

CHAPTER 17

Planning Out Future Action, Affect, and Cognition

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On Monday, there is an important meeting that you have to attend. Even though you are highly motivated to contribute to the meeting, you did not find the time to think about it during the week. So you reserve some time on the weekend to prepare for the meeting by setting and committing to goals that specify what you want to achieve in the meeting. In this chapter, we argue that doing so is just a first step toward a successful meeting. You need to take a further step. As successful goal striving commonly faces a host of challenges, we suggest that people better prepare themselves for prospective goal striving by making plans that specify how one wants to manage one's actions, feelings, and thoughts when certain challenges arise.

IF-THEN PLANNING

Successful goal striving is facilitated when the chosen goals are highly desirable and perceived as feasible (Gollwitzer, 1990). In other words, the goals that are striven for need to match the person's needs, higher order goals, and attitudes, as well as norms (e.g., regarding needs, see Hagger, Chatzisarantis, & Harris, 2006; Ryan & Deci, 2000; for higher order goals, see Gollwitzer & Kirchhof, 1998; and for attitudes and norms, see Ajzen & Fishbein, 1980), and they have to be in line with the person's control and self-efficacy beliefs (Ajzen, 1991; Bandura, 1977). It also matters how the chosen goals are framed; for instance, as promotion versus prevention goals (Higgins, 1997) or as performance versus learning goals (Dweck & Leggett, 1988). Finally, it is important that one feels committed to attaining the chosen goal (Oettingen, Pak, & Schnetter, 2001), as strong commitments help people to persist (i.e., "stay in the field"; Lewin, 1926).

However, successful goal striving also depends on how effectively people cope with the typical problems faced while they engage in goal striving: People need to get started with the initiation of goal-directed responses (i.e., they should not procrastinate), to shield their goal striving from distractions, and to quickly disengage from ineffective means, and they should not overextend themselves, because that would only handicap other important but currently nonfocal goal pursuits. In the present chapter, we argue that an incredibly powerful self-regulation strategy for effective goal striving is making “if-then” plans (i.e., forming implementation intentions) that spell out behavioral, affective, and cognitive goal-directed responses to potential critical situations ahead of time, prior to actually encountering them.

What Are If-Then Plans?

If-then plans (also referred to as implementation intentions; Gollwitzer, 1993, 1999) focus on the when, where, and how of striving toward one’s goals. Ideally, they have the following format: “If the critical situation *X* is encountered, then I will perform the goal-directed response *Y*!” These implementation intentions are to be differentiated from goal intentions. The latter merely specify desired end states (“I want to achieve goal *X*!” or “I want to exert behavior *X*!”). In implementation intentions, on the other hand, the “if” component of an implementation intention specifies a future critical event or point in time, and the “then” component specifies how one will respond once these situational cues are actually encountered. Implementation intentions thus delegate control over the initiation of the intended response to a specified critical future situation (an opportunity that cannot be missed or an obstacle that needs to be overcome) by creating a link between this situation and a proper response that facilitates goal attainment.

Indeed, implementation intentions have been found to help people with their goal striving. Evidence that forming if-then plans enhances the rate of goal attainment has been obtained in many studies regarding a whole array of different domains, such as achievement, health, sports, and social relationships. A meta-analysis (Gollwitzer & Sheeran, 2006) involving more than 8,000 participants in 94 independent studies revealed a medium-to-large effect size ($d = 0.65$) of implementation intentions on the rate of goal attainment, and this on top of the effects of goal intentions (i.e., control participants who formed mere goal intentions). More recent meta-analyses focusing exclusively on goals of eating a healthy diet (Adriaanse, Vinkers, de Ridder, Hox, & de Wit, 2011) and engaging in physical activity (Belanger-Gravel, Godin, & Amireault, 2013) or on people’s prospective memory performance (Chen et al., 2015) also demonstrate the beneficial effects of forming implementation intentions.

How Do Implementation Intentions Work?

The Mental Representation of the “If” Component

Because forming an implementation intention implies the selection of a prospective critical situation, the mental representation of this situation can be expected to become highly activated and hence more accessible. Such heightened accessibility

of the situational cue specified in the “if” part of an implementation intention has been demonstrated in studies using different cognitive task paradigms. Webb and Sheeran (2004) used a cue-detection task and observed that the situational cues specified in implementation intentions were detected faster and more accurately than those that were not. 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 on the attended ear did decrease. 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 no matter whether the cued recall was requested 15 minutes or 24 hours later. 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 looked at perceptual consequences of making if-then plans. In these studies, a well-established chronometric method was employed: the psychological refractory period (PRP) paradigm, combined with the locus-of-slack logic. The collected data (Janczyk, Dambacher, Bieleke, & Gollwitzer, 2015) support the idea that if-then plans even facilitate early perceptual processing and not just attentional responding to the specified critical cues.

In sum, various studies suggest that if-then plans enhance the activation of the mental representation of specified critical situational cues, making them more easily accessible. There are also some studies showing that the heightened accessibility of the mental representation of the critical cues specified in an implementation intention mediates the attainment of the respective goals (e.g., Aarts, Dijksterhuis, & Midden, 1999; Webb & Sheeran, 2007).

The Associative Link between the “If” Part and the “Then” Part

Gollwitzer (1999) postulated that forming implementation intentions creates a strong associative link between the critical situation specified in the “if” part and the goal-directed response specified in the “then” part. The consequence of such situation–response links he refers to as *strategic automaticity*: Even though if-then plans are formed intentionally, once the specified critical cue is encountered, it triggers the linked response in an automatic fashion. More specifically, the execution of the goal-directed response specified in the “then” component of the implementation intention is assumed to exhibit features of automaticity, including immediacy, efficiency, lack of need for a further conscious intent, and autonomous (i.e., stimulus-guided) responding.

Indeed, if-then planners were found to act more quickly (e.g., Gollwitzer & Brandstätter, 1997, Experiment 3), and this speed-up effect did still evince under high cognitive load and thus qualifies as efficient (e.g., Brandstätter, Lengfelder, & Gollwitzer, 2001). Also, a conscious intent to respond is not needed when the critical situation is encountered. Consistent with this last assumption, implementation

intention effects were observed even when the critical cue was presented subliminally (e.g., Bayer, Achtziger, Gollwitzer, & Moskowitz, 2009). Finally, action control by implementation intentions is also associated with an enhanced autonomy of the specified critical response (i.e., a further feature of automaticity). Using a flanker task, Wieber and Sassenberg (2006) observed that the situational cue specified in the “if” part of an implementation intention still received attention when it was presented in a task that required ignoring it. In line with this finding, Schweiger Gallo, Pfau, and Gollwitzer (2012) observed that hypnotic instructions enriched with respective implementation intentions produced an increase in hypnotic responsiveness; importantly, this performance increase was accompanied by a felt involuntariness of responding.

In sum, various studies suggest that if-then planning strengthens the associative link between the specified critical cue and the specified response, thus promoting automatic responding to the critical situation. There are also some studies showing that the established associative links mediate the impact of forming implementation intentions on automatic responding (Webb & Sheeran, 2007, 2008).

Further Evidence for the Strategic Automaticity Hypothesis

There is a host of further research supporting the hypothesis that forming implementation intentions allows people to intentionally switch from effortful action control by goals to automatic action control by situational cues. This research can be grouped into three categories: assessing brain data, studying people who have particular difficulties with self-regulation, and demonstrating that implementation intentions still evince their beneficial effects when automatic habitual responses need to be outrun.

BRAIN DATA

In a functional magnetic resonance imaging (fMRI) study, Gilbert, Gollwitzer, Cohen, Oettingen, and Burgess (2009) had participants perform a prospective memory task. Prospective memory performance was assessed in terms of the frequency of acting on a presented prospective stimulus. Participants performed the task on the basis of goal intentions versus implementation intentions. 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, these brain data are in line with the data collected using cognitive task paradigms reported above, suggesting that action control by if-then plans is automatic. But do the brain processes triggered by implementation intentions actually mediate the observed facilitating effects on goal attainment? In the Gilbert et al. study (2009), the increased brain activity in the medial rostral prefrontal cortex closely matched the increase in prospective memory performance produced by forming implementation intentions.

