CHAPTER 13

Planning Promotes Goal Striving

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Determining the factors that promote successful goal striving is one of the fundamental questions studied by self-regulation and motivation researchers (for a review, see Gollwitzer & Oettingen, 2012). A number of theories and supporting empirical data suggest that the type of goal chosen and the strength of the commitment to that goal are important determinants of whether an individual carries out the behaviors necessary for goal attainment (e.g., Ajzen, 1991; Bandura, 1977; Carver & Scheier, 1998; Locke & Latham, 1990, 2013). In these models, choosing or accepting a goal or standard is the central act of will in the pursuit of goals. We agree with this contention but argue that a further act of will can greatly facilitate goal attainment, in particular, when goal striving is confronted with problems of implementation. Such an act of will takes the form of making a plan that specifies when, where, and how a goal-directed response is to be enacted. More specifically, the person self-regulates by making an if–then plan, forming an implementation intention that specifies an anticipated opportunity or obstacle and links it to a goal-directed response.

Accordingly, Gollwitzer (1993, 1999) has proposed a distinction between goal intentions and implementation intentions. Goal intentions 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. In contrast, implementation intentions have the structure of "If situation X is encountered, then I will perform the goal-directed response Y!" Whereas goal intentions merely specify desired end states ("I want to achieve goal X!"), the if-component of an implementation intention specifies when and where one wants to act on the given goal, and the then-component of the plan specifies how this will be done. Implementation intentions therefore delegate control over the initiation of the intended goal-directed response to a critical situational cue by creating a strong associative link between this cue and the respective goal-directed response.

Empirical data collected in experimental laboratory and field studies support the assumption that implementation intentions help close the gap between wanting to attain a goal and actually attaining it. This positive effect on goal attainment has been observed

for goals related to various domains of life: the consumer world, academic achievement, environmental protection, health concerns, and goals related to being more egalitarian in judging others or showing prosocial behaviors. It also does not seem to matter whether these goals have been assigned by others or whether people came up with them by themselves. A meta-analysis published in 2006 based on close to 100 implementation intention studies showed a medium-to-large effect on increased rate of goal attainment ($d = 0.61$; Gollwitzer & Sheeran, 2006). There are also more recent meta-analyses focusing exclusively on the health goals of eating a healthy diet (Adriaanse, Vinkers, de Ridder, Hox, & de Wit, 2011) and engaging in physical activity (Belanger-Gravel, Godin, & Amireault, 2013), as well as the improvement of people's prospective memory performance (Chen et al., 2015).

Effectively Coping with the Challenges of Goal Pursuit

People can use implementation intentions to deal effectively with the major challenges of goal striving (Gollwitzer, 2014). Forming implementation intentions has been demonstrated to facilitate getting started, to protect an ongoing goal pursuit from disruptions, to disengage readily from ineffective means and unattainable goals, and to pursue the focal goal without getting exhausted. Implementation intentions were found to help individuals to *get started* with goal striving in terms of remembering to act. Extensive research using experimental task paradigms common in the analysis of prospective memory found that if–then plans do enhance memory to enact one's intentions at a certain point in time or event in the future. An enhancement of prospective memory performance is also observed with all kinds of real-life tasks, such as taking medication on time, taking flu shots, or casting one's vote. Implementation intentions also help action initiation, for example, in terms of overcoming an initial reluctance to act with respect to obtaining a mammography, undertaking a testicular self-examination, performing cervical or colorectal cancer screening, and resuming activity after joint replacement surgery. Moreover, people starting to eat a low-fat diet, recycle, engage in more physical exercise, use public transportation rather than one's own car, and purchase organically produced food were all found to benefit from having formed respective implementation intentions.

Goals such as eating a low-fat diet and engaging in regular physical exercise cannot be accomplished by a simple, discrete, one-shot action because they require that people keep striving over an extended period of time. The needed *staying on track* may become very difficult when certain internal stimuli (e.g., being anxious, tired, and overburdened) or external stimuli (e.g., temptations and distractions) interfere with the ongoing goal pursuit. With respect to shielding an ongoing goal pursuit from disruptive internal stimuli, implementation intentions were found to be effective with respect to performance anxiety in sports (e.g., Stern, Cole, Gollwitzer, Oettingen, & Balcetis, 2013), test anxiety, social and general anxiety, worry about attending psychotherapy, and also more specific emotions (e.g., disgust; Schweiger Gallo, McCulloch, & Gollwitzer, 2012). With respect to protecting an ongoing goal pursuit from outside interference, implementation intentions were found to be effective regarding distractive video clips in studies with college students, as well as with 6- to 8-year-old children.

Goals and means that are no longer feasible and/or desirable require individuals to adjust goal striving or even to *disengage* from the chosen goals and means altogether. Such

disengagement can free up resources and minimize frustration that results from experiencing repeated negative feedback. However, because having chosen a goal or means is linked to potential self-defensiveness originating from a strengthened sense of accountability, individuals often stick to the chosen goals and means even though this is disadvantageous, a phenomenon referred to as *escalation of commitment* (Brockner, 1992). Implementation intentions can be used to promote the disengagement needed in such situations by specifying negative feedback as a critical cue, and linking this cue to switching to a more appropriate alternative goal pursuit or using alternative means. Indeed, when research participants were asked to form implementation intentions that linked negative feedback on the ongoing goal striving to immediately switching to a different means or goal, disengagement from goals and means was found to occur more frequently than for participants who had merely been asked to form respective goal intentions (e.g., "I will only work with the best means available!"; Henderson, Gollwitzer, & Oettingen, 2007). Recently, Wieber, Thürmer, and Gollwitzer (2015) observed that down-regulating self-defensiveness by using if–then plans (Thürmer, McCrea, & Gollwitzer, 2013) provides a further route to promoting disengagement from a failing course of action.

