their expectations that they would be able to improve the way they interacted with their

patients' relatives. In the contrast group, the nurses alternated in their mental elaborations between positive aspects of a future in which they improved the relationships with the relatives (e.g., contentment, affection, evenness of temper) and negative aspects of reality that impeded such a future (e.g., lack of time, too many patients, lack of patience). In the positive fantasy group, the nurses mentally elaborated only positive aspects of improved communication, and in the negative reality group, they elaborated only negative aspects of impeding reality. Two weeks later, all participating nurses were asked how hard they had tried to improve their relations with patients' relatives and to indicate their interest in participating in a workshop on improving communication with patients' relatives. Again, high-expectancy participants in the mental contrast group showed the strongest commitment to improve communication with patients' relatives. They reported having tried harder, and they were more interested in participating in the workshop than were participants in the control groups (the elaboration of the future-only and the reality-only groups).

Mental Contrasting and Efficiency in Health Service Managers

In an intervention study, personnel managers of four different large hospitals (Oettingen, Hagenah, et al., 2006, Study 5) were trained in using the self-regulatory strategy of mental contrasting and were asked to apply it to their pressing everyday problems. A control group was trained in using and applying the strategy of thinking only about positive aspects of having solved such problems. Two weeks later, all of the participants were asked how successful they were over the last 2 weeks in organizing their time, making decisions, completing overdue projects, and relinquishing futile projects. Participants in the mental contrast group reported having organized their time better, having made decisions with greater ease, having completed more overdue projects, and having relinquished more futile projects as compared with participants in the positive future-only control group. These findings suggest that mental contrasting of everyday problems forces managers in the health care domain to take a more decisive stand with respect to approaching and solving their daily tasks. The present study also indicates that the self-regulatory strategy of mental contrasting can be easily learned and successfully applied to all kinds of everyday problems, not just the ones that were used to acquire the technique.

Summary

The determinants of goal setting (high perceived feasibility and desirability) do not necessarily guarantee that people will commit themselves strongly to attaining a positive future (e.g., reducing cigarette consumption,

obtaining physical fitness). It takes the application of the self-regulatory tool of mental contrasting (i.e., juxtaposing the positive future with relevant hindrances and obstacles posed by present reality) to make people act on their high expectations of success (feasibility). But the presented research suggests that mental contrasting not only benefits patients in setting strong health-promoting and disease-preventing goals but also can be used by health care providers to help them set binding goals to improve their communication with patients. Finally, the self-regulatory strategy of mental contrasting can be easily taught and learned. As it is a general cognitive procedure, once acquired, it may be applied to any health-related problem or concern patients, providers, or managers in the medical setting might have.

IMPLEMENTING MEDICAL ADHERENCE GOALS

In traditional theories on goal striving, the intention to achieve a certain goal is seen as an immediate determinant (or at least predictor) of goal-directed action, and a strong intention is expected to facilitate goal attainment more than a weak intention (Ajzen, 1991; Ajzen & Fishbein, 1980; Sheeran, 2002). Over time, evidence has accumulated showing that forming strong intentions was only a prerequisite for successful goal attainment as there are a host of subsequent implemental problems that need to be solved successfully (Gollwitzer, 1996). For instance, after having set a goal (e.g., to reduce smoking), people may procrastinate in acting on their intentions and thus fail to initiate goal-directed behavior. Moreover, in everyday life people normally strive for multiple, often even competing goals, many of which are not simple short-term but long-term projects that require repeated efforts (e.g., to lose weight). Goal pursuit may come to an early halt because competing projects have temporarily gained priority and the individual fails to successfully resume the original project. Also, to meet their goals, people have to seize viable opportunities to act, a task that becomes particularly difficult when attention is directed elsewhere (e.g., one is absorbed by competing goal pursuits, wrapped up in ruminations, gripped by intense emotional experiences, or simply tired) and when these opportunities are not obvious at first sight or only present themselves briefly.