CRITICAL SAMPLES

Further support for the strategic automaticity hypothesis (also referred to as the delegation of action control to situational cues hypothesis; Gollwitzer, 2014) comes from studies using critical samples—that is, individuals with poor self-regulatory abilities, such as people with schizophrenia and substance abuse disorders (Brandstätter et al., 2001, Studies 1 & 2), people with frontal lobe damage (Lengfelder & Gollwitzer, 2001), and children with attention-deficit/hyperactivity disorder (ADHD; Gawrilow & Gollwitzer, 2008).

Brandstätter et al. (2001, Study 1) assigned hospitalized opiate addicts under withdrawal the goal to write a short curriculum vitae (CV) before the end of the day; half of the participants formed a relevant implementation intention (they specified when and where they would start to write what), and the other half (control group) formed an irrelevant implementation intention (when and where they would eat what for lunch). Eighty percent of the participants with a relevant implementation intention had written a short CV at the end of the day, whereas none of the participants with an irrelevant implementation intention succeeded in doing so.

Implementation intentions also benefit children with ADHD. These children are known to have deficits in executive functions pertaining to (1) response inhibition, (2) task shifting, (3) working memory, and (4) dealing with delay aversion. Making respective if-then plans ameliorated all of these deficits (see Gawrilow & Gollwitzer, 2008; Gawrilow, Gollwitzer, & Oettingen, 2011a, 2011b). For example, with respect to response inhibition, performance in the presence of stop signals improved in children with ADHD who had formed implementation intentions (Gawrilow & Gollwitzer, 2008, Studies 1 & 2). This improved response inhibition was found to be reflected in electrocortical data. Typically, the P300 component evoked by NoGo stimuli has greater amplitude than the P300 evoked by Go stimuli; however, this difference is less pronounced in children with ADHD. Paul et al. (2007) found that if-then plans improved response inhibition and increased the P300 difference (NoGo minus Go) in children with ADHD.

IMPLEMENTATION INTENTIONS CONTROL HABITUAL RESPONSES

Assuming that the control of responses by implementation intentions is immediate and efficient, and adopting a simple horse race model (Adriaanse, Gollwitzer, de Ridder, de Wit, & Kroese, 2011), people should be in a good position to break reflexive responses by forming implementation intentions that spell out a response contrary to the reflexive response that is to be controlled. This hypothesis has been tested in numerous studies. Automatic biases, such as stereotyping, represent reflexive responses that can 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 stereotyping (e.g., "When I see a black face, then I will think 'safe'!") indeed reduced automatic stereotyping. Moreover, studies conducted by Schweiger Gallo, Keil, McCulloch, Rockstroh, and Gollwitzer (2009) with individuals suffering from arachnophobia (i.e., fear of spiders) showed that implementation intentions geared toward ignoring presented spider pictures or toward staying calm in the face of such pictures helped reduce

the arousal in these participants, even though individuals with arachnophobia are known to reflexively experience arousal when confronted with spider pictures. Using dense-array electroencephalography (EEG), it was shown that implementation intentions specifying an ignore response significantly reduced the early activity in the visual cortex in response to spider pictures typically observed in individuals with arachnophobia, 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.

Finally, Cohen, Bayer, Jaudas, and Gollwitzer (2008, Study 2) 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 that was geared toward fast responding alleviated this reduced speed of classifications made by the noncorresponding hand.

Still, forming implementation intentions may not always block reflexive habitual 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 and the if-then guided response is based on weak implementation intentions, the reflexive response will win over the if-then planned response (Webb, Sheeran, & Luszczynska, 2009); 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 (see later discussion).

Alternative Process Mechanisms?

Other potential process mechanisms than the ones described above have been explored. For instance, furnishing goals with implementation intentions might produce an increase in goal commitment or self-efficacy, which in turn may cause a heightened goal attainment. However, a meta-analysis of 66 implementation intention studies that assessed goal commitment or self-efficacy after the formation of if-then plans revealed negligible effects of making if-then plans on goal commitment and self-efficacy (Webb & Sheeran, 2008). Also, having to furnish goals with implementation intentions may be interpreted by the research participants as a hint that the experimenter wants them to do well on the goal at hand. However, no increase in experimenter demand is observed after the formation of implementation intentions (e.g., Schweiger Gallo et al., 2009). Finally, one might argue that implementation intentions have positive effects on goal attainment because they provide extra strategy knowledge. Several studies have critically tested this idea by using if-then plans that did not provide additional strategy information or by providing critical strategy information to participants who had formed mere goal intentions. However, the data did not support the alternative process hypothesis that enhanced strategy knowledge underlies implementation intention effects (e.g.,

Palayiwa, Sheeran, & Thompson, 2010; Webb, Ononaiye, Sheeran, Reidy, & Lavda, 2010).

Finally, the effects of implementation intentions may be understood as nothing more than specific goal effects, in line with Locke and Latham's (2013) goal-setting theory postulating that specific goals lead to better performance than "do your best" goals. The specificity that Locke and Latham are referring to in their extensive research, however, refers to the standards that people want to ultimately meet in their goals, and in their research they find that challenging, precisely defined standards promote goal attainment. In the case of implementation intentions, in contrast, the when, where, and how of goal striving is specified. Thus it is not the level or specificity of goal standards but rather the specificity of goal behavior that accounts for the goal attainment promoting effects of implementation intentions.

PLANNING FOR PROSPECTIVE GOAL STRIVING: THE SELF-REGULATION OF ACTION, AFFECT, AND COGNITION

We now report exemplary studies demonstrating that implementation intentions are very effective in helping people to use prospective situations (opportunities, obstacles) in the service of goal attainment. The studies are grouped in terms of which goal-directed responses were targeted by the if-then plans made by the research participants, that is, behavioral, affective, or cognitive goal-directed responses. For each of the three categories (action, affect, and cognition), we discuss at least two different types of self-regulatory problems and present the relevant research findings.

Future Planning and the Regulation of Action

When it comes to the self-regulation of goal-directed action, it is of primary importance that people initiate relevant behavioral responses (i.e., get started with goal striving) and stay on track until the goal is attained (i.e., shield goal striving from distraction). If-then planning has been found to facilitate meeting these demands of effective goal striving. Extensive research explored what types of if-then plans are best suited to facilitate getting started and staying on track. In this research, different kinds of negative influences on getting started and staying on track were analyzed, such as nonconscious influences from outside or inside the person, as well as performance handicaps people were painfully aware of. If-then planning stood its test, and it was discovered that it even managed to promote group performance in situations in which groups are known to fall behind individual performance.

Planning to Overcome Nonconscious Influences on Behavior

Implementation intentions have been shown to help individuals regain control over a variety of situational influences that affect our behavior outside of awareness, leading to negative consequences, such as driving too fast, overspending, and remaining attached to a failing course of action.

A plethora of studies have documented how human behavior can be primed outside of awareness (Bargh, 2013). Although these primes can at times be facilitative to goal striving, they can be deleterious at others. Gollwitzer, Sheeran, Trötschel, and Webb (2011) used implementation intentions to intervene when nonconscious primes were used to manipulate behavior. In one study, participants had to solve as many arithmetic problems as possible within a set time frame. In a 2×2 design, participants were first asked (or not) to form distraction-focused implementation intentions ("If I get distracted, then I will concentrate on the test even more!") and then were primed (or not) to behave prosocially. Later, while working on the arithmetic problems, participants were distracted by a presumed other participant (actually a confederate) asking for directions to the experimenter's office. When primed to behave prosocially, participants spent significantly more time attending to this distraction in comparison with those who had not received the prime. However, those who had formed the implementation intention described above were protected from this priming effect. In a further study, utilizing a driving simulator, Gollwitzer et al. (2011) looked at differences in driving speed and driving errors after some participants were randomly primed to be fast during an ostensibly unrelated prior task. Overall, participants who received the speed prime drove faster and made more driving errors than those who did not receive this prime. However, participants who had formed an implementation intention to control fast driving ("If I enter a curve, then I will slow down, and if I enter a straight road, then I will accelerate!") were shielded from the prime and did not increase their speed and error rate.

In addition to priming, other nonconscious processes, such as mimicry, can also affect our behavior. Behavioral mimicry (when at least two people are engaged in the same behavior) is quite ubiquitous in our social world (Chartrand & Lakin, 2013). Mimicry of others often occurs outside of awareness and is known to induce increased liking for the person who mimics us. This consequence may be to our advantage (e.g., when we want to make friends with people) and our disadvantage (e.g., when a salesperson mimics us to nudge us into buying things from her). Wieber, Gollwitzer, and Sheeran (2014, Study 2) used implementation intentions to buffer against mimicry effects when mimicry was being used for exploitative purposes. First, participants were given the intention to be thrifty, which was then furnished or not furnished with an implementation intention. At the end of the study, all participants were asked by the experimenter who mimicked them (or did not) whether they wanted to use some of the money they had received as compensation to purchase leftovers (e.g., chocolate) from other studies. As it turned out, mimicked participants supported with implementation intentions did not waste money on these leftovers.