Finally, forming implementation intentions can help to prevent *resource depletion* because it enables individuals to engage in automated goal striving (spelled out below). As a consequence, the self should not become depleted (Baumiester, Vohs, & Tice, 2007) when goal striving is regulated by implementation intentions. Indeed, in studies using different ego depletion paradigms, research participants who used implementation intentions to self-regulate in one task did not show reduced self-regulatory capacity in a subsequent task (e.g., Webb & Sheeran, 2003). Moreover, Bayer, Gollwitzer, and Achtziger (2010) demonstrated that people can protect themselves from the negative effects of existing ego depletion in striving for a new goal (i.e., performance on a subsequent task) by spelling out performance on the respective task in advance in terms of if–then plans; a reduced task performance was no longer observed with ego-depleted participants. These findings imply that even individuals who believe that willpower is a limited resource do have a chance to escape the negative performance effects of ego depletion. Believers of the limited resource model do not have to be turned into nonbelievers or even believers of an unlimited resource model (Job, Walton, Bernecker, & Dweck, 2013) by a respective persuasion intervention. Rather, people only need to form if–then plans before starting to work on a first task, thus preventing ego depletion, or to form if–then plans prior to working on subsequent tasks, in which case they perform effectively when ego depletion has occurred.

PROCESS EXPLANATION: STRATEGIC AUTOMATICITY

Research on the underlying mechanisms of implementation intention effects indicates that implementation intentions facilitate goal attainment on the basis of psychological mechanisms that relate to the anticipated situation specified in the if-part of the plan, and the mental link created between the if-part and the then-part. Because forming an implementation intention implies the selection of a prospective critical situation, the mental representation of this situation is expected to become highly activated and hence more accessible. This heightened accessibility of the if-part of the plan has been observed in several studies using different cognitive task paradigms. For instance, Webb and Sheeran

(2004), using a cue detection task, observed that implementation intentions improved performance. Using a dichotic listening task paradigm, Achtziger, Bayer, and Gollwitzer (2012, Study 1) found that words describing the critical cue specified in the if-part of an implementation intention were drawing attention toward them. When these critical words were presented to the nonattended ear, the shadowing performance in terms of enunciating the words presented in parallel to the attended ear did decrease in implementation intention participants. Moreover, using a cued recall task in Study 2, participants more effectively recalled the available situational opportunities to attain a set goal given that these opportunities had been specified in if–then links, and this was true whether the cued recall was requested 15 minutes or 24 hours later. Furthermore, using a lexical decision task paradigm, Parks-Stamm, Gollwitzer, and Oettingen (2007) observed that implementation intentions not only increased the activation level of the specified critical cue but also diminished the activation level of nonspecified competing situational cues. Finally, a recent line of research examined perceptual consequences of making if–then plans. In these studies, a well-established chronometric method was employed: the psychological refractory period (PRP) paradigm (Pashler, 1994) combined with the locus-of-slack logic (Schweickert, 1978). The collected data (Janczyk, Dambacher, Bieleke, & Gollwitzer, 2015) support the idea that if–then plans do facilitate early perceptual processing and not just attentional responding of the specified critical cues. In summary, the studies reported in this paragraph do suggest that if–then plans enhance the activation of the mental representation of specified critical situational cues, making them more accessible.

There are also studies demonstrating a strong associative link between the mental representation of the specified critical cue and the mental representation of the specified response. These associative links (Webb & Sheeran, 2007, 2008) are quite stable over time (Papies, Aarts, & de Vries, 2009). Gollwitzer (1999) argued that the associative links created by forming implementation intentions should lead to a consequence that is best referred to as *strategic automaticity*: Once the critical cue is encountered, the execution of the goal-directed response specified in the then-component of the implementation intention exhibits features of automaticity, including immediacy, efficiency, no need of a conscious intent, and autonomous responding. Having formed an implementation intention, which can best be understood as a strategic act of will because it is intended to promote goal attainment, individuals can then act *in situ* without having to deliberate on whether to act.

Indeed, if–then planners were found to act more quickly (e.g., Gollwitzer & Brandstätter, 1997, Experiment 3); this speeded-up responding still evinced under high cognitive load and therefore qualifies as efficient (e.g., Brandstätter, Lengfelder, & Gollwitzer, 2001). Moreover, no repeated conscious intent is needed in the critical situation. Consistent with this claim, implementation intention effects are observed even when the critical cue is presented subliminally (e.g., Bayer, Achtziger, Gollwitzer, & Moskowitz, 2009). Also supportive of the assumption that no conscious intent is needed is recent research by Schweiger Gallo, Pfau, and Gollwitzer (2012) on increased hypnotic responsiveness. When standard hypnotic instructions were enriched with respective implementation intentions, an increase in hypnotic responsiveness was observed, as assessed by heightened performance on a word search task. Importantly, this increase in performance was accompanied by a felt involuntariness of responding. Finally, action control by implementation intentions is also associated with an enhanced autonomy of the specified critical

response (i.e., a fourth feature of automaticity). Using a flanker task, Wieber and Sassenberg (2006) observed that the situational cues specified in the if-part of an implementation intention still received attention when they were presented in a task context that required the participant to ignore them.