In an attempt to find a self-regulatory tool for effective goal implementation, Gollwitzer (1993, 1996, 1999) distinguished between goal intentions and implementation intentions. Goal intentions (goals) have the structure of "I intend to reach Z," whereby Z may relate to a certain outcome or behavior to which the individual feels committed. Implementation intentions (plans) have the structure of "If situation X is encountered, then I will perform the goal-directed response Y." Holding an implementation intention commits an individual to perform the specified goal-directed

response once the critical situation is encountered. Both goal intentions and implementation intentions are set in an act of will, whereby the first specifies the intention to meet a goal or standard, and the second refers to the intention to perform a plan. Commonly, implementation intentions are formed in the service of goal intentions as they specify the where, when, and how of goal-directed responses. For instance, a possible implementation intention in the service of the goal intention to eat healthful food would link a suitable situational context (e.g., one's order taken at a restaurant) to an appropriate behavior (e.g., asking for a low-fat meal). As a consequence, a strong mental link is formed between the situation of the waiter taking an order and the goal-directed response of asking for a low-fat meal.

Why Implementation Intentions Are Expected to Facilitate Goal Implementation

The mental links created by implementation intentions are expected to facilitate goal attainment on the basis of psychological processes that relate to both the anticipated situation and the specified response. Because forming implementation intentions implies the selection of a critical future situation, it is assumed that the mental representation of the situation becomes highly activated, hence is more accessible. This heightened accessibility should make it easier for one to detect the critical situation and readily attend to it even when one is busy with other things. Moreover, this heightened accessibility should facilitate the recall of the critical situation. As forming implementation intentions involves first a selection of an effective goal-directed behavior that is then linked to the selected critical situation, initiation of the intended response should become automated. Initiation should be swift and efficient and should not require conscious intent once the critical situation is encountered.

The Specified Situation

The accessibility hypothesis with respect to the specified situation was tested in studies measuring how well participants holding implementation intentions attended to, detected, and recalled the critical situation as compared with participants who had formed only goal intentions (Gollwitzer, Bayer, Steller, & Bargh, 2002). In a study using a dichotic listening paradigm (i.e., different information is presented simultaneously to research participants' left and right ears and participants have to repeat, or shadow, the information presented to the ear to which the experimenter asks them to attend), it was observed that words describing the anticipated critical situation were highly disruptive to focused attention in participants in the implementation intention group as compared with participants in the goal inten-

tion group (i.e., the shadowing performance of the attended materials decreased). In a study using the embedded figures test (Gottschaldt, 1926), in which smaller a-figures are hidden within larger b-figures, enhanced detection of the hidden 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). In a cued-recall experiment, participants in the implementation intention group recalled the situational options to attain a given goal more effectively than participants in the goal intention group. Finally, Aarts, Dijksterhuis, and Midden (1999) using a lexical decision task observed faster lexical decision times (i.e., recognizing presented stimuli as words vs. nonwords) for those words that described critical cues specified in implementation intentions. It is important to note that the faster lexical responses to these critical words (i.e., their heightened accessibility) mediated the beneficial effects of implementation intentions on goal attainment. The latter result implies that the goal-promoting effects of implementation intentions are based on the heightened accessibility of selected critical situational cues.

The Specified Goal-Directed Behavior

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

In further experiments (Brandstätter, Lengfelder, & Gollwitzer, 2001, Studies 3 and 4), the efficiency of action initiation was explored. 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 (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. Participants in the implementation intention group showed a substantial increase in speed of responding to the number 3 compared with the control group, regardless of whether the simultaneously demanded primary task (a memorization task in Study 3 and a tracking task in Study 4) was either easy or difficult to perform. Apparently, the immediacy

of responding induced by implementation intentions is also efficient in the sense that it does not require much in the way of cognitive resources (i.e., can be performed even when dual tasks have to be performed at the same time).