The previous studies highlight the impact that nonconscious *external* influences can have on our behavior; however, our behavior can also be affected by *internal* biases that operate outside of our awareness. One such bias, often referred to as the *sunk-cost fallacy* (Arkes & Blumer, 1985), refers to our tendency to persevere a failing course of action due to the amount of resources we have already invested (e.g., sitting through a terrible 2-hour movie just because you have already paid for the ticket and watched the first 30 minutes). Henderson, Gollwitzer, and Oettingen (2007) approached the sunk-cost fallacy by asking whether implementation

intentions could help facilitate disengagement in sunk-cost situations. Participants were asked to form an implementation intention emphasizing abandonment of an unsuccessful means of goal pursuit: "If I receive disappointing feedback, then I'll switch my strategy!" All participants were first asked to solve trivia questions and to select one of three strategies that could, ostensibly, produce different performance outcomes. Participants were then asked to justify the choice of their strategy, a manipulation used by Bobocel and Meyer (1994) to enhance sunk-cost bias. Finally, they completed two sets of the trivia questions. By design, everyone experienced failure concerning the first set, and some participants experienced improvement in the second. After the second set, participants were given the choice to stick with the current strategy or to give up on it and make a change. Those in the control conditions fell prey to the sunk-cost fallacy and maintained their current strategies, regardless of whether or not their performance improved or continued to decline in the second set. Those with the implementation intention to switch when disappointing feedback was received were much more likely to change their strategies, regardless of whether or not performance was improving.

So far, we saw implementation intentions help individuals to act in their best interest despite the presence of a variety of situational contexts that, when left unchecked, threaten to derail their good intentions. In the next section, we look at how implementation intentions facilitate coping with more obvious threats to achievement.

Planning to Overcome Obstacles to Performance

We have just discussed ways in which implementation intentions can help us regain control over unconscious behavioral influences. Now we turn our attention to how implementation intentions can help us regain control when we are aware of our undesirable behavior that handicaps goal attainment. For example, oftentimes when we should be working to meet our goals, we might find ourselves sitting on the couch watching television instead. Perhaps this is because the television was on in the background and we glanced over for a second that turned into 2 hours. Perhaps this is because we are avoiding an important high-stakes task for fear of failing. Whatever the reason, we know that we should be working and are looking for help to get up off the couch. In a number of studies, implementation intentions have been shown to be an effective strategy to overcome such obstacles, whether they are external distractions, such as a television show (Wieber, von Suchodoletz, Heikamp, Trommsdorff, & Gollwitzer, 2011), or internal, such as doubts regarding one's future performance potential (Bayer & Gollwitzer, 2007; Thürmer, McCrea, & Gollwitzer, 2013).

Wieber et al. (2011) examined the effectiveness of using implementation intentions to remain focused on a primary task and avoid becoming consumed by appealing distractions. Children were asked to use a computer to categorize various images of animals and vehicles under two different distraction situations. In the first situation, distracting stimuli that varied in its attractiveness would appear directly in front of the children on the computer screen above the images they were tasked with classifying. In the second situation, a highly attractive animated movie played just to the left of the child, requiring that he or she turn away from the task

at hand to view the movie. In the first scenario, an inverse relationship was found between the attractiveness of the distracting stimuli and the children's classification performance. However, for the children who had formed an implementation intention ("If there is a distraction, then I will ignore it!"), this inverse relationship disappeared as they were able to maintain high performance despite the attractiveness of the distraction. In the second scenario, in which an entertaining movie was constantly playing in the background, there was no difference between children with and without implementation intentions regarding how many times a child glanced at the movie screen. However, children who formed implementation intentions spent significantly less time looking overall, which resulted in better performance on the categorization task.

Thürmer et al. (2013) demonstrated that implementation intentions can also be used to curb self-handicapping. When the costs of failing at a given task are high, we can become distracted from the task itself and, instead, preoccupied with defending our sense of self-worth. This particular form of distraction often results in self-handicapping behaviors, by which we purposefully create obstacles to our future success (e.g., failing to study for an upcoming exam) as a way of protecting the self. Thürmer et al. (2013, Study 2) found that participants who formed implementation intentions ("And when I start with the test section of the task, then I will ignore my worries and tell myself: I can do it!") prior to a task ostensibly meant to assess intelligence and predict long-term career success chose to use their free time to better prepare for the upcoming task, in contrast to those who did not form such implementation intentions. Using a similar implementation intention also geared toward fostering self-efficacy, Bayer and Gollwitzer (2007) were able to even improve the performance on the Raven Intelligence Test in female high school students.

Planning to Overcome Obstacles to Group Performance

The previously discussed studies have all focused on individual action control and its shortcomings. We now point out that groups can fall victim to similar action control shortcomings and that these problems can be overcome by utilizing collective, group-based implementation intentions. An immediate question might be: Why should group implementation intentions be necessary if each group member could be given an individual implementation intention directed at the same aim?

The answer to this question is addressed in recent work by Thürmer, Wieber, and Gollwitzer (2017). They used triadic groups tasked with collectively holding up a heavy medicine ball for as long as possible. Groups were randomly assigned to form individual implementation intentions ("And if my muscles hurt, then I will ignore the pain and tell myself: I can do it!"), collective implementation intentions ("And if our muscles hurt, then we will ignore the pain and tell ourselves: We can do it!"), or an individual or collective control condition that received the same information without the if-then format ("We (I) will ignore our (my) muscle pain and tell ourselves (myself): We (I) can do it!"). Performance was measured as decrease in persistence compared with a baseline measure. Groups who formed implementation intentions performed significantly better than those who did not form implementation intentions, and groups who made collective plans performed better than those

who made individual if-then plans. Moreover, collective implementation intentions appeared to foster more intensive group interaction and communication than individual implementation intentions. Thürmer et al. (2017) went on to show that when open communication is allowed within a group, collective implementation intentions are more effective than individual implementation intentions; however, when group communication is impeded, individual implementation intentions produce better performance outcomes. Therefore, whether collective or individual if-then plans are most beneficial will depend on the group context.

Just like individuals, groups have a tendency to fall prey to the sunk-cost fallacy and escalate commitment to failing courses of action. Wieber, Thürmer, and Gollwitzer (2015) were interested in whether implementation intentions, which had been shown to reduce escalating commitment in individuals, could prevent groups from making ill-advised investments. Participants were grouped into triads and asked to simulate a city council committee tasked with overseeing the funding of a local project. In three stages, the triad was asked to invest more of the city's budget into the project (despite the fact that the costs began to outweigh the benefits as time went on). Participants were told that the money that was not invested in the project would go toward other important city costs (such as hospital and school maintenance). Whereas control condition participants continued to invest large proportions of their city budget into the failing project, those in the collective implementation intentions condition ("If we are about to make an investment decision, then we will judge the project as neutral observers who are not responsible for earlier decisions!") invested significantly less money during the second and third stages. This implementation intention apparently empowered the groups to distance themselves from the initial investment, thus curtailing future investments.

A benefit to group decision making is that groups can make better informed decisions than any single individual by pooling the knowledge of all group members together—but group members often fail to capitalize on this advantage. Thürmer, Wieber, and Gollwitzer (2015) explored whether collective implementation intentions could overcome this common group oversight. Participants were again placed into triads tasked with making the optimal choice among multiple fictitious job applicants. Prior to any group discussion, individual participants were given limited information that would lead to a suboptimal candidate choice. The truly optimal candidate would only become apparent after considering all of the collective group knowledge. Groups that made a collective implementation intention to consider all of the available information prior to making their final choice detected the ideal applicant more frequently than groups that did not form this collective implementation intention (despite having access to all of the collective information).

