

# Weakness of the will: Is a quick fix possible?

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**Abstract** Weakness of the will may lead to ineffective goal striving in the sense that people lacking willpower fail to get started, to stay on track, to select instrumental means, and to act efficiently. However, using a simple self-regulation strategy (i.e., forming implementation intentions or making if–then plans) can get around this problem by drastically improving goal striving on the spot. After an overview of research investigating how implementation intentions work, I will discuss how people can use implementation intentions to overcome potential hindrances to successful goal attainment. Extensive empirical research shows that implementation intentions help people to meet their goals no matter whether these hindrances originate from within (e.g., lack of cognitive capabilities) or outside the person (i.e., difficult social situations). Moreover, I will report recent research demonstrating that implementation intentions can even be used to control impulsive cognitive, affective, and behavioral responses that interfere with one’s focal goal striving. In ending, I will present various new lines of implementation intention research, and raise a host of open questions that still deserve further empirical and theoretical analysis.

**Keywords** Willpower · Implementation intentions · If–then plans · Action control · Strategic automaticity · Goal striving

## Introduction

In the goal literature there seems to be widespread agreement on the most prominent challenges of goal attainment (Gollwitzer and Oettingen 2012; Bargh et al. 2010). One is getting started as discussed extensively in the literature on procrastination (e.g., Andreou and White 2010) and self-handicapping (e.g., Hirt and McCrea 2009; Tice 1991), and another is staying on track in the face of temptations and distractions as exemplified most clearly in Walter Mischel’s research using the Marshmallow and the Mr. Clown Box task paradigms, respectively (Mischel 1974; Mischel and Patterson 1978). Furthermore, people seem to have problems with calling a halt to unsuccessful efforts to reach a desired goal as studied in research on the escalation of commitment (e.g., Brockner 1992; Staw 1981), and finally, by extending much energy with respect to an ongoing goal pursuit people often fail to preserve energy for subsequent goal pursuits as discussed in the extensive research on ego depletion (e.g., Baumeister and Vohs 2007).

If one considers succumbing to these challenges as an indication of weakness of the will, one may be tempted to argue that all of these problems can be easily ameliorated by a stronger act of willing in the sense of decisively instructing oneself to try harder to reach one’s goals (Triandis 1980). One may also suggest to enhance a person’s willingness to try very hard to reach a given goal (i.e., induce a stronger goal commitment; Gollwitzer 1990) by heightening the perceived desirability of the goal at hand (i.e., the expected incentive value of the goal at hand is high) as well as its feasibility (i.e., one feels in control of instrumental goal-directed actions). However, meta-analyses reveal that enhancing the strength of the intention to reach a given goal does improve the rate of goal attainment only to a rather small degree (Sheeran 2002; Webb and Sheeran 2006). As a consequence, I will suggest

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an alternative way of supporting goal striving that is impaired by weakness of the will: It is the rather cool-minded act of planning out in advance how one wants to deal with the critical problems of goal striving once they are actually encountered.

In highlighting the importance of planning for increased goal attainment, I (Gollwitzer 1993, 1999) introduced the concept of implementation intentions or if–then planning. Forming implementation intentions goes beyond intending to reach a goal. While goal intentions have the structure of “I intend to reach X!” with X relating to a desired future behavior or outcome, implementation intentions link critical situational cues with instrumental goal-directed responses: “If situation Y is encountered, then I will perform the goal-directed response Z!” Thus, implementation intentions define exactly when, where, and how one wants to act toward realizing one’s goals. In order to form an implementation intention, individuals need to identify a goal-relevant situational cue (such as a good opportunity to act, or an obstacle to goal pursuit) and link it to an instrumental goal-directed response. Whereas goal intentions merely specify a desired future behavior or outcome, the if-component of an implementation intention specifies when and where one wants to act on this goal (i.e., a certain situational cue), and the then-component of the implementation intention specifies the response that is to be initiated. For instance, a person who wants to complete a writing project (goal intention) might form the following implementation intention to support the attainment of her goal: “If the first section of the paper is finished, then I’ll immediately start with the second section!”

Empirical data collected in experimental lab and field studies support the assumption that implementation intentions help close the gap between wanting to attain a goal and actually attaining it (review by Gollwitzer and Sheeran 2006). This positive effect on the rate of 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 be more egalitarian in judging others or showing pro-social behaviors. It also doesn’t seem to matter whether these goals have been assigned by others (e.g., provided by an experimenter and then adopted by the research participant) or people came up with them by themselves.

A meta-analysis published in 2006 based on close to a hundred implementation intention studies showed a medium to large effect on increased rate of goal attainment ( $d = .61$ ; Gollwitzer and Sheeran 2006). There are also more recent meta-analyses focusing exclusively on the health goals of eating a healthy diet (Adriaanse et al. 2011c) and engaging in physical activity (Belanger-Gravel et al. 2013); both report a medium effect size of forming implementation intentions.