In a final set of two priming experiments, Bayer, Achtziger, Gollwitzer, Malzacher, and Moskowitz (2006) tested whether implementation intentions led to action initiation without conscious intent once the critical situation was encountered. In these experiments, the critical situation was presented subliminally, and its facilitating influence on initiating the goal-directed behavior was assessed. Results indicated that subliminal presentation of the critical primes led to a speed-up in responding in participants with implementation intentions but not in participants with mere goal intentions. These subliminal priming effects suggest that when planned through implementation intentions, the initiation of goal-directed behavior becomes triggered by the anticipated situational cue, without the need for further conscious intent.

There might be additional or even alternative process mechanisms to the stimulus perception and response initiation processes described earlier. For example, furnishing goals with implementation intentions might produce an increase in goal commitment, which in turn causes heightened goal attainment. However, this hypothesis has not received any empirical support. For instance, when Brandstätter et al. (2001, Study 1) analyzed whether heroin addicts under withdrawal benefit from forming implementation intentions in handing in a newly composed curriculum vitae before the end of the day, they also measured participants' commitment to do so. Although the majority of the participants in the implementation intention group succeeded in handing in the curriculum vitae on time, none of the participants in the goal intention group succeeded in this task. These two groups, however, did not differ in terms of their goal commitment ("I feel committed to compose a curriculum vitae" and "I have to complete this task") measured after the goal intention and implementation intention instructions had been administered. This finding was replicated with young adults who participated in a professional development workshop (Oettingen et al., 2000, Study 2), and analogous results are reported in research on the effects of implementation intentions on meeting health promotion and disease prevention goals (e.g., Orbell, Hodgkins, & Sheeran, 1997).

Implementation Intentions and Their Effects on Performing Wanted Behaviors

Given that implementation intentions facilitate attending to, detecting, and recalling viable opportunities to act toward goal attainment and, in addition, automate action initiation in the presence of such opportunities,

people who form implementation intentions should show higher goal attainment rates as compared with people who do not furnish their goal intentions with implementation intentions. This hypothesis is supported by the results of a host of studies examining the attainment of various types of goal intentions (a recent meta-analysis by Gollwitzer & Sheeran, 2006, listed more than 90 studies demonstrating implementation intention effects). Many of the goals analyzed in these studies related to health protection and disease prevention (e.g., resisting taking up smoking, taking up regular exercise, performing breast self-examination, preventing binge drinking, eating a low-fat diet, using vitamin supplements regularly, flossing, and reducing snack food consumption).

Types of Goals

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

Potential Moderators

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

Second, the strength of commitment to the respective goal intention also matters. Orbell et al. (1997) reported that the beneficial effects of implementation intentions on compliance in performing a breast examination were observed only in those women who strongly intended to perform a breast self-examination. This finding suggests that implementation intentions do not work when the respective goal intention is weak. In line with this conclusion, the beneficial effects of implementation intentions on a person's recall of the specified situations (Gollwitzer, Bayer, et al., 2002, Study 3) can no longer be observed when the respective goal intention has been abandoned (i.e., the research participants were told that the assigned goal intention need no longer be reached as it had been performed by some other person). Third, the strength of the commitment to the formed implementation intention makes a difference, too. In Gollwitzer, Bayer, et al.'s (2002) Study 3, the strength of the commitment to the implementation intention was varied by telling the participants (after an extensive personality testing session) 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 showed lower implementation intention effects (i.e., cued-recall performance for selected opportunities) than the former. Finally, the strength of the mental link between the *if*-part and the *then*-part of an implementation intention should also affect how beneficial forming implementation intentions turns out to be. For example, if a person takes much time and concentration encoding the if–then plan or keeps repeating a formed if–then plan by using inner speech, stronger mental links should emerge, which in turn should produce stronger implementation intention effects (Steller, 1992).