Future Planning and Affect Regulation

Implementation intentions' self-regulatory benefits for action control extend into emotion regulation (summaries by Sheeran, Webb, Gollwitzer, & Oettingen, in press; Webb, Schweiger Gallo, Miles, Gollwitzer, & Sheeran, 2012). Implementation intentions allow people to take control of their affect in one of two ways: via either a direct or indirect path. In the direct path, implementation intentions focus on down- or up-regulating an anticipated critical emotion (e.g., reducing anticipated

disgust or enhancing prospective happiness): “If I feel disgust (joy), then I will tell myself: Stay calm! (Enjoy your happiness!).” In the indirect path, implementation intentions are used to prevent the elicitation of the critical emotion: “If somebody utters a stinging (nice) comment then I tell myself: He didn’t mean it that way!” For this purpose, one can also make an if-then plan to ignore the comment altogether. In the following, we discuss a number of studies that used different kinds of implementation intentions to control future emotions.

Planning to Regulate Disgust

In general, upsetting stimuli are associated with negative valence and high arousal, whereas pleasant stimuli are associated with moderate arousal but positive valence (e.g., Lang, Bradley, & Cuthbert, 1999). Thus it is the combination of the negative valence and high arousal that can make a stimulus unpleasant; if either of these components were to be reduced, the stimulus should not be as upsetting. Using disgusting objects as stimuli, Schweiger Gallo, McCulloch, and Gollwitzer (2012) targeted each of these components in isolation using either indirect implementation intentions (“And if I see blood, then I will take the perspective of a physician!”) to reduce negative valence without altering arousal or direct implementation intentions (“And if I see blood, then I will stay calm and relaxed!”) to reduce arousal without changing valence. Participants were exposed to a series of images consisting of equal proportions of positive, neutral, and disgusting pictures and asked to provide valence and arousal ratings for each image. As predicted, in comparison with control participants, the ratings of disgusting images made by participants who had formed indirect implementation intentions showed significantly reduced negative valence ratings with no difference regarding arousal. When the direct implementation intentions had been formed, participants showed decreased arousal to disgusting images in comparison with control participants but showed no difference in their valence ratings. These results emphasize the precision with which implementation intentions can be used to regulate anticipated affect. In line with this finding, Schweiger Gallo et al. (2009) observed that regulating disgust with implementation intentions did not come at an emotional cost to the experience of other emotions. The disgust-regulating implementation intentions did not create an overall flat affect in participants; rather, participants were still able to fully enjoy the positive affect associated with the pleasant images.

Further evidence for the precision with which implementation intentions can operate is presented in a recent study focusing on the emotion of *grima* (Schweiger Gallo, Fernández-Dols, Gollwitzer, & Keil, 2017). *Grima*, a Spanish word with no perfectly corresponding word in English, refers to the unpleasant feelings associated with distressingly high-pitched, squeaky sounds, such as hearing somebody’s fingernails scratch a chalkboard. Schweiger Gallo et al. (2017) found that although *grima* is most similar to feelings of disgust (*asco* in Spanish), it does possess unique characteristics, such as being specifically elicited by auditory stimuli and varying in certain physiological responses (e.g., differential changes in heart rate). To test whether implementation intentions would allow discerning regulation of such similar negative emotions as *grima* and *asco*, Schweiger Gallo et al. (2017) had participants (native Spanish speakers) listen to pleasant and unpleasant stimuli

(which included sounds uniquely associated with *grima* or *asco*) and asked them to rate associated valence and arousal. Prior to this listening task, some participants formed a *grima*-specific implementation intention (“And if I hear a *grima*-eliciting sound, then I will ignore it!”). Participants with this implementation intention geared toward down-regulating *grima* were able to successfully weaken the *grima*, but not the disgust, experience. In other words, the effect of the implementation intentions held true for the *grima*-eliciting sounds only, not for disgust-related sounds.

Planning to Regulate Anxiety

In a number of studies, implementation intentions have also been shown to successfully reduce anxiety (e.g., Parks-Stamm, Gollwitzer, & Oettingen, 2010; Schweiger Gallo et al., 2009; Stern, Cole, Gollwitzer, Oettingen, & Balcetis, 2013). As we have already discussed the studies by Schweiger Gallo et al. (2009) with participants with arachnophobia, we focus here on sports performance anxiety and text anxiety, utilizing different types of implementation intentions.

Stern et al. (2013) looked at regulating anxiety for a golf-putting task (Study 1) and a dart-throwing task (Study 2). In order to induce anxiety, participants’ performances were filmed, ostensibly for experts to analyze and critique. However, before engaging in the respective tasks, participants were asked to generate their own personalized implementation intentions. Given that people respond differently under pressure, this guaranteed that participants were able to target personally relevant anxiety-related affective states (e.g., “If I feel irritated, then I will tell myself to relax”). In comparison to participants who did not form an implementation intention to regulate their anxiety (adjusting for individual differences in previous experience), those who did were significantly less anxious (as measured by objective coders blind to conditions) and perceived their targets to be closer (i.e., less difficult). As a result, participants in the implementation intentions condition performed significantly better than those whose anxiety went unregulated.

Although the varying types of implementation intentions discussed thus far appear to work equally well, it is important to point out that not all forms of implementation intentions can be expected to effectively control one’s affective responses. Before having participants complete a math test designed to tax working memory while being distracted by entertaining commercials on the same screen, Parks-Stamm et al. (2010) had participants complete a scale of general test anxiety. Next, participants formed either the implementation intentions of “If I hear or see the commercials, then I will ignore them!” or “If I hear or see the commercials, then I will increase my efforts on the math task!” Although the type of implementation intention did not matter for those with low test anxiety, for those who were highly anxious about exams, the implementation intention focusing on increasing effort on the task diminished their performance. Apparently, forming implementation intentions that are geared toward increasing one’s efforts is counterproductive for individuals who are already shaken by high test anxiety. Similarly, Gollwitzer and Schaal (1998) observed that highly motivated individuals experienced reduced performance when using an effort-focused implementation intention to overcome disruptive stimuli.

Planning to Regulate Counterproductive Positive Emotions

The previous sections focused on down-regulating unpleasant emotions such as anxiety and disgust; however, it can sometimes be necessary to down-regulate positive emotions to achieve one's goals. Although positive moods are generally thought to be desirable and beneficial, positive moods can also make us more susceptible to reliance on heuristics and stereotypes (e.g., Beukeboom & Semin, 2005). Thus a positive mood can be a barrier to one's good intentions to judge other people in an accurate, nonstereotypical way. Bayer, Gollwitzer, and Achtziger (2010), capitalizing on the known regulatory benefits of implementation intentions, investigated whether implementation intentions could be used to prevent enhanced stereotypical judgments during positive affective states. Participants watched either a film clip of stand-up comedy (to induce a positive mood) or a documentary (to induce a neutral mood) prior to judging two women in hand-painted sketches. Participants were asked to choose from different statements describing the women in the sketches and were provided with multiple-choice answers, with one gender-stereotypical choice for each image. Some participants also formed an implementation intention designed to prevent the consequential effects of a positive mood ("Whenever I analyze a given person, then I will ignore her gender!"). Participants with a positive mood induction chose less stereotypical descriptions when they had formed this implementation intention—actually as few as participants without a positive mood. In contrast, when no such implementation intention had been formed, participants with a positive mood induction showed the common effect that positive mood enhances stereotyping.

Anger can be looked at as a positive emotion when it comes to asserting oneself. For example, romantic relationships benefit when a partner does not hide but discloses his or her anger (Baumeister, Stillwell, & Wotman, 1990), and in the business domain it has been found that conveyed anger during negotiations often leads opponents to yield (van Kleef, Dreu, & Manstead, 2004). However, when engaged in ultimatum bargaining in which one party has the power to propose how a lump of money sitting on the table is to be shared, anger over unfair offers (i.e., the proposer taking an unequally large share of the money) commonly leads the receiver to reject the proposed offer, ending up with even less money (Güth, Schmittberger, & Schwarze, 1982). From an economic perspective, this is a foolish retort, given that getting something is always better than getting less (or even nothing at all). Kirk, Gollwitzer, and Carnevale (2011) used an ultimatum game task paradigm to study the regulation of anger by implementation intentions. Participants had to play the role of the receiver, and it was explained that if the proposed offer was rejected, then the proposer and the receiver would only receive a minor part of the offer the proposer had made. Before receiving a series of unfair offers, some participants formed the implementation intentions of either "If I feel any negative emotions, then I will tell myself: Stay calm!" or "If I receive an offer, then I will tell myself: This is an opportunity to make money!" There were no significant differences found between the two types of implementation intentions, but the acceptance rate of unfair offers was higher in receivers who had formed either of the two implementation intentions in comparison with those who did not.