### The challenges of goal pursuit: Effective goal striving created on the spot

People can use implementation intentions to deal effectively with all four of the major challenges of goal striving. Forming implementation intentions has been demonstrated to facilitate getting started (i.e., they no longer let good opportunities pass by), to protect an ongoing goal pursuit from disruptions (i.e., they stick to the ongoing focal goal pursuit even in the face of temptations and distractions), to readily disengage from ineffective means and unattainable goals (i.e., they do not lose sight of alternative more effective means and more feasible goals), and to pursue the focal goal without getting exhausted (i.e., they do not become ego depleted).

Implementation intentions were found to help individuals to *get started* with goal striving in terms of remembering to act. Extensive research using task paradigms common in the analysis of prospective memory (i.e., memory to enact one’s intentions at a certain point in time or event in the future) found that if–then plans do enhance prospective memory performance no matter whether it is time- or event based (e.g., Chasteen et al. 2001; Chen et al. 2014; McDaniel et al. 2008; Rummel et al. 2012; Zimmermann and Meier 2010). More applied research also observed an enhancement of prospective memory performance as a consequence of forming implementation intentions (e.g., with respect to taking vitamin pills, Sheeran and Orbell 1999; antiepileptic drug adherence, Brown et al. 2009; taking contraceptive pills, Martin et al. 2009; taking a flu shot, Milkman et al. 2011; voter turn-out, Nickerson and Rogers 2010).

Implementation intentions also seem to help action initiation in terms of overcoming an initial reluctance to act (e.g., with respect to obtaining a mammography; Rutter et al. 2006; undertaking a testicular self-examination; Sheeran et al. 2005a; performing cervical cancer screening (Sheeran and Orbell 2000) or colorectal cancer screening (Neter et al. 2014); and resuming activity after joint replacement surgery; Orbell and Sheeran 2000). Moreover, to start eating a low-fat diet (Armitage 2004), to recycle (Holland et al. 2006), to engage in more physical exercise (Milne et al. 2002), to use public transportation rather than one’s own car (Bamberg 2000), and to purchase organically produced food (Bamberg 2002) were all found to be more readily acted upon by individuals who previously had formed implementation intentions (see also Gollwitzer and Oettingen 2011).

Many such goals (e.g., to eat a low-fat diet and to engage 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. *Staying on track* may then become very difficult

when certain internal stimuli (e.g., being anxious, tired, overburdened) or external stimuli (e.g., temptations, distractions) interfere with the ongoing goal pursuit (e.g., implementing a ritual of going to bed that guarantees a satisfying sleep behavior; Loft and Cameron 2013). With respect to shielding an ongoing goal pursuit from inside stimuli, implementation intentions were demonstrated to be effective with respect to performance anxiety (Achtziger et al. 2008), test anxiety (Parks-Stamm et al. 2010), social anxiety (Webb et al. 2010), general anxiety (Varley et al. 2011), worry about attending psychotherapy (Sheeran et al. 2007), and more specific emotions such as fear (Schweiger Gallo et al. 2009) or disgust (Schweiger Gallo et al. 2012a). With respect to protecting an ongoing goal pursuit from outside interference, implementation intentions were demonstrated to be effective regarding distractive video clips in studies with college students (Gollwitzer and Schaal 1998) as well as in studies with 6–8 year old children (Wieber et al. 2011). Moreover, a host of studies demonstrates that implementation intentions can be used to shield an ongoing goal pursuit (e.g., dieting goals) from temptations (e.g., tasty but unhealthy snacks; Verhoeven et al. 2013; Kroese et al. 2011; summary by Adriaanse et al. 2011c).

Goals and means that are no longer feasible and/or desirable in their current form may require individuals to adjust goal striving and to *disengage* from the chosen goals and means. Such disengagement can free up resources and minimize negative affect (frustration) resulting from repeated negative feedback. However, because having chosen a goal or means produces a high degree of self-defensiveness (free choice produces a sense of accountability), individuals often stick to the chosen goals and means even though this is ultimately hurting them (i.e., escalation of commitment; Brockner 1992; Staw 1981). Implementation intentions can be used to promote functional disengagement by specifying negative feedback as a critical cue, and linking this cue to switching to a functional alternative goal or 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, or to reflecting on the message entailed by the received failure feedback on the ongoing goal striving, functional disengagement from goals and means was found to occur more frequently than for participants who had only been asked to form respective goal intentions (e.g., “I will only work with the best means available!”; Henderson et al. 2007).