The most convincing support for the hypothesis that action control by implementation intentions qualifies as automatic was obtained in a functional magnetic resonance imaging (fMRI) study reported by Gilbert, Gollwitzer, Cohen, Oettingen, and Burgess (2009), in which participants had to perform a prospective memory task; the frequency of acting on a prospective stimulus was assessed in participants who had formed either a goal intention or an implementation intention. Acting on goal intentions was associated with brain activity in the lateral rostral prefrontal cortex, whereas acting on implementation intentions was associated with brain activity in the medial rostral prefrontal cortex. Brain activity in the latter area is known to be associated with bottom-up (stimulus) control of action, whereas brain activity in the former area is known to be related to top-down (goal) control of action (Burgess, Dumontheil, & Gilbert, 2007). As automatic action control qualifies as highly stimulus driven rather than outcome driven, these brain data are in line with the data collected using cognitive task paradigms suggesting that action control by if–then plans is automatic.

But do the processes triggered by implementation intentions actually mediate their effects on goal attainment? In the Gilbert and colleagues study (2009), the increased brain activity in the medial rostral prefrontal cortex matched the increase in prospective memory performance caused by forming implementation intentions. Moreover, Aarts, Dijksterhuis, and Midden (1999), using a lexical decision task, found that implementation intentions led to faster lexical decision times for those words that described the specified critical situation; importantly, this heightened accessibility of the critical situation in turn mediated the beneficial effects of implementation intentions on rate of goal attainment. Finally, Webb and Sheeran (2007, 2008) found that the effects of if–then plans on goal attainment were mediated simultaneously by accessibility of the specified situational cues and strength of the created associative links between these cues and the respective goal-directed responses.

WHEN WILLPOWER IS NEEDED

Any self-regulation strategy that claims to facilitate goal attainment reliably has to prove itself under conditions when "the going gets tough." Such conditions are manifold, but the following three stick out: (1) when a person's capabilities, such as intelligence, limit goal striving; (2) when opponents, such as negotiation partners, limit one's goal striving; and (3) when the wanted behavior runs into conflict with unwanted reflexive (impulsive) behavior. For all three of these situations, implementation intentions, however, stood the test.

As to situations in which *knowledge, skills, and personal attributes* constrain performance, Bayer and Gollwitzer (2007) found that simple if–then plans managed to enhance participants' performance with respect to a standardized intelligence test (i.e., the Raven test). Participants only had to form a self-efficacy-enhancing implementation intention: "Whenever I start a new problem on this test, then I will tell myself: I can solve this problem!" Given that intelligence is commonly conceived of as a stable personality attribute,

these findings are striking. They have led to recent research on the question of whether people can also change unwanted personality traits if they furnished respective goals with implementation intentions. In line with Bayer and Gollwitzer's studies on enhancing intelligence, Hudson and Fraley (2015) found that when people add implementation intentions such as "If I feel stressed, then I'll call my mom and talk about it!" to the goal to change an unwanted personality trait of being an introvert to becoming an extravert, this actually leads to respective personality change.

As to situations in which an *opponent limits one's performance*, studies in which pairs of negotiators had to distribute a common resource were conducted (Trötschel & Gollwitzer, 2007). In these studies, negotiators played the roles of representatives of two neighboring countries and negotiated the distribution of the regions, villages, and towns of a disputed island. When the negotiation outcomes were framed in terms of losses as compared to gains, the common finding (e.g., Bazerman, Magliozzi, & Neale, 1985) that loss frames lead to less cooperation than goal frames was replicated. However, when participants formed implementation intentions to make cooperative counterproposals whenever a proposal from the counterpart was received, the negative effect of loss framing was wiped out; now participants negotiated as constructively under a loss frame as they did under a gain frame. Research using the ultimatum game (Kirk, Gollwitzer, & Carnevale, 2011) also indicated that implementation intentions can help performance in the face of opponents. Impulsive rejections of unfair offers at a cost to oneself were successfully curbed by making if–then plans geared toward down-regulating anger.

The self-regulation of an ongoing goal pursuit needs willpower when *reflexive (impulsive) responses* hinder initiating and executing goal-directed responses that are instrumental to attaining one's goals. Can making if–then plans help people to allow their goals to win out over their antagonistic reflexive responses? By assuming that the control of action by implementation intentions is immediate and efficient, and adopting a simple horserace model (see Adriaanse, Gollwitzer, de Ridder, de Wit, & Kroese, 2011), people should be in a position to break reflexive responses by forming implementation intentions that spell out a response contrary to the reflexive response to the critical situation. This hypothesis has been tested with respect to cognitive, affective, and behavioral reflexive responses.

Automatic biases, such as stereotyping, represent a reflexive *cognitive* response that may be in opposition to one's goals to be fair. Extending earlier work by Gollwitzer and Schaal (1998), Stewart and Payne (2008) found that implementation intentions designed to counter automatic stereotypes (e.g., "When I see a black face, I will then think 'safe'!") indeed managed to reduce automatic stereotyping. Further research by Mendoza, Gollwitzer, and Amodio (2010) using the so-called "shooter task" paradigm, has added to these findings by showing that the behavioral expression of stereotypes can also be down-regulated by forming implementation intentions.

With respect to reflexive *affective* responses, a series of studies was conducted by Schweiger Gallo, Keil, McCulloch, Rockstroh, and Gollwitzer (2009) with individuals suffering from arachnophobia (fear of spiders). Implementation intentions geared toward either ignoring presented spider pictures or staying calm in the face of such pictures helped to reduce the arousal in these participants, even though arachnophobic individuals are known to reflexively experience arousal when confronted with spider pictures. Actually, both types of implementation intentions reduced the arousal to the degree that was observed with control participants not suffering from arachnophobia. One study, using

dense-array electroencephalography (EEG), even indicated that implementation intentions specifying an ignore response significantly reduced the early activity in the visual cortex in response to spider pictures typically observed with arachnophobic individuals, as reflected in a smaller P1 assessed at 120 milliseconds after a spider picture had been presented. Apparently, the strategically automated ignore response managed to outrun the reflexive fear response.