Future Planning and the Regulation of Cognition

Dual-process models of thinking segment cognitive processing into two separate modes of thought: reflective and impulsive (e.g., Strack & Deutsch, 2004). Reflective processes are more effortful, requiring slow, deliberate, and conscious consideration, whereas impulsive processes require less cognitive effort and are quick, automatic, and often operate outside of awareness via previously formed cognitive associations. Implementation intentions are uniquely situated within dual-process models in that people can use them to strategically plan ahead of time whether they want to be guided by a reflective or reflexive thought process when they enter a critical prospective situation (Martiny-Huenger, Bieleke, Oettingen, & Gollwitzer, 2016). In the following, we present studies demonstrating this, and show that implementation intentions can be used to control not only the thinking process but also the content of thoughts.

Planning to Change One's Mode of Thought

In the research by Henderson et al. (2007), reported earlier, on people's readiness to switch between strategies (means) of performing a given task, a further implementation intention was used that read like this: "If I receive disappointing feedback, then I'll think about how things have been going with my strategy!" For participants who had formed this reflection implementation intention, it was found that the decision to switch one's strategy for performing the task at hand reflected not just the failure feedback that was received regarding the first set of items but also whether there was any improvement (positive feedback) or not in performing the second set of items.

Encouraged by this finding suggesting that if-then plans can help people to engage in reflection, Doerflinger, Martiny-Huenger, and Gollwitzer (2017; Study 1) explored the effectiveness of using implementation intentions to facilitate a reflective thinking process when making decisions about ongoing investments. In a first experiment, given the hypothetical role of a chief financial officer, participants had to decide which of two departments within the company should receive a large sum of money as an initial investment. Next, participants were told that 5 years later, their chosen department was either thriving and profitable or not. Participants were then provided a second sum of money to be divided up between the two departments as they wished. It turned out that only participants who received negative feedback and were equipped with an implementation intention to deliberate before making a reinvestment decision ("If the situation looks unfavorable, then I will deliberate thoroughly!") invested significantly less money to the department that was initially chosen. Those in the negative feedback condition who did not make the deliberation plan made reinvestment decisions similar to those in the positive feedback condition—behaving as if their initially chosen department were thriving instead of failing. In two follow-up experiments, using a poker game in which participants could earn actual cash, a reflective implementation intention was tested against an impulsive implementation intention ("If the situation looks unfavorable, then I will decide quickly and spontaneously!"). There was a significant main effect of perceived probability. The more likely it looked that one had

a losing hand, the higher the odds were that participants would fold and end the round instead of increasing their investment; importantly, however, this relationship was stronger for those who formed a reflective rather than an impulsive implementation intention.

Like Kirk et al. (2011), Bieleke, Gollwitzer, Oettingen, and Fischbacher (2017) also sought to help individuals profit from any financial opportunity, even one below their ideal marker of fairness. Using an ultimatum task paradigm, participants received 10 ultimatum offers that varied in equitability. Participants were given either a reflection-focused implementation intention (“If I start acting in a hasty way, then I will tell myself: Use your brain!”) or an impulsivity-focused one (“If I start pondering at length, then I will tell myself: Listen to your guts!”). Participants of the two implementation intention conditions significantly differed in their response times to unfair offers, with participants with the reflection-focused plan taking more time before making a decision. Moreover, those who formed reflection-focused implementation intentions were more likely to accept the unfair offers, that is, to opt for making more profitable decisions.

Planning to Change Future Thought Content

Although reasoning outcomes can be improved by implementing a more reflective thought process (as seen in the preceding section), this may not always be possible, as reasoning sometimes runs off too quickly for reflection to get in between. In these situations, however, people still have the option of “programming” the content of their thoughts ahead of time.

Although racial bias, such as believing that minorities are more violent and dangerous, can be overcome with deliberate thought, engaging in effortful reflection is not always possible, and there can be disastrous consequences when split-second decisions are called for. There are frequent examples of the cost of split-second decisions in the form of headlines regarding lethal force used by police officers in which the victim is significantly more likely to be black or Hispanic than white (Buehler, 2017). Provided that these split-second decisions happen in the realm of impulsive, automatic processing that is hard to moderate (Strack & Deutsch, 2004), there is the question of whether content-focused implementation intentions qualify as an alternative. Luckily, research by Mendoza, Gollwitzer, and Amodio (2010) provides a positive answer. They hypothesized that racial disparity in the use of deadly force is reduced if the shooter is able to remove racial content (which is irrelevant to the decision of whether or not force should be used) from his or her thoughts. To test this hypothesis, Mendoza et al. (2010) had participants engage in a shooter task in which they were shown images of black and white males holding either a weapon object (e.g., a gun) or a nonweapon object (e.g., a cell phone) with the instruction to quickly shoot any armed targets. To ensure that decisions were made so quickly that deliberate thinking could not take place, participants received an error message if they slowed down their responses. Results replicated previous findings indicating an overall racial bias in shooter tasks (Correll et al., 2007). There were, however, significantly fewer shooting errors made overall, and particularly in trials with unarmed and black targets, by participants who had made if-then plans (“If I see a person, then I will ignore his race!” and “If I see a person with a gun, then I

will shoot! If I see a person with an object, then I will not shoot!") compared with control participants without such plans.

Another kind of automatic, cognitive bias that people often fall prey to is that of social projection, whereby we assume that other people hold similar beliefs and attitudes to our own (e.g., "I like sushi; so other people must like sushi, too"). Although such projection can have its benefits, such as increased feelings of closeness (Robbins & Krueger, 2005), it can also have costs (e.g., when projecting that the majority of people smoke cigarettes hinders behavior change). Given the fact that social projection can have positive as well as negative consequences, A. Gollwitzer, Schwörer, Stern, Gollwitzer, and Bargh (2017) explored whether implementation intentions could be used for both intensifying and reducing social projection. They found that implementation intentions could successfully up-regulate ("If I'm asked to estimate what percentage of people agree with me, then I will remember that other people are similar!") as well as down-regulate ("If I'm asked to estimate what percentage of other people agree with me, then I will remember that other people are different!") this cognitive bias.

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 are still a host of research questions that need to be addressed.

Potential Moderators

Moderators of if-then plan effects on goal attainment have been targeted so far 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.

Features of If-Then Plans

Only if-then plans to which people feel highly committed can be expected to guide people's actions (Achtziger et al., 2012). The person with an if-then plan that carries high commitment no longer feels 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 autopilot—the planned action will be triggered directly by the specified situational cue.

Implementation intentions may, however, differ in their format. For instance, when it comes to shielding an ongoing goal pursuit from internal and external disruptions, a variety of 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 "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 the present 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!”). Research by Adriaanse, van Oosten, de Ridder, de Wit, and Evers (2011) suggests that negation implementation intentions are less effective than the latter two types (i.e., replacement and ignoring if-then plans). One can also form implementation intentions geared toward stabilizing the ongoing focal goal pursuit at hand. For instance, “If the first part of my paper is finished, then I’ll immediately turn to the second part!” Bayer et al. (2010) demonstrated the effectiveness of such if-then plans 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 moods, and ego depletion. Recent research shows 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) by specifying the disruptive stimulus in the “if” part and a reminder of the goal at hand in the “then” part: “. . . then I will remind myself that my paper has a deadline that I want to meet!”

When forming implementation intentions, strong associative links between the critical situation and the goal-directed response have to be created. This is achieved most easily when implementation intentions use an if-then format. Simply specifying the when, where, and how of goal striving is a suboptimal way of creating strong associative links. Chapman, Armitage, and Norman (2009) observed that, for the goal to increase fruit and vegetable intake, inducing implementation intentions using an if-then format had a greater impact than stimulating implementation intentions by asking research participants to list 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 a way so that it is readily detected when it is actually encountered. Even though concrete specifications may appear to 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, Gollwitzer, & Sheeran, 2008) knows exactly what is implied and will thus easily identify 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 the person feels capable of executing in the critical situation (i.e., for which self-efficacy is high; Wieber, Odenhal, & Gollwitzer, 2010).

Features of the Planning Person

Various relevant personality attributes have been discussed (Gollwitzer, 2014). 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. 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 be reduced in highly impulsive individuals. For individuals high in urgency, it was found that implementation intentions fail to promote goal attainment when the situational context is emotionally charged. Making if-then plans and acting on them is heightened, however, in individuals high in conscientiousness and those with a propensity to manage their time and money effectively.