Applying these findings to the health domain, a health care provider who is concerned about maximizing the implementation of health goals in his or her patients should ask them to form respective implementation intentions. This is particularly true when the patients regard the implementation of the goal to be difficult (e.g., has to be acted on at inconvenient times, is unpleasant to perform, or is easy to forget). However, health care providers first need to be sure that the patients are highly committed to the health goal at hand. If this is not the case, measures to raise the perceived feasibility and desirability should be taken, and the mental contrasting procedure should be applied to achieve strong goal commitments. Moreover, implementation intentions should be suggested in a way so that patients find it easy to strongly commit to the plans made (e.g., patients are allowed to fill the *if*-parts and *then*-parts of implementation intentions with what they feel fit best to their daily lives and behavioral capabilities; Murgraff, White, & Phillips, 1996). Finally, physicians or other health care providers may want to motivate patients to mentally repeat the formed implementation

plans to strengthen the links between the situations specified in the *if*-part and the goal-directed responses selected for the *then*-part.

Implementation Intentions and the Control of Unwanted Intrusions

Research on implementation intentions has focused mostly on the self-regulatory issue of getting started with goals that one wants to achieve, that is, doing more good (e.g., engaging in regular physical exercise) and less bad (e.g., avoiding unhealthful foods). However, once a person has initiated goal pursuit, he or she still needs to bring it to a successful ending. People need to protect an ongoing goal from being thwarted by attending to attractive distractions or by falling prey to conflicting bad habits (e.g., the goal of eating less fatty foods may conflict with the habit of snacking). There are two major strategies in which implementation intentions can be used to control unwanted intrusions that potentially hamper the successful pursuit of wanted goals: (a) directing one's implementation intentions toward the suppression of anticipated unwanted responses to disruptive stimuli and (b) blocking all (even nonanticipated) kinds of unwanted influences from inside or outside the person by directing one's implementation intentions toward spelling out the wanted goal pursuit (Gollwitzer, Bayer, & McCulloch, 2005).

Responding to Unwanted Intrusions With Suppression

If, for instance, a person wants to eat healthfully and not fall prey to tempting foods (such as chocolate bars), the person can protect him- or herself from snacking on tempting chocolate bars by furnishing the goal of not falling prey to temptations with suppression-oriented implementation intentions. Suppression-oriented implementation intentions can take different forms. They may focus on reducing the intensity of the unwanted response (i.e., falling for the temptation) by intending not to show the unwanted response: "And if my friend offers me chocolate, then I will not long for it and take it!" But they may also try to reduce the intensity of the unwanted response by specifying the initiation of the respective antagonistic response: "And if my friend offers me chocolate, then I will think of fruits and ask for them!" Finally, suppression-oriented implementation intentions may focus a person away from the critical situation: "And if my friend offers me chocolate, then I'll simply ignore his offer and my cravings!"

Two lines of experiments analyzed the effects of suppression-oriented implementation intentions. The first line analyzed the control of unwanted spontaneous attentional responses to tempting distractions (Gollwitzer & Schaal, 1998). Participants had to perform a boring task (i.e., perform a

series of simple arithmetic tasks) while being bombarded with attractive distractive stimuli (e.g., clips of award-winning commercials). Whereas control participants were asked to form a mere goal intention ("I will not let myself get distracted!"), experimental participants in addition formed one of the following two implementation intentions: "And if a distraction arises, then I'll ignore it!" or "And if a distraction arises, then I will increase my effort at the task at hand!" The "ignore" implementation intention always helped participants to ward off the distractions (as assessed by their task performance), no matter whether the motivation to perform the tedious task (assessed at the beginning of the task) was low or high. The "effort increase" implementation intention, however, could only achieve this when motivation to perform the tedious task was low. Possibly, when motivation is high to begin with, effort increase implementation intentions may create overmotivation that hampers task performance. It seems appropriate therefore to advise highly motivated individuals who experience temptations (e.g., a person who is extremely motivated to reduce fat intake) to resort to implementation intentions that ignore the temptation rather than to implementation intentions that focus on the strengthening of efforts.

The second line of experiments analyzing suppression-oriented implementation intentions studied the control of the activation of stereotypical beliefs and prejudicial evaluations (Gollwitzer & Schaal, 1998). In various priming studies using short stimulus onset asynchronies (less than 300 ms), research participants with implementation intentions indeed managed to inhibit the automatic activation of stereotypical beliefs and prejudicial evaluations about women, the elderly, the homeless, and soccer fans. The implementation intentions used specified being confronted with a member of the critical group in the *if*-part, and a "then I won't stereotype" (alternatively: "then I won't evaluate negatively") or a "then I will ignore the group membership" response in the *then*-part. No matter which of the two formats was used, both types of suppression-oriented implementation intentions were effective.