Moreover, with respect to *behavioral* reflexive responses, Cohen, Bayer, Jaudas, and Gollwitzer (2008, Study 2; see also Miles & Proctor, 2008) found that if–then plans help decrease the advantage of habitual behavioral responses over nonhabitual ones, as observed in a Simon classification task. In this type of task, classifying a stimulus (e.g., low vs. high tones) with the hand that corresponds to the location of the presented stimulus (i.e., to the left vs. right side of the person) is faster than classifying it with the noncorresponding hand. Specifying a noncorresponding response in an implementation intention geared toward fast responding, however, managed to alleviate this reduced speed of classifications made by the noncorresponding hand.

Implementation intentions were also found to help people control behavioral priming effects that occur outside a person's awareness (Gollwitzer, Sheeran, Trötschel, & Webb, 2011). Various experiments tested whether people can protect their ongoing goal pursuits from antagonistic priming effects by using if–then plans. In one of the studies, participants had to perform a driving simulation task. Participants primed with the goal of being fast increased driving speed and mistakes when they had merely formed a goal intention to drive only as fast as safety allowed or had formed no driving-related goal intention at all. However, participants who had furnished the safety-related goal intention of driving only as fast as safety allowed with an implementation intention ("Whenever I enter a curve, then I'll reduce my speed!") no longer evinced any priming effects. Priming the goal to drive fast no longer increased speed and driving mistakes.

In addition, if–then plans specifying the replacement of a habitual response with an alternative response when the critical habitual situation is encountered helped people break bad snacking habits (Adriaanse, Gollwitzer, et al., 2011). When the researchers investigated the cognitive processes underlying this effect using a primed lexical decision task, it turned out that the habitual unhealthy snack was more accessible than an alternative healthy snack (e.g., an apple) when primed with the critical situation (e.g., feeling irritated). Importantly, this was reversed when participants formed if–then plans that linked the initiation of the healthy response to the critical habitual cue.

Still, forming implementation intentions may not always block reflexive responses. Whether the reflexive response or the if–then guided response will "win the race" depends on the relative strength of the two behavioral orientations. For instance, if the reflexive response is based on strong habits (Webb, Sheeran, & Luszczynska, 2009), and the if–then guided response is based on weak implementation intentions, the reflexive response will win over the if–then planned response; but the reverse should be true when weak habits are in conflict with strong implementation intentions. This implies that inhibiting strong reflexive responses requires the formation of strong implementation intentions.

One route to forming strong implementation intentions pertains to creating strong links between situational cues (if-component) and goal-directed responses (then-component). This may be achieved by enriching the formation of implementation intentions with mental imagery (e.g., Knäuper, Roseman, Johnson, & Krantz, 2009; Knäuper et al., 2011). But note that verbal encoding has often been found to suffice in making

implementation intentions effective (McFarland & Glisky, 2012). An alternative route to strengthening implementation intentions was suggested by Adriaanse, de Ridder, and de Wit (2009), who argued that people should specify those critical cues for the if-part of an implementation intention that speak to their unique personal problems with the habitual behavior they want to overcome. Oettingen (2012, 2014; Oettingen & Cachia, Chapter 30, this volume) points out that mentally contrasting a desired future outcome with present reality helps people to detect the personal obstacles that actually stand in the way of goal attainment, and it creates a readiness to link these obstacles to instrumental responses to overcome them. In summary, if–then plans have the potential to reduce the disruptive influence of reflexive antagonistic responses, and this seems to hold true for cognitive, affective, and behavioral responses alike.

NEW DIRECTIONS IN IMPLEMENTATION INTENTION RESEARCH

One new line of research on implementation intentions pertains to using them in *behavior change interventions*. Here the critical question is: How are people helped best to make effective if–then plans? One approach that has been used successfully (for athletic goals: Achtziger, Gollwitzer, & Sheeran, 2008; for weight loss goals: Armitage, Norman, Noor, Alganem, & Arden, 2014) is creating extensive lists of both critical situational cues and instrumental goal-directed responses, providing these lists to people, and asking them to create if–then plans. These plans are then formed by picking those critical situations that are personally most relevant and linking them to the listed responses that participants feel capable of executing in these situations.

A quite different approach to developing behavior change interventions using implementation intentions is teaching the formation of implementation intentions in terms of a metacognitive strategy. Content-free principles of plan formation that are explained in detail can then be used by the individual for any of the goals he or she wants to attain. An intervention that does this very effectively is mental contrasting with implementation intentions (see Oettingen & Cachia, Chapter 30, this volume). Mental contrasting (Oettingen, 2000; Oettingen, Pak, & Schnetter, 2001) implies juxtaposing fantasies about desired future outcomes with obstacles in present reality. This strategy not only creates strong goal commitments and vigorous goal striving in individuals with high expectations of success, but it also guarantees the identification of personally relevant obstacles that can then be specified as the critical cues in the if-component of implementation intentions; it also helps to identify instrumental means to overcome these obstacles that can be specified in the then-component. Moreover, mental contrasting has been found to create a readiness for making plans that link obstacles to instrumental goal-directed responses (Kappes, Singmann, & Oettingen, 2012). Because implementation intentions are known to unfold their beneficial effects in particular when both the commitment to the goal and the respective implementation intention is high (Achtziger et al., 2012; Sheeran, Webb, & Gollwitzer, 2005), mental contrasting guarantees that these prerequisites are in place.