Features of the Targeted Goal

Many studies report that participants who form implementation intentions perform better than participants who only form goal intentions, in particular when the goals at hand are difficult rather than easy (Gollwitzer & Sheeran, 2006). In addition, having a strong goal commitment in place is a prerequisite for the positive effects of implementation intentions on goal attainment. Sheeran, Webb, and Gollwitzer (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) showing 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).

Features of the Context

One important contextual feature is the emotional state of the person when forming if-then plans and when enacting them. Anger is an emotional state with positive effects on plan formation and enactment (Maglio, Gollwitzer, & Oettingen, 2014). It creates a strong sense of control that facilitates both the making of firm plans and the decisive acting on them. Another relevant 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 enhanced open-mindedness. As implementation intentions affect behavior by automatic bottom-up action control, deliberative mindsets undermine this type of action control—eliminating the common beneficial effects that implementation intentions have on goal attainment (Wieber, Sezer, & Gollwitzer, 2014).

Considering All of These Moderators at Once

In sum, many factors have been found to enhance or weaken action control by implementation intentions. Most 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, as 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 (ECR), 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. 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 undermine the positive effects of implementation intentions on physical activity.

Such a comprehensive approach is also called for when it comes to sticking two different types of self-regulation strategies together to create a powerful behavior-change intervention. For instance, having mental contrasting precede the formation of implementation intentions makes great sense, as it puts the prerequisites for if-then plan effects into place. Mental contrasting (Oettingen, 2000, 2012; Oettingen et al., 2001) implies juxtaposing fantasies about desired future outcomes with obstacles of present reality. This strategy not only creates strong goal commitments and vigorous goal striving in individuals with high expectations of success but also guarantees the identification of personally relevant obstacles that can then be specified as the critical cues in the “if” component of implementation intentions. Moreover, it helps to identify instrumental responses to be specified in the “then” component. Finally, mental contrasting has been found to create a readiness for making plans that link obstacles to instrumental goal-directed responses (Kappes, Singmann, & Oettingen, 2012). As implementation intentions are known to unfold their beneficial effects when the commitment to both the goal and the respective implementation intention is high, mental contrasting guarantees that these prerequisites are in place.

However, sticking two self-regulatory behavior change tools together may not always be beneficial. Various studies 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, as it reduces self-defensiveness and thus encourages making binding if-then plans. If the information is nonthreatening, however, a self-affirmation exercise may not be helpful, as it may curb the perceived necessity to make goal-promoting if-then plans; one feels already pretty good about oneself and one’s goal striving does not seem to need a boost.

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) report that when participants were assigned a task goal in the lab, making an if-then plan hindered participants’ ability to capitalize on a presented alternative opportunity for achieving the goal. 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. Therefore, from a goal-attainment perspective, speaking of costs only makes sense when a better opportunity is not seized. So the question arises 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 unexpectedly arising better opportunities (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 equivalent, instrumentality.

Moreover, as discussed above, implementation intentions respect the strength of the superordinate goal and its state of activation. This means that people can be expected to sensitively adjust their goal striving 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. Recent research also shows that if-then-guided goal striving is quite sensitive to failure feedback (Gollwitzer et al., 2008; Legrand, Bieleke, Gollwitzer, & Mignon, 2017). The feedback only needs to be articulate and severe so that the person acting on an if-then plan respects it. Still, future research might want to investigate how if-then plans can be worded in a way so that rigidity is kept at a minimum. One route we can imagine to be effective is using "if" and "then" specifications that are rather inclusive (e.g., "If I get anxious, then I will tell myself: Be confident!"), covering many different critical situations and many instrumental responses.

CONCLUSION

B. F. Skinner proposed in 1971 that in order to change behavior, the environment must be structured in such a way as to reward desirable behaviors. This implies that who we are and what we do is purely the result of the situations we find ourselves in. However, given the limited control we have on the world around us, Skinner's perspective paints quite a bleak outlook for anyone looking to change his or her behavior in the future. But as we have discussed in the present chapter, implementation intentions allow us to commandeer prospective situations to our personal benefit by linking them to desired, goal-directed responses.

REFERENCES

- Aarts, H., Dijksterhuis, A., & Midden, C. (1999). To plan or not to plan?: Goal achievement or interrupting the performance of mundane behaviors. *European Journal of Social Psychology, 29*, 971-979.
- Achtziger, A., Bayer, U. C., & Gollwitzer, P. M. (2012). Committing to implementation

- intentions: Attention and memory effects for selected situational cues. *Motivation and Emotion*, *36*, 287–303.
- Achtziger, A., Gollwitzer, P. M., & Sheeran, P. (2008). Implementation intentions and shielding goal striving from unwanted thoughts and feelings. *Personality and Social Psychology Bulletin*, *34*, 381–393.
- Adriaanse, M. A., Gollwitzer, P. M., de Ridder, D. T. D., de Wit, J. B. F., & Kroese, F. M. (2011). Breaking habits with implementation intentions: A test of underlying processes. *Personality and Social Psychology Bulletin*, *37*, 502–513.
- Adriaanse, M. A., van Oosten, J. M., de Ridder, D. T., de Wit, J. B., & Evers, C. (2011). Planning what not to eat: Ironic effects of implementation intentions negating unhealthy habits. *Personality and Social Psychology Bulletin*, *37*, 69–81.
- Adriaanse, M. A., Vinkers, C. D. W., de Ridder, D. T. D., Hox, J. J., & de Wit, J. B. F. (2011). Do implementation intentions help to eat a healthy diet?: A systematic review and meta-analysis of the empirical evidence. *Appetite*, *56*, 183–193.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*, 179–211.
- Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior*. Englewood Cliffs, NJ: Prentice-Hall.
- Arkes, H. R., & Blumer, C. (1985). The psychology of sunk cost. *Organizational Behavior and Human Decision Processes*, *35*, 124–140.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, *84*, 191–215.
- Bargh, J. A. (Ed.). (2013). *Social psychology and the unconscious: The automaticity of higher mental processes*. New York: Psychology Press.
- Baumeister, R. F., Stillwell, A., & Wotman, S. R. (1990). Victim and perpetrator accounts of interpersonal conflict: Autobiographical narratives about anger. *Journal of Personality and Social Psychology*, *59*, 994–1005.
- Bayer, U. C., Achtziger, A., Gollwitzer, P. M., & Moskowitz, G. (2009). Responding to subliminal cues: Do if-then plans cause action preparation and initiation without conscious intent? *Social Cognition*, *27*, 183–201.
- Bayer, U. C., & Gollwitzer, P. M. (2007). Boosting scholastic test scores by willpower: The role of implementation intentions. *Self and Identity*, *6*, 1–19.
- Bayer, U. C., Gollwitzer, P. M., & Achtziger, A. (2010). Staying on track: Planned goal striving is protected from disruptive internal states. *Journal of Experimental Social Psychology*, *146*, 505–514.
- Belanger-Gravel, A., Godin, G., & Amireault, S. (2013). A meta-analytic review of the effect of implementation intentions on physical activity. *Health Psychology Review*, *7*, 23–54.
- Beukeboom, C. J., & Semin, G. R. (2005). Mood and representations of behaviour: The how and why. *Cognition and Emotion*, *19*, 1242–1251.
- Bieleke, M., Gollwitzer, P. M., Oettingen, G., & Fischbacher, U. (2017). Social value orientation moderates the effects of intuition versus reflection on responses to unfair ultimatum offers. *Journal of Behavioral Decision Making*, *30*, 569–581.
- Bobocel, D. R., & Meyer, J. P. (1994). Escalating commitment to a failing course of action: Separating the roles of choice and justification. *Journal of Applied Psychology*, *79*, 360–363.
- Brandstätter, V., Lengfelder, A., & Gollwitzer, P. M. (2001). Implementation intentions and efficient action initiation. *Journal of Personality and Social Psychology*, *81*, 946–960.
- Buehler, J. W. (2017). Racial/ethnic disparities in the use of lethal force by US police, 2010–2014. *American Journal of Public Health*, *107*, 295–297.
- Burgess, P. W., Dumontheil, I., & Gilbert, S. J. (2007). The gateway hypothesis of rostral PFC (Area 10) function. *Trends in Cognitive Sciences*, *11*, 290–298.