Blocking Detrimental Self-States

In the research presented in the last paragraph, implementation intentions specified a critical situation or problem in the *if*-part that was linked to a *then*-part describing an attempt to suppress the unwanted response to an intrusive or tempting stimulus. This type of self-regulation by implementation intentions requires that the person correctly anticipate potential hindrances to achieving the goal and what kind of unwanted responses these hindrances elicit. However, implementation intentions can also be used to protect oneself from responding to unwanted intrusions by taking a different approach. Instead of gearing one's implementation intentions toward antici-

pated potential hindrances (or temptations) and the unwanted responses triggered thereof, the person may form implementation intentions geared to stabilizing the goal pursuit at hand. For instance, if a person who has the goal of eating low-fat foods stipulates in advance how he or she will go about having dinner (i.e., "When the waiter asks my order for the dessert, then I will request the berries"), internal distractions or interferences from inside (e.g., being hungry, tired, nervous) should not show any effect. The critical interaction with the waiter should simply run off as planned, and the intrusive self-states of being hungry or tired should not succeed in affecting the critical goal-directed behavior of ordering a low-fat dessert.

As is evident from this example, the present self-regulatory strategy should be of special value whenever the influence of detrimental self-states (e.g., being upset) on derailing one's goal-directed behavior has to be controlled. This should be true no matter whether such self-states and their influence on behavior reside in the person's consciousness or not. Gollwitzer and Bayer (2000) tested this hypothesis in a series of experiments in which participants were asked to make or not make plans (i.e., form implementation intentions) regarding their performance on an assigned task. Prior to beginning the task, participants' self-states were manipulated in such a way that performing the task at hand became more difficult (e.g., a state of self-definitional incompleteness prior to a task that required perspective taking, Gollwitzer & Wicklund, 1985; a good mood prior to a task that required evaluating others nonstereotypically, Bless & Fiedler, 1995; a state of ego depletion prior to a task that required persistence, Baumeister, 2000; Muraven, Tice, & Baumeister, 1998). It was observed that the induced critical self-states negatively affected task performance only for those participants who had not planned out working on the task at hand through implementation intentions (i.e., had only set themselves the goal of coming up with a great performance). In other words, successful task performance depended on additional implementation intentions that spelled out how to perform the task at hand to block the effects of these detrimental self-states.

This research provides a new perspective on the psychology of self-regulation. Effective self-regulation is commonly understood in terms of strengthening the self, so that the self can meet the challenge of being a powerful executive agent (Baumeister, Heatherton, & Tice, 1994). Therefore, most research on goal-directed self-regulation focuses on strengthening the self in such a way that threats and irritations become less likely, or on restoring an already threatened or irritated self. Instead, Gollwitzer and Bayer's (2000) research introduced a perspective on goal-directed self-regulation that focuses on facilitating action control without changing the self. It is assumed that action control becomes easy if a person's behavior is directly controlled by situational cues and that forming implementation intentions achieves such direct action control. As this mode of action

control circumvents the self, it does not matter whether the self is threatened or secure, agitated or calm, because the self is effectively disconnected from its influence on behavior.