Mental contrasting interventions have recently been enriched with explicit instructions to form if–then plans. In such mental contrasting with implementation intentions (MCII) interventions, researchers observed lasting behavior change (for a review, see Oettingen, Wittchen, & Gollwitzer, 2013; Oettingen, 2014). With regard to physical exercise and healthy eating (i.e., eating more fruits and vegetables) in middle-aged adults,

drastic improvements were observed that lasted over the time periods of 4 months and 2 years, respectively (Stadler, Oettingen, & Gollwitzer, 2009, 2010). Moreover, Adriaanse, Oettingen, Gollwitzer, Hennes, de Ridder, & de Wit (2010) showed that MCII helped to reduce unhealthy snacking in college students. MCII worked for both students with weak and strong such habits, and it was more effective than either mental contrasting or forming implementation intentions alone. Finally, MCII also had beneficial effects outside of the health domain. For example, it enhanced study efforts in students preparing for standardized tests, and it improved academic performance at home and at school (Duckworth, Grant, Loew, Oettingen, & Gollwitzer, 2011; Duckworth, Kirby, Gollwitzer, A., & Oettingen, 2013). It was also found to promote integrative bargaining in buyer and seller dyads negotiating over the sale of a car; again, MCII worked better than either mental contrasting or if–then plans alone (Kirk, Oettingen, & Gollwitzer, 2013).

However, sticking two self-regulatory behavior change tools together (as is done in MCII) may not always be beneficial. For instance, various studies have explored whether combining self-affirmation with the formation of implementations would intensify behavior change effects. Whereas self-affirmation plus if–then plan formation worked well in some intervention studies (e.g., reducing alcohol consumption: Ferrer, Shmueli, Bergman, Harris, & Klein, 2012; eating more fruits and vegetables: Harris et al., 2014), it did not help in others (e.g., promoting exercise behavior; Jessop, Sparks, Buckland, Harris, & Churchill, 2014). Possibly, whenever the information provided with regard to the behavior change at issue turns out to threaten the person's self-integrity, a self-affirmation exercise prior to forming implementation intentions may be helpful because it reduces self-defensiveness and therefore encourages participants to make binding if–then plans. If the information is nonthreating, however, a self-affirmation exercise may not be helpful because it may curb the perceived necessity to make goal-promoting if–then plans; if one feels already pretty good about oneself, one's goal striving does not seem to need a boost. Finally, a recent study on the reduction of alcohol consumption in adolescents shows that self-affirmation exercises themselves can be strengthened by making if–then plans ("If I am anxious, then I will think about the things I value about myself"), and that self-affirmation guided by if–then plans created particularly strong behavior change effects (Armitage, Rowe, Arden, & Harris, 2014).

A further new line of implementation intention research pertains to the use of *if–then plans in groups*. Two questions are addressed in this research: The first is whether individual group members can use implementation intentions to promote collaboration and therefore improve group performance. The second is whether groups can also use we-implementation intentions (If we encounter . . . , then we will . . . !) to promote group performance, and which type of implementation intention (I- vs. We-implementation intentions) is more conducive to promoting group performance (Thürmer, Wieber, & Gollwitzer, 2015a, 2015b; Wieber, Thürmer, & Gollwitzer, 2012, 2013). For instance, Thürmer and colleagues (2015b) analyzed how collective if–then plans improved organizational decision making through increased information exchange and cooperation. Three-person panels had to choose the best of three job applicants. The first candidate was modestly qualified, with six out of nine attributes in his favor—but every panel member knew about all six of these positive attributes. The second candidate also had six attributes in his favor, but the individual panel members only shared knowledge about three of them. The third candidate, the superior candidate, had nine attributes in his favor, but each panel member received information about only three of these positive

attributes. To realize that the third candidate had nine positive attributes, the members of the panels had to share information with one another. All the panels were instructed to do so before arriving at a final decision. Half the panels made an if–then plan: "If we are ready to make a decision, then we will review the positive qualities of all candidates before deciding!" Panels that made no if–then plans chose the superior candidate only 18% of the time, whereas panels with if–then plans selected the superior candidate 48% of the time.

A final new line of research explores whether if–then plans can be used to benefit one's *social interactions*. For instance, Stern and West (2014) reported that implementation intentions specifying how to act when feeling anxious boosts interest in sustained contact and close interpersonal distance in interracial interactions. And Przybylinski and Andersen (2012) observed that implementation intentions can be used to block *transference*, in which prior relationships play out in present ones often without awareness and even when problematic to the individuals involved. Finally, Wieber, Gollwitzer, and Sheeran (2014) demonstrated that mimicry effects on social interactions can also be controlled by forming if–then plans, even though, as with transference, people are not usually aware of its influence on their judgments and behaviors. Although mimicry generally facilitates social interactions, sometimes its effects can hamper the pursuit of focal goals (e.g., when we fall for the persuasive efforts of a salesperson mimicking our bodily and facial expressions). In one of their studies, Wieber and colleagues had participants form the goal "I want to be thrifty with my money! I will save my money for important investments!" or an implementation intention regarding this goal "I want to be thrifty with my money! And if I am tempted to buy something, then I will tell myself: I will save my money for important investments!" They were then mimicked by the experimenter, who tried to seduce them into spending the money they had earned for participating in the experiment on some leftover coffee vouchers and chocolate bars. Control group participants showed the common mimicry effect of a higher readiness to spend their money when being mimicked by the salesperson. Implementation intentions to be thrifty, however, strongly reduced participants' giving in to the persuasive attempts of the experimenter to spend their money, whereas mere goal intentions to be thrifty failed to do so.

OPEN QUESTIONS

Even though research on the effects of if–then plans on the rate of goal attainment and the underlying processes of these effects has been quite extensive since the time when the concept of implementation intentions was first introduced (Gollwitzer, 1993), there is still a host of unanswered questions.