- Chapman, J., Armitage, C. J., & Norman, P. (2009). Comparing implementation intention interventions in relation to young adults' intake of fruit and vegetables. *Psychology and Health, 24*, 317-332.
- Chartrand, T. L., & Lakin, J. L. (2013). The antecedents and consequences of human behavioral mimicry. *Annual Review of Psychology, 64*, 285-308.
- Chen, X. J., Wang, Y., Liu, L. L., Cui, J. F., Gan, M. Y., Shum, D. H., & Chan, R. C. (2015). The effect of implementation intention on prospective memory: A systematic and meta-analytic review. *Psychiatry Research, 226*, 14-22.
- Cohen, A.-L., Bayer, U. C., Jaudas, A., & Gollwitzer, P. M. (2008). Self-regulatory strategy and executive control: Implementation intentions modulate task switching and Simon task performance. *Psychological Research, 72*, 12-26.
- Correll, J., Park, B., Judd, C. M., Wittenbrink, B., Sadler, M. S., & Keesee, T. (2007). Across the thin blue line: Police officers and racial bias in the decision to shoot. *Journal of Personality and Social Psychology, 92*, 1006-1023.
- Doerflinger, J., Martiny-Huenger, T., & Gollwitzer, P. M. (2017). Planning to deliberate thoroughly: If-then planned deliberation increases the adjustment of decisions to newly available information. *Journal of Experimental Social Psychology, 69*, 1-12.
- Dweck, C. S., & Leggett, E. L. (1988). A social-cognitive approach to motivation and personality. *Psychological Review, 95*, 256-273.
- Ferrer, R. A., Shmueli, D., Bergman, H. E., Harris, P. R., & Klein, W. M. P. (2012). Effects of self-affirmation on implementation intentions and the moderating role of affect. *Social Psychological and Personality Science, 3*, 300-307.
- Gawrilow, C., & Gollwitzer, P. M. (2008). Implementation intentions facilitate response inhibition in children with ADHD. *Cognitive Therapy and Research, 32*, 261-280.
- Gawrilow, C., Gollwitzer, P. M., & Oettingen, G. (2011a). If-then plans benefit delay of gratification performance in children with and without ADHD. *Cognitive Therapy and Research, 35*, 442-455.
- Gawrilow, C., Gollwitzer, P. M., & Oettingen, G. (2011b). If-then plans benefit executive functions in children with ADHD. *Journal of Social and Clinical Psychology, 30*, 616-646.
- Gilbert, S. J., Gollwitzer, P. M., Cohen, A.-L., Oettingen, G., & Burgess, P. W. (2009). Separable brain systems supporting cued versus self-initiated realization of delayed intentions. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 35*, 905-915.
- Gollwitzer, A., Schwörer, B., Stern, C., Gollwitzer, P. M., & Bargh, J. A. (2017). Down and up regulation of a highly automatic process: Implementation intentions can both decrease and increase social projection. *Journal of Experimental Social Psychology, 70*, 19-26.
- Gollwitzer, P. M. (1990). Action phases and mind-sets. In E. T. Higgins & R. M. Sorrentino (Eds.), *The handbook of motivation and cognition: Foundations of social behavior* (Vol. 2, pp. 53-92). New York: Guilford Press.
- Gollwitzer, P. M. (1993). Goal achievement: The role of intentions. *European Review of Social Psychology, 4*, 141-185.
- Gollwitzer, P. M. (1999). Implementation intentions: Strong effects of simple plans. *American Psychologist, 54*, 493-503.
- Gollwitzer, P. M. (2012). Mindset theory of action phases. In P. Van Lange, A. W. Kruglanski, & E. T. Higgins (Eds.), *Handbook of theories of social psychology* (Vol. 1, pp. 526-545). London: SAGE.
- Gollwitzer, P. M. (2014). Weakness of the will: Is a quick fix possible? *Motivation and Emotion, 38*, 305-322.
- Gollwitzer, P. M., & Brandstätter, V. (1997). Implementation intentions and effective goal striving. *Journal of Personality and Social Psychology, 73*, 186-199.
- Gollwitzer, P. M., & Kirchhof, O. (1998). The willful pursuit of identity. In J. Heckhausen &

- C. S. Dweck (Eds.), *Motivation and self-regulation across the life span* (pp. 389–423). Cambridge, UK: Cambridge University Press.
- Gollwitzer, P. M., Parks-Stamm, E. J., Jaudas, A., & Sheeran, P. (2008). Flexible tenacity in goal pursuit. In J. Shah & W. Gardner (Eds.), *Handbook of motivation science* (pp. 325–341). New York: Guilford Press.
- Gollwitzer, P. M., & Schaal, B. (1998). Metacognition in action: The importance of implementation intentions. *Personality and Social Psychology Review*, *2*, 124–136.
- Gollwitzer, P. M., & Sheeran, P. (2006). Implementation intentions and goal achievement: A meta-analysis of effects and processes. *Advances in Experimental Social Psychology*, *38*, 69–119.
- Gollwitzer, P. M., Sheeran, P., Trötschel, R., & Webb, T. (2011). Self-regulation of behavioral priming effects. *Psychological Science*, *22*, 901–907.
- Güth, W., Schmittberger, R., & Schwarze, B. (1982). An experimental analysis of ultimatum bargaining. *Journal of Economic Behavior and Organization*, *3*, 367–388.
- Hagger, M. S., Chatzisarantis, N. L. D., & Harris, J. (2006). From psychological need satisfaction to intentional behavior: Testing a motivational sequence in two behavioral contexts. *Personality and Social Psychology Bulletin*, *32*, 131–148.
- Hall, P. A., Zehr, C. E., Ng, M., & Zanna, M. P. (2012). Implementation intentions for physical activity in supportive and unsupportive environmental conditions: An experimental examination of intention-behavior consistency. *Journal of Experimental Social Psychology*, *48*, 432–436.
- Hall, P. A., Zehr, C., Paultzki, J., & Rhodes, R. (2014). Implementation intentions for physical activity behavior in older adult women: An examination of executive function as a moderator of treatment effects. *Annals of Behavioral Medicine*, *48*, 130–136.
- Harris, P. A., Brearley, I., Sheeran, P., Barker, M., Klein, W. M. P., Creswell, J. D., . . . Bond, R. (2014). Combining self-affirmation with implementation intentions to promote fruit and vegetable consumption. *Health Psychology*, *33*, 729–736.
- Henderson, M. D., Gollwitzer, P. M., & Oettingen, G. (2007). Implementation intentions and disengagement from a failing course of action. *Journal of Behavioral Decision Making*, *20*, 81–102.
- Higgins, E. T. (1997). Beyond pleasure and pain. *American Psychologist*, *52*, 1280–1300.
- Janczyk, M., Dambacher, M., Bieleke, M., & Gollwitzer, P. M. (2015). The benefit of no choice: Goal-directed plans enhance perceptual processing. *Psychological Research*, *79*, 206–220.
- Jessop, D. C., Sparks, P., Buckland, N., Harris, P. R., & Churchill, S. (2014). Combining self-affirmation and implementation intentions: Evidence of detrimental effects on behavioral outcomes. *Annals of Behavioral Medicine*, *47*, 137–147.
- Kappes, A., Singmann, H., & Oettingen, G. (2012). Mental contrasting instigates goal pursuit by linking obstacles of reality with instrumental behavior. *Journal of Experimental Social Psychology*, *48*, 811–818.
- Kirk, D., Gollwitzer, P. M., & Carnevale, P. J. (2011). Self-regulation in ultimatum bargaining: Goals and plans help accepting unfair but profitable offers. *Social Cognition*, *29*, 528–546.
- Koestner, R., Lekes, N., Powers, T. A., & Chicoine, E. (2002). Attaining personal goals: Self-concordance plus implementation intentions equals success. *Journal of Personality and Social Psychology*, *83*, 231–244.
- Kroese, F. M., Adriaanse, M. A., Evers, C., & De Ridder, D. T. D. (2011). “Instant success”: Turning temptations into cues for goal-directed behavior. *Personality and Social Psychology Bulletin*, *37*, 1389–1397.
- Lang, P. J., Bradley, M. M., & Cuthbert, B. N. (1999). *International Affective Picture System*