The research by Gollwitzer and Bayer (2000) supports this line of reasoning by demonstrating that task performance (e.g., taking the perspective of another person, judging people in a nonstereotypical manner, and solving difficult anagrams) is not impaired by the respective detrimental self-states (e.g., self-definitional incompleteness, mood, and ego depletion) if performing these tasks has been planned in advance through implementation intentions. Support for this line of reasoning also comes from studies that analyze special groups of individuals who are known to have problems with action control because of various attention, memory, and executive function deficits. For instance, Brandstätter et al. (2001, Studies 1 and 2) demonstrated that patients with schizophrenia and individuals addicted to heroine under withdrawal benefited greatly from forming implementation intentions when it came to performing an experimental go/no-go task or the real-life task of composing a curriculum vitae, respectively. Moreover, Lengfelder and Gollwitzer (2001) observed improved task performance on a go/no-go task in patients with frontal lobe impairment who had formed respective implementation intentions, even under conditions of high cognitive load created by a difficult dual task. Finally, Park and collaborators (Chasteen et al., 2001; Liu & Park, 2004) reported research with older adults indicating that implementation intentions facilitated the performance of experimental tasks (i.e., signing one's name on each worksheet) and real-life tasks (i.e., performing regular blood glucose tests) that engage prospective memory processes known to decline in older adults.

The studies with special samples suggest that implementation intentions block not only the negative effects of variable detrimental self-states (e.g., irritation) on goal attainment (task performance) but also the negative effects of more stable deficits in the cognitive functioning underlying effective action control. As implementation intentions are known to automate the implementation of the goal or task, the cognitive deficits overcome by implementation intentions should be of the more effortful type. The self-regulatory strategy of planning out goal striving through implementation intentions therefore is an easy-to-use and cheap alternative to training individuals who show deficits in effortful cognitive functioning.

Blocking Adverse Situational Influences

People's goal pursuits are threatened not only by detrimental self-states (e.g., being tired) or stable aspects of the self (e.g., lacking certain executive functions) but also by adverse situational contexts (e.g., peer pressure).

There are many situations that have negative effects on goal attainment unbeknownst to the person who is striving for a goal. A prime example is the *social loafing* phenomenon in which people show reduced effort in the face of work settings that produce a reduction of accountability (i.e., performance outcomes can no longer be checked at an individual level). As people are commonly not aware of this phenomenon, they cannot form implementation intentions that specify a social loafing situation as a critical situation, thereby rendering an implementation intention that focuses on suppressing the social loafing response as an unviable self-regulatory strategy. As an alternative, however, people may resort to forming implementation intentions that stipulate how the intended task is to be performed and thus effectively block any negative situational influences.

Indeed, when Endress (2001) ran a social loafing experiment that used a brainstorming task (i.e., participants had to find as many different uses for a common knife as possible), she observed that participants with an implementation intention ("And if I have found one solution, then I will immediately try to find a different solution!") but not participants with a mere goal intention ("I will try to find as many different solutions as possible!") were protected from social loafing effects. Further studies that support the idea that implementation intentions make a goal pursuit invulnerable to adverse situational influences are reported by Trötschel and Gollwitzer (in press). In their experiments on the self-regulation of negotiation behavior, loss-framed negotiation settings (i.e., the negotiation goal is framed in terms of avoiding losses) failed to unfold their negative effects on fair and cooperative negotiation outcomes when the negotiators had planned out their goal intentions to be fair and cooperative in terms of if–then plans. In a similar vein, Gollwitzer (1998) reported experiments in which ongoing goal pursuits (e.g., to drive safely, to concentrate on a given math task) that had been planned out in advance by implementation intentions were protected from intrusive influences of competing goals (e.g., to be fast and to attend to a person asking for help, respectively) activated outside of awareness by using classic goal-priming procedures (Bargh, 1990; Bargh, Gollwitzer, Lee-Chai, Barndollar, & Trötschel, 2001).

These findings suggest that the self-regulatory strategy of planning out goal pursuit in advance places a person in the position of reaping positive outcomes without having to change the environment from an adverse to a facilitative one. This is very convenient, as such environmental change is often cumbersome or not under the person's control (e.g., a person with the goal of reducing fat intake cannot easily change the menu at a favorite restaurant). Also, often people are not aware of the adverse influences of the current environment (e.g., the automatic activation of bad eating habits in situations in which the person has sinned repeatedly and consistently in

the past). In such situations, implementation intentions that specify critical situations in the *if*-part and a coping response in the *then*-part do not qualify as a viable alternative self-regulatory tool. Rather, people need to resort to the strategy of planning the ongoing goal pursuit (e.g., eating healthfully) through implementation intentions, thereby protecting it from all kinds of expected and unexpected adverse situational influences.