Potential Moderators

Moderators of if–then plan effects on goal attainment have been targeted with respect to features of the implementation intentions formed, the superordinate goal, the person, and the context in which implementation intentions are formed and executed.

Regarding the *features of if–then plans*, it is important to recognize that people can commit to their plans to a different degree, and that only people who form their if–then

plans in a binding manner can be expected to be guided by them (Achtziger et al., 2012). The person with an if–then plan should no longer be able to feel that there is a choice to be made when the critical situation is encountered. The action to be taken in the critical situation has been determined ahead of time, and the person is now on automatic pilot— the planned action will be triggered directly by the specified cue.

But implementation intentions may also differ in their format. For instance, when it comes to shielding an ongoing goal pursuit from internal and external disruptions, quite different if–then plans can be used. Take the example of a person whose goal is to stay friendly to a neighbor who keeps making outrageous requests. She may form suppression-oriented implementation intentions, such as "And if my neighbor approaches me with an outrageous request, then I will not get upset!" The then-component of such suppression-oriented implementation intentions does not have to be worded in terms of not showing (i.e., negating) the critical behavior (in this example getting upset); it may alternatively specify a replacement behavior ("then I will respond in a friendly manner!"), or focus on ignoring the critical cue altogether ("then I'll ignore her request!"). Recent research (Adriaanse, van Oosten, de Ridder, de Wit, & Evers, 2011) suggests that negation implementation intentions are less effective than the latter two types (i.e., replacement and ignore if–then plans).

One can also form implementation intentions geared toward stabilizing the ongoing focal goal pursuit at hand: "If the first part of my paper is finished, then I'll immediately turn to the second part!" Bayer and colleagues (2010) demonstrated their effectiveness in a series of studies showing that if–then plans geared toward stabilizing an ongoing goal pursuit effectively blocked the disruptive effects of self-doubts, inappropriate mood, and ego depletion. Research indicates that the ongoing goal pursuit can also be stabilized in a more general way (Kroese, Adriaanse, Evers, & de Ridder, 2011; van Koningsbruggen, Stroebe, Papies, & Aarts, 2011). Such if–then plans specify the disruptive stimulus in the if-part and a reminder of one's goal at hand in the then-part: "then I will remind myself that my paper has a deadline that I want to meet!"

It is important to recognize, however, that focusing one's if–then plans on the ongoing activity may at times be counterproductive. For instance, for individuals with high test anxiety, using implementation intentions that increase the focus on the ongoing task of performing well on a challenging arithmetic test was demonstrated to be harmful to task performance (Parks-Stamm, Gollwitzer, & Oettingen, 2010). And Gollwitzer and Schaal (1998) observed that individuals who were highly motivated to do well on a focal arithmetic test performed more poorly than a no-plan control group when using assigned if–then plans that specified "to increase one's efforts" on the test when disruptive stimuli are encountered (in this case, attractive video clips). Possibly, in both of these studies, focusing strictly on the ongoing math test may have triggered worries about succeeding on the test and therefore undermined performance.

Also, when forming implementation intentions, the associative link created between the critical situation and the instrumental response should be as strong as possible. This is achieved most easily when implementation intentions use an if–then format. Simply having research participants specify the when, where, and how of acting and trusting that they will in turn form if–then plans is a suboptimal way of creating strong implementation intentions in research participants. For instance, Chapman, Armitage, and Norman (2009) observed that for the goal to increase one's fruit and vegetable intake,

an implementation intention using an if–then format had a greater impact than an implementation intention that settled with simply listing the when, where, and how of acting toward the goal.

For if–then plans to be effective, it is also important that people specify the critical situational cue in such a way that it is readily detected when it is actually encountered. Even though concrete specifications may in general be superior in this respect than abstract specifications, this may not always be true. Think, for example, of the specification of internal cues. Specifying as the critical cue the state of getting irritated may seem rather abstract, but the individual (e.g., a tennis player who wants to stay calm when he is falling behind in the game; Achtziger et al., 2008) knows exactly what is implied and will therefore easily recognize this state when it occurs. When it comes to appropriate specifications of the then-component of an if–then plan, it seems crucial to pick a response that is highly instrumental to goal attainment. Also, it needs to be a response that the person feels capable to execute in the critical situation (i.e., self-efficacy is high; Wieber, Odenthal, & Gollwitzer, 2010).

Finally, there is the question of how many if–then plans should one form for a given goal? Verhoeven, Adriaanse, de Ridder, de Vet, and Fennis (2013) investigated the behavioral and cognitive implications of making multiple implementation intentions targeting unhealthy snacking habits and its underlying processes, linking multiple habitual snacking cues to healthy alternatives. They found that formulating multiple implementation intentions was not effective in decreasing unhealthy snacking, whereas formulating a single plan successfully induced behavior change. By using a lexical decision task, they also observed that when making a single plan, but not multiple plans, the healthy alternative became cognitively more accessible in response to a critical cue prime than the habitual response.

Moderators of the effects of if–then plans may also be found in certain *features of the planning person*. For instance, the personality attribute of socially prescribed perfectionism seems to undermine implementation intention effects on goal progress, whereas for participants who score high on self-oriented perfectionism, no such effects are observed (Powers, Koestner, & Topciu, 2005). Possibly, social perfectionists fail to commit and stick to implementation intentions because they are very sensitive to the fact that the preferences of others often change unexpectedly, and that their high readiness to respond to such changes in a flexible manner may be undermined by strong commitments to a fixed if–then plan. Moreover, the willingness to make if–then plans and reliably enact them seems to also be reduced in highly impulsive individuals (i.e., for individuals high in urgency, it was found that implementation intentions fail to promote goal attainment when the situational context is emotionally charged; Burkhard, Rochat, & Van der Linden, 2013; see also Churchill & Jessop, 2010, 2011), whereas it seems to be heightened in individuals high in conscientiousness (Webb, Christian, & Armitage, 2007) and those with a strong propensity to manage their time and money effectively (Lynch, Netemeyer, Spiller, & Zammit, 2009).