- (IAPS): *Technical manual and affective ratings* (Tech. Rep. No. A-4). Gainesville: University of Florida, Center for Research in Psychophysiology.
- Legrand, E., Bieleke, M., Gollwitzer, P. M., & Mignon, A. (2017). Nothing will stop me?: Flexibly tenacious goal striving with implementation intentions. *Motivation Science, 3*, 101-118.
- Lengfelder, A., & Gollwitzer, P. M. (2001). Reflective and reflexive action control in frontal lobe patients. *Neuropsychology, 15*, 80-100.
- Lewin, K. (1926). *Vorsatz, Wille und Bedürfnis* [Intention, will, and need]. Berlin, Germany: Springer.
- Locke, A. E., & Latham, G. (Eds.). (2013). *New developments in goal setting and task performance*. New York: Routledge.
- Maglio, S. J., Gollwitzer, P. M., & Oettingen, G. (2014). Emotion and control in the planning of goals. *Motivation and Emotion, 38*, 620-634.
- Martiny-Huenger, T., Bieleke, M., Oettingen, G., & Gollwitzer, P. M. (2016). From thought to automatic action: Strategic and incidental action control by if-then planning. In R. Deutsch, B. Gawronski, & W. Hofmann (Eds.), *Reflective and impulsive determinants of behavior* (pp. 69-84). New York: Psychology Press.
- Masicampo, E. J., & Baumeister, R. F. (2012). Committed but close-minded: When making a specific plan for a goal hinders success. *Social Cognition, 30*, 37-55.
- Mendoza, S. A., Gollwitzer, P. M., & Amodio, D. M. (2010). Reducing the expression of implicit stereotypes: Reflexive control through implementation intentions. *Personality and Social Psychology Bulletin, 36*, 512-523.
- Oettingen, G. (2000). Expectancy effects on behavior depend on self-regulatory thought. *Social Cognition, 18*, 101-129.
- Oettingen, G. (2012). Future thought and behavior change. *European Review of Social Psychology, 23*, 1-63.
- Oettingen, G., Pak, H., & Schnetter, K. (2001). Self-regulation of goal setting: Turning free fantasies about the future into binding goals. *Journal of Personality and Social Psychology, 80*, 736-753.
- Palayiwa, A., Sheeran, P., & Thompson, A. (2010). "Words will never hurt me!": Implementation intentions regulate attention to stigmatizing comments about appearance. *Journal of Social and Clinical Psychology, 29*, 575-598.
- Parks-Stamm, E. J., Gollwitzer, P. M., & Oettingen, G. (2007). Action control by implementation intentions: Effective cue detection and efficient response initiation. *Social Cognition, 25*, 248-266.
- Parks-Stamm, E. J., Gollwitzer, P. M., & Oettingen, G. (2010). Implementation intentions and test anxiety: Shielding academic performance from distraction. *Learning and Individual Differences, 20*, 30-33.
- Paul, I., Gawrilow, C., Zech, F., Gollwitzer, P. M., Rockstroh, B., Odenthal, G., . . . Wienbruch, C. (2007). If-then planning modulates the P300 in children with attention-deficit/hyperactivity disorder. *NeuroReport, 18*, 653-657.
- Robbins, J. M., & Krueger, J. I. (2005). Social projection to ingroups and outgroups: A review and meta-analysis. *Personality and Social Psychology Review, 9*, 32-47.
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*, 68-78.
- Schweiger Gallo, I., Fernández-Dols, J., Gollwitzer, P. M., & Keil, A. (2017). Grima: A distinct emotion concept? *Frontiers in Psychology, 8*, Article 131.
- Schweiger Gallo, I., Keil, A., McCulloch, K. C., Rockstroh, B., & Gollwitzer, P. M. (2009). Strategic automation of emotion regulation. *Journal of Personality and Social Psychology, 96*, 11-31.

- Schweiger Gallo, I., McCulloch, K. C., & Gollwitzer, P. M. (2012). Differential effects of various types of implementation intentions on the regulation of disgust. *Social Cognition, 30*, 1-17.
- Schweiger Gallo, I., Pfau, F., & Gollwitzer, P. M. (2012). Furnishing hypnotic instructions with implementation intentions enhances hypnotic responsiveness. *Consciousness and Cognition, 21*, 1023-1030.
- Sheeran, P., Webb, T. L., & Gollwitzer, P. M. (2005). The interplay between goal intentions and implementation intentions. *Personality and Social Psychology Bulletin, 31*, 87-98.
- Sheeran, P., Webb, T. L., Gollwitzer, P. M., & Oettingen, G. (in press). Self-regulation of affect-health behavior relations. In D. M. Williams, R. E. Rhodes, & M. T. Conner (Eds.), *Affective determinants of health-related behaviors*. New York: Oxford University Press.
- Skinner, B. F. (1971). *Beyond freedom and dignity*. New York: Penguin Books.
- Stern, C., Cole, S., Gollwitzer, P. M., Oettingen, G., & Balcetis, E. (2013). Effects of implementation intentions on anxiety, perceived proximity, and motor performance. *Personality and Social Psychology Bulletin, 39*, 623-635.
- Stewart, B. D., & Payne, B. K. (2008). Bringing automatic stereotyping under control: Implementation intentions as efficient means of thought control. *Personality and Social Psychology Bulletin, 34*, 1332-1345.
- Strack, F., & Deutsch, R. (2004). Reflective and impulsive determinants of social behavior. *Personality and Social Psychology Review, 8*, 220-247.
- Thürmer, J. L., McCrea, S. M., & Gollwitzer, P. M. (2013). Regulating self-defensiveness: If-then plans prevent claiming and creating performance handicaps. *Motivation and Emotion, 37*, 712-725.
- Thürmer, J. L., Wieber, F., & Gollwitzer, P. M. (2015). A self-regulation perspective on hidden profile problems: If-then planning to review information improves group decisions. *Journal of Behavioral Decision Making, 28*, 101-113.
- Thürmer, J. L., Wieber, F., & Gollwitzer, P. M. (2017). Planning and performance in small groups: Collective implementation intentions enhance group goal striving. *Frontiers in Psychology, 8*, Article 603.
- van Kleef, G. A., De Dreu, K. D. W., & Manstead, A. S. R. (2004). The interpersonal effects of anger and happiness in negotiations. *Journal of Personality and Social Psychology, 86*, 57-76.
- van Koningsbruggen, G. M., Stroebe, W., Papies, E. K., & Aarts, H. (2011). Implementation intentions as goal primes: Boosting self-control in tempting environments. *European Journal of Social Psychology, 41*, 551-557.
- Webb, T. L., Ononaiye, M. S. P., Sheeran, P., Reidy, J. G., & Lavda, A. (2010). Using implementation intentions to overcome the effects of social anxiety on attention and appraisals of performance. *Personality and Social Psychology Bulletin, 36*, 612-627.
- Webb, T. L., Schweiger Gallo, I., Miles, E., Gollwitzer, P. M., & Sheeran, P. (2012). Effective regulation of affect: An action control perspective on emotion regulation. *European Review of Social Psychology, 23*, 143-186.
- Webb, T. L., & Sheeran, P. (2004). Identifying good opportunities to act: Implementation intentions and cue discrimination. *European Journal of Social Psychology, 34*, 407-419.
- Webb, T. L., & Sheeran, P. (2007). How do implementation intentions promote goal attainment?: A test of component processes. *Journal of Experimental Social Psychology, 43*, 295-302.
- Webb, T. L., & Sheeran, P. (2008). Mechanisms of implementation intention effects: The role of goal intentions, self-efficacy, and accessibility of plan components. *British Journal of Social Psychology, 47*, 373-395.

- Webb, T. L., Sheeran, P., & Luszczynska, A. (2009). Planning to break unwanted habits: Habit strength moderates implementation intention effects on behaviour change. *British Journal of Social Psychology, 48*, 507-523.
- Wieber, F., Gollwitzer, P. M., & Sheeran, P. (2014). Strategic regulation of mimicry effects by implementation intentions. *Journal of Experimental Social Psychology, 53*, 31-39.
- Wieber, F., Odenhal, G., & Gollwitzer, P. M. (2010). Self-efficacy feelings moderate implementation intention effects. *Self and Identity, 9*, 177-194.
- Wieber, F., & Sassenberg, K. (2006). I can't take my eyes off of it: Attention attraction of implementation intentions. *Social Cognition, 24*, 723-752.
- Wieber, F., Sezer, L. A., & Gollwitzer, P. M. (2014). Asking "why" helps action control by goals but not plans. *Motivation and Emotion, 38*, 65-78.
- Wieber, F., Thürmer, J. L., & Gollwitzer, P. M. (2015). Attenuating the escalation of commitment to a faltering project in decision-making groups: An implementation intention approach. *Social Psychology and Personality Science, 6*, 587-595.
- Wieber, F., von Suchodoletz, A., Heikamp, T., Trommsdorff, G., & Gollwitzer, P. M. (2011). If-then planning helps school-aged children to ignore attractive distractions. *Social Psychology, 42*, 39-47.