Recently, implementation intentions were demonstrated to be effective in the down-regulation of self-handicapping (Thürmer et al. 2013). More specifically, it was shown that implementation intentions geared towards increasing self-assurance undermined the popular self-handicapping

strategy of inflating the performance handicap of feeling stressed. Accordingly, Wieber et al. (2014c) wondered whether down-regulating self-defensiveness by if–then plans provides a further route to promoting disengagement from a failing course of action. So we conducted a study in which groups received negative feedback on their progress towards a conjointly set goal (i.e., three-person groups acted as a city council board deciding how much to invest in an evolving kindergarten construction project) in order to trigger escalation of commitment. Then, some groups received if–then plans that specified a self-distancing response (i.e., taking the perspective of a neutral observer) as we hoped this would allow reducing self-defensiveness. Indeed, in response to negative feedback, these implementation intentions made groups reduce their investments, whereas groups that operated on the mere goal intention to take a neutral perspective did not.

Finally, forming implementation intentions can help prevent *resource depletion* as it enables individuals to engage in automated goal striving (see below) and behavior control that does not require high levels of deliberate effort. As a consequence, the self should not become depleted (Muraven and Baumeister 2000) 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 and Sheeran 2003). Moreover, Bayer et al. (2010) demonstrated that people can protect themselves from the negative effects of being ego depleted on striving for another goal (i.e., performance on a different task) by spelling out performance on the subsequent task in advance in terms of if–then plans; in other words, a reduced task performance was no longer observed with ego depleted participants.

These findings imply that even individuals who do believe that willpower is a limited resource may 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 non-believers or even believers of an unlimited resource model (Job et al. 2010, 2013) by a respective persuasion intervention. Rather, people only need to be asked 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 (thus performing effectively in case ego depletion has occurred).

### Process explanation: Strategic automaticity

Research on the underlying mechanisms of implementation intention effects has discovered 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 forged between the if-part and the then-part of the plan. Because forming an implementation intention implies the selection of a critical future situation, the mental representation of this situation becomes highly activated and hence more accessible (Gollwitzer 1999). This heightened accessibility of the if-part of the plan has been observed in several studies testing this hypothesis by using different cognitive task paradigms. For instance, Webb and Sheeran (2004) using a cue detection task observed that implementation intentions improved performance (fewer misses and more hits), without stimulating erroneous responses to similar cues (false alarms). Achtziger et al. (2012) observed in a cued recall experiment that participants more effectively recalled the available situational opportunities to attain a set goal given that these opportunities had been specified in if-then links (i.e., in implementation intentions); this effect showed up no matter whether the cued recall was requested 15 min or 24 h later. Furthermore, in a study by Parks-Stamm et al. (2007) using a lexical decision task paradigm it was observed that implementation intentions did not only increase the activation level of the specified critical cues but also diminished the activation level of non-specified competing situational cues. Also supporting the assumption of heightened accessibility, Achtziger et al. (2012) using a dichotic listening task paradigm found that words describing the critical cue specified in the if-part of an implementation intention were drawing people's attention towards them. When these critical words were presented on the non-attended ear, the shadowing performance (i.e., announcing the words presented in parallel on the attended ear) decreased in implementation intention participants.

In order to go beyond the attentional consequences of forming implementation intentions, a recent line of research looked at perceptual consequences. In these studies, a well-established chronometric method was employed: the Psychological Refractory Period (PRP) paradigm (Pashler 1994) which was combined with the locus-of-slack logic (Schweickert 1978). The collected data (Janczyk et al. in press) are compatible with the idea that plans in the form of implementation intentions even manage to facilitate early perceptual processing (and not just attentional responding).

In sum, the studies reported in this paragraph using different cognitive task paradigms do suggest that if-then planning enhances the activation of the mental representation of specified critical situational cues so that they become more easily accessible. Further studies indicate that forming implementation intentions not only heightens the activation level (and thus the accessibility) of the mental presentation of the situational cues specified in the if-component but it also creates a strong associative link

between the mental representation of the specified opportunity and the mental representation of the specified response (Webb and Sheeran 2007, 2008). These associative links seem to be quite stable over time (Papies et al. 2009), and they are strong enough to allow for the activation of the mental representation of the specified response (the plan's then-component) by subliminal presentation of the respective critical situational cue (if-component) (Webb and Sheeran 2007).

Gollwitzer (1999) argued that the strong associative (critical situation with goal-directed response) links created by forming implementation intentions 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 autonomy. Having formed an implementation intention which can be understood as a strategic act of will as it is intended to promote goal attainment, individuals can then act in situ without having to deliberate on whether to act or not.