But what about moderators in terms of the cognitive capacities that are needed to form and enact if–then plans? Research on this question has turned to critical clinical samples: children with attention-deficit/hyperactivity disorder (ADHD) (see summary by Gollwitzer, Gawrilow, & Oettingen, 2010; see also Barkley, Chapter 27, this volume), patients with frontal lobe damage (e.g., Lengfelder & Gollwitzer, 2001; McFarland & Glisky, 2011), and patients with schizophrenia (Brandstätter, Lengfelder, & Gollwitzer,

2001; Chen et al., 2014), all of whom are known to suffer from cognitive deficits related to executive functions. All of these samples benefited from forming implementation intentions. For instance, children with ADHD who were taught the MCII technique were rated by their parents to have shown a heightened level of self-regulation in their everyday life during the 2 weeks after the intervention (Gawrilow, Morgenroth, Schultz, Oettingen, & Gollwitzer, 2013). This indicates that even though children with ADHD are known to suffer from reduced executive functions, they can benefit from making if–then plans in their daily self-regulation challenges (e.g., doing their homework on time).

Further research involving children with ADHD showed that the typical deficits in executive functions can also be targeted directly by forming respective implementation intentions. For instance, it was demonstrated (Gawrilow & Gollwitzer, 2008) that children with ADHD who furnished a suppression goal with implementation intentions improved inhibition of an unwanted response in a go/no-task to the same level observed in children without ADHD, and the combination of implementation intentions and psychostimulant medication resulted in the highest level of suppression performance in children with ADHD. Moreover, children with ADHD made fewer perseverative errors on a shifting task when instructed to make respective if–then plans, and they also benefited from if–then plans in solving math problems that required both working memory and the inhibition of distractions (Gawrilow, Gollwitzer, & Oettingen, 2011b). And finally, children with ADHD could successfully use if–then plans to enhance their delay of gratification performance (Gawrilow, Gollwitzer, & Oettingen, 2011a). It appears, then, that individuals with handicapped executive functions can still use if–then plans as a self-regulation tool for their daily goal pursuits, and they can even make if–then plans to support exactly those executive functions in which they are weak.

Features of the targeted goal have also been studied as potential moderators. In line with the notion that if–then plans unfold their effects when "the going gets tough," many studies indicate that participants who form implementation intentions perform better than participants who only form goal intentions when the goals at hand are difficult rather than easy (Gollwitzer & Sheeran, 2006). However, having a strong goal commitment in place is a prerequisite for the positive effects of implementation intentions on attaining difficult goals. Sheeran and colleagues (2005, Study 1) report that weak goal commitments undermine the effectiveness of if–then plans. This observation is in line with findings by Koestner, Lekes, Powers, and Chicoine (2002), who found that implementation intentions evince stronger effects when they are formed in the service of self-concordant goals. People also refrain from acting on their if–then plans when the respective goal is not activated in the situation at hand (Sheeran et al., 2005, Study 2).

But should people form implementation intentions for all of their goals, from studying to having fun? It seems that the benefits of if–then planning for attaining a single goal do not typically extend to multiple goals (Dalton & Spiller, 2012). Planning may draw attention to the difficulty of executing multiple goals, which undermines commitment to those goals relative to other desirable activities and thereby undermines if–then planning effects. Framing the execution of multiple goals as a manageable endeavor, however, seems to reduce the perceived difficulty of multiple goal pursuit and can therefore help people accomplish the various goals they have furnished with if–then plans.

Finally, various *contextual features* matter. One is the emotional state in which the person finds him- or herself when forming if–then plans and enacting them. An emotional state that has positive effects on plan formation and enactment seems to be the

emotion of anger (Maglio, Gollwitzer, & Oettingen, 2014). Apparently, anger creates a strong sense of being in control that facilitates both the making of firm plans and decisively acting on them. Another contextual feature seems to be the person's mindset. When a person is deliberating on the pros and cons of pursuing a goal, he or she experiences a deliberative mindset (Gollwitzer, 2012) that is characterized by open-mindedness. Because implementation intentions affect behavior by automatic, bottom-up action control processes triggered by exactly those situational cues specified in the if-part, being in a deliberative mindset should disrupt this type of action control. As a consequence, deliberative mindsets have been found to eliminate the common beneficial effects that implementation intentions have on goal attainment (Wieber, Sezer, & Gollwitzer, 2014).

In summary, many factors enhance or weaken action control by implementation intentions; they pertain to the implementation intentions formed, the superordinate goal, the person, and the context in which implementation intentions are formed and enacted. Most of the studies so far have focused on one of these factors at a time. But future research might want to address the question of how these factors interact. Such a more comprehensive approach is exemplified by a recent set of studies reported by Hall, Zehr, Ng, and Zanna (2012). They examined the joint influence of goal strength, executive control resources (ECRs), and differentially supportive environmental conditions on the effectiveness of implementation intentions geared toward enhancing physical exercise. The beneficial effects of implementation intentions turned out to be more potent under challenging environmental conditions, and implementation intentions were of special benefit for those with initially low ECRs. However, more recent research by Hall, Zehr, Paultzki, and Rhodes (2014), also examining the interaction of potentially undermining factors of implementation intention effects, found that in old to very old people, low ECRs do manage to undermine the positive effects of implementation intentions on physical activity.