Potential Costs of Using Implementation Intentions

Given the many benefits of forming implementation intentions, one wonders about the possible costs, if any. Three issues come to mind when considering this possibility. First, action control by implementation intentions may be characterized by rigidity and thus may hurt performance that requires flexibility. Second, forming implementation intentions may be a costly self-regulatory strategy in terms of producing a high degree of ego depletion and consequently handicap needed self-regulatory resources. Third, even though implementation intentions successfully suppress unwanted thoughts, feelings, and actions in a given context, these very thoughts, feelings, and actions may rebound in a subsequent different context.

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

The assumption that implementation intentions delegate the control of behavior to situational cues implies that the self is not implicated when behavior is controlled through implementation intentions. As a consequence, the self should not become depleted when a self-regulation task is regulated by implementation intentions. This has been observed not only in a study by Gollwitzer and Bayer (2000) using a classic ego-depletion paradigm that required participants to control their emotions while watching a humorous movie but also in a recent experiment by Webb and Sheeran (2003, Study 1) in which participants had to perform the Stroop task as an initial task. Indeed, when participants had to perform a subsequent difficult self-regulation task (i.e., anagrams or puzzles) that required sustained effort, participants who had performed the initial task with the help of implementation intentions showed greater persistence than participants who had performed the initial task without implementation intentions.

Gollwitzer, Bayer, Trötschel, and Sumner (2006) ran two rebound experiments following research paradigms developed by Macrae, Bodenhausen, Milne, and Jetten (1994). In both studies participants first had to suppress the expression of stereotypes in a first-impression formation task that focused on a particular member of a stereotyped group (i.e., homeless people). Rebound was measured in terms of subsequent expression of stereotypes in either a subsequent task that demanded the evaluation of the group of homeless people in general (Study 1) or a lexical decision task that assessed the accessibility of homeless stereotypes (Study 2). Participants who had been assigned the mere goal of controlling stereotypic thoughts while forming an impression of the given homeless person were more stereotypical in their judgments of homeless people in general (Study 1) and showed a higher accessibility of homeless stereotypes (Study 2) than participants who had been asked to furnish this lofty goal with relevant if–then plans.

The ego-depletion and rebound studies on implementation intentions imply that a person who has set him- or herself the goal to adhere to certain medical instructions and furnished this goal with respective implementation intentions should experience less ego depletion and rebound effects. Accordingly, a person whose goal is to eat less fatty food should not be ego depleted after a tempting situation has been resisted, and thus should not be handicapped in performing subsequent tasks that require much self-regulation (e.g., dealing with problems at work or at home in a calm and emotionally controlled manner). Moreover, there should not be any rebound in the sense that having escaped one tempting situation (e.g., being offered a chocolate bar) will make the person more ready to succumb to a subsequent temptation (e.g., a German bratwurst).

Even though implementation intentions seem to achieve their effects without costs in terms of ego depletion or rebound, this does not mean that forming implementation intentions is a foolproof self-regulatory strategy. In everyday life, people may not succeed in using implementation intentions effectively for various reasons. First, a person may start forming implementation intentions even though he or she has not set a strong health goal yet. Before people start forming implementation intentions, it is important that they strengthen perceived feasibility and desirability and apply the self-regulatory strategy of mental contrasting. Second, a person may link a critical situation to a behavior or outcome that turns out to be outside of his or her control (e.g., if a person whose goal is to eat healthfully plans to ask for a vegetarian meal but the restaurant he or she frequents does not offer such meals). A similar problem arises with implementation intentions that specify opportunities that hardly ever arise (e.g., if a person who plans to ask for a vegetarian meal in his or her favorite restaurant mostly cooks for him- or herself at home) or implementation intentions that specify behaviors

that have zero instrumentality with respect to reaching the goal (e.g., if a person with the goal of eating healthfully plans to ask for a vegetarian meal not knowing that most restaurants add fatty cheese to make it tasty).