Costs of If–Then Planning

Given the many benefits of forming if–then plans, one wonders about potential costs. Such costs may be expected when recognizing and quickly seizing an alternative opportunity is essential for achieving the goal at hand. Indeed, Masicampo and Baumeister (2012) reported that when participants were assigned a task goal in the laboratory, making an if–then plan hindered participants' capitalization on a presented alternative opportunity for achieving the goal. Research in our laboratory also showed the advantage in seizing specified situational cues; their mental representations become highly activated, and the mental representations of competing situational cues become deactivated (Parks-Stamm et al., 2007). But recent research indicates that this lack of flexibility is dependent on the person's counterfactual mindset (McCulloch & Smallman, 2014). More specifically, subtractive counterfactual mindsets in which counterfactual thoughts focus on removing a performed action were found to enhance flexibility. In contrast, additive counterfactual mindsets in which counterfactual thoughts focus on imagining new actions were found to enhance rigidity.

But is the failure to use alternative opportunities actually a cost in terms of reaching the goal for which the implementation intention has been formed? Note that the goal is still attained even though an alternative opportunity to realize the goal has not been seized. From a goal attainment perspective, therefore, speaking of costs only makes

sense when a better opportunity is not seized. So the question that arises is whether opportunities that promise easier or more beneficial goal attainment than the one specified in one's implementation intention will indeed stay unused. Interestingly, research on this question shows that implementation intention participants seem to have no problems with making effective use of better opportunities that arise unexpectedly (Gollwitzer, Parks-Stamm, Jaudas, & Sheeran, 2008). Analogous research analyzing the use of alternative goal-directed responses shows that implementation intentions also seem to allow people to stay open to the use of responses that are of higher or at least the same instrumentality.

Moreover, as we noted earlier, implementation intentions respect the strength of the superordinate goal and its state of activation. This means that people can be expected to adjust their goal striving sensitively to the strength and activation of the goal at hand. They should stop striving for goals they have attained and halt striving in inappropriate contexts. So there is no need to fear that if–then guided goal striving is rigidly repeated again and again only because the critical situation is encountered repeatedly, or that people rigidly act on their if–then plans in inappropriate situations. For instance, one does not have to fear that an if–then plan to complain to one's boss as soon as one sees him will be enacted at his birthday party. Recent research also shows that if–then guided goal striving is quite sensitive to failure feedback (Gollwitzer et al., 2008). The feedback only needs to be explicit enough to be noticed by the person acting on an if–then plan. Still, in the future researchers might want to investigate how if–then plans can be worded in a way to keep rigidity at a minimum. One route that we imagine might be effective is using if- and then-specifications that are rather inclusive ("If I get anxious, then I will tell myself: Be confident!") and therefore cover many different critical situations and many instrumental responses.

Alternative Process Explanations

Rather than operating via strategic automaticity, might forming if–then plans increase a person's commitment to the goal (produce heightened goal strength) or increase his or her self-efficacy with regard to attaining the goal at hand? But a critical meta-analytic analysis of these potential alternative explanations (Webb & Sheeran, 2008) does not render them viable. A further alternative explanation is the presumption that implementation intention participants as compared to mere goal intention participants are always given more information on the details of how to attain the goal at hand. Admittedly, in the first studies on implementation intentions, this problem has not received the necessary attention. But recent research makes sure that either the mere goal intention group receives strategy information as well or that the if–then plan group receives no additional strategy information at all; the instructions given in the goal intention condition are simply worded in an if–then format. Even under these very controlled circumstances, participants with if–then plans show enhanced goal attainment compared to participants with mere goal intentions (e.g., Wieber, Gollwitzer, & Sheeran, 2014).

There is also the possibility that if–then plans may have unfolded their often striking effects by having enhanced experimenter demand. However, in various studies, experimenter demand was checked after the experiment was completed, and no differences between mere goal and implementation intention participants were evident. Also, experimenter demand was often checked in pilot participants who received either mere goal or

implementation intention instructions. Again, no differences emerged between goal and if–then plan participants.

Finally, the effects of implementation intentions maybe understood as nothing but specific goal effects, in line with Locke and Latham's (1990) *goal-setting theory,* which postulates that specific goals lead to better performance than "do your best" goals. But note that the specificity to which Locke and Latham refer in their extensive research relates to the standards that people ultimately want to meet in their goals, and it is challenging, precisely defined standards that are found to promote goal attainment (Locke & Latham, 2013). In the case of implementation intentions, in contrast, the when, where, and how of goal striving is specified and linked together in the form of an if–then statement: "If a certain situation occurs, then I will show a certain goal-directed response!" It is therefore not the level of goal standards (e.g., for a tree cutter, exactly how many trees he wants to cut on a given day) but rather when, where, and how a person wants to act in order to meet the set goal standards.

CONCLUSION

We suggested that goal striving can be enhanced by a simple planning strategy: making if–then plans. Certainly, there are other routes people may take to enhance their goal striving. These pertain to strengthening goal commitment by enhancing self-efficacy beliefs (Bandura, 1977) or changing the framing of one's goals, so that one becomes more willing to strive. The latter can be achieved by focusing on autonomous rather than controlled rewards (Ryan & Deci, 2000), by adopting a promotion rather than a prevention focus (Higgins, 1997), or by setting learning goals rather than performance goals (Dweck & Leggett, 1988). In contrast, the presented research suggests that goal striving can be strategically enhanced by making if–then plans, thus handing it over to specified if (situation)–then (goal-directed response) contingencies that establish bottom-up regulation of one's goal striving.

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