Finally, there is the question of how concretely people should specify the *if*-parts and *then*-parts of their implementation intentions. If the goal is to eat healthfully, one can form an implementation intention that holds either this very behavior in the then-part or a more concrete operationalization of it. The latter seems appropriate whenever a whole array of specific operationalizations is possible, as planning in advance which type of goal-directed behavior is to be executed once the critical situation is encountered prevents disruptive deliberation in situ (with respect to choosing one behavior over another). An analogous argument applies to the specification of situations in the *if*-part of an implementation intention. People should specify the situation in the *if*-part to such a degree that a given situation will no longer raise the question of whether it qualifies as the critical situation or not.

SUMMARY

People can use implementation intentions not only to promote the initiation of goal-directed actions but also to protect their ongoing goal pursuits from being thwarted. The latter can be achieved in two different ways. As long as one is in a position to anticipate what could potentially make one stray off course (the relevant hindrances, barriers, distractions, and temptations), one can specify these critical situations in the *if*-part of an implementation intention and link it to a response that facilitates goal attainment. The response specified in the *then*-part of an implementation intention can then be geared to ignoring disruptive stimuli, suppressing the impeding responses to them, or overcoming obstructions to goal pursuit by engaging in it all the more.

This way of using implementation intentions to protect goal pursuit from straying off course necessitates that people know what kind of obstacles and distractions need to be watched for. Moreover, people need to know what kind of unwanted responses are potentially triggered (so that they can attempt to suppress them) and what kind of goal-directed responses are particularly effective in suppressing these unwanted responses (so that they can engage in these goal-directed activities). Consequently, much social, clinical, and cognitive psychological knowledge is required to be in a position to come up with effective *if*- and *then*-components of such implementation intentions.

However, an easier solution is available. Instead of concentrating on potential obstacles and various ways of effectively dealing with them, people may exclusively concern themselves with the intricacies of implementing

the goal pursuit at hand. People can plan out the goal pursuit by forming implementation intentions that determine how the various steps of goal attainment are to be executed. Such careful planning encapsulates goal pursuit, protecting it from the adverse influence of potential obstacles and distractions, whether internal or external. This self-regulatory strategy of goal pursuit permits attaining goals without having to change a noncooperative self or an unfavorable environment.

Implementation intentions create cognitive links between select situational cues and intended goal-directed behaviors. The effectiveness of implementation intentions lies in the fact that after generation, the mental representation of the specified situational cue becomes highly activated. Once this cue is actually encountered, the planned behavior runs off automatically, overriding and defying any habits or divisive spontaneous attentional responses. Given people's limited resources for conscious and effortful self-regulation, delegating control to situational cues by one express act of fiat is an effective way to bridge the gap that exists between their best intentions and the successful attainment of their goals.

CONCLUSION

Classic motivational approaches to behavior change focus on increasing the target behavior's desirability and feasibility. It is assumed that such interventions strengthen a person's intention (goal) to perform the respective behavior, which in turn guides a person's actions. Recent research on action control observed, however, that high perceived feasibility (high expectation of success) is not necessarily translated into strong goal intentions and that strong goal intentions do not necessarily lead to the initiation of the respective behavior. With respect to translating high expectations of success into strong intentions, Oettingen (1996, 1999; Oettingen et al., 2001) reported that people with high expectations of success will only then form strong intentions if they have contrasted the positive aspects of the desired behavioral change with the obstacles they see in the way of achieving this change. With respect to translating strong intentions into behavior, Gollwitzer (1993, 1996, 1999) observed that furnishing this intention with if–then plans that specify when and where one wants to act drastically increases attainment rates. It is argued therefore that physicians' or other health care providers' instructions to patients should not only focus on enhancing the perceived desirability and feasibility of health-promoting and disease-preventing and -reducing behaviors (motivational intervention) but also be geared to teaching their patients the relevant skills of mental contrasting and planning (self-regulation intervention).

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