There is vast empirical evidence that if-then planners act more quickly (e.g., Gollwitzer and Brandstätter 1997, Experiment 3), deal more effectively with cognitive demands (e.g., speed-up effects still evince under high cognitive load and thus qualify as efficient; e.g., Brandstätter et al. 2001), and do not need to consciously intend to act in the critical moment. Consistent with this last assumption, implementation intention effects are observed even when the critical cue is presented subliminally (e.g., Bayer et al. 2009) or when the respective goal is activated outside of awareness (Sheeran et al. 2005b, Study 2). Most telling with respect to this feature of automaticity (i.e., no conscious intent is needed) is research conducted by Schweiger Gallo et al. (2012b) on increasing hypnotic responsiveness. The authors enriched standard hypnotic instructions with respective implementation intentions and found an increase in hypnotic responsiveness 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 has also been found to be associated with a fourth feature of automaticity: an enhanced autonomy of the specified critical response. Using a flanker task, Wieber and Sassenberg (2006) showed that the situational cues specified in the if-part of an implementation intention still received attention even when they were presented in a context where a task had to be performed that required to ignore them.

Further support for the hypothesis that action control by implementation intentions qualifies as automatic was obtained in an fMRI study reported by Gilbert et al. (2009),

in which participants had to perform a prospective memory task (i.e., frequency of acting on a prospective stimulus was assessed) on the basis of either mere goal or goal plus implementation intention instructions. Acting on the basis of goal intentions was associated with brain activity in the lateral rostral prefrontal cortex, whereas acting on the basis of 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 et al. 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. They are also in line with recent findings showing that adding a why-clause to if–then plans (i.e., turning if–then plans into if–then–why plans; Wieber et al. 2014b) undermines the effectiveness of these plans. Apparently, thinking of reasons for one’s actions as triggered by the why-clause installs top-down action control which gets into conflict with the bottom-up action control instigated by if–then plans.

But do these postulated processes actually mediate implementation intention effects? There is supportive evidence for this assumption. In the Gilbert et al. study (2009), the increased brain activity in the medial rostral pre-frontal cortex matched the increase in prospective memory performance in participants who had formed implementation intentions. Moreover, various studies explicitly tested whether the heightened accessibility of the mental representation of critical cues that are specified in an implementation intention mediates the attainment of the respective goal intention. In a study by Aarts et al. (1999) using a lexical decision task it was found that the formation of implementation intentions led to faster lexical decision times for those words that described the specified critical situation, and that this heightened accessibility of the critical situation (as measured by faster lexical decision responses) in turn mediated the beneficial effects of implementation intentions on rate of goal attainment. Moreover, studies by Webb and Sheeran (2007, 2008) found that the effects of if–then plans on goal attainment were mediated simultaneously by the accessibility of specified situational cues and by the strength of the association forged between these cues and the intended response.

### How strong is the guidance created by if–then plans?

Any self-regulation strategy that claims to facilitate goal attainment has to prove itself under conditions when the

“going gets tough.” Such conditions are manifold, but the following three stick out: (1) when capabilities limit goal striving (e.g., taking an intelligence test), (2) when opponents limit goal striving (e.g., tennis tournaments, negotiations), and (3) when antagonistic impulsive responses limit goal striving as the wanted behavior (e.g., no littering) runs into conflict with reflexive antagonistic responses (i.e., habitual littering). For all three of these situations implementation intentions, however, stood their test.

As to situations where knowledge and skills constrain performance, simple implementation intentions were found to enhance participants’ performance on a standardized intelligence test (Bayer and Gollwitzer 2007). Participants only had to form the following implementation intention: “Whenever I start a new problem on this test, then I will tell myself: I can solve this problem!” As to situations where an opponent limits one’s performance, studies in which pairs of negotiators had to distribute a common resource were conducted (Trötschel and 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 participants formed implementation intentions to make cooperative counterproposals whenever a proposal from the counterpart was received, the pairs of negotiators managed to be more cooperative even when the negotiation had to take place under a loss frame (i.e., participants are told how many points they lose rather than win during each round of negotiation and are thus reluctant to make concessions). Apparently, implementation intentions managed to break the commonly observed competitiveness enhancing effect of loss framing. Recent research using the ultimatum game (Kirk et al. 2011) also showed 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 towards down-regulating anger.

Finally, as to situations where a desired behavior gets into conflict with an antagonistic reflexive response a host of research has been conducted as well. The self-regulation of an ongoing goal pursuit needs willpower when reflexive responses (e.g., habitual responses, Wood and Neal 2007) hinder the initiating and executing of the needed goal-directed responses that are instrumental to goal attainment. Can the self-regulation strategy of forming if–then plans also help people to let their goals win out over their reflexive responses? By assuming that action control by implementation intentions is immediate and efficient, and adopting a simple horserace model of action control (Adriaanse et al. 2011a), 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 assumption has been



tested by analyzing the control of various kinds of reflexive responses: cognitive, affective, and behavioral responses.

Automatic biases, such as stereotyping, represent *reflexive cognitive* responses that can be in opposition to one's fairness goals. 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'!") could indeed reduce automatic stereotyping. Recent research by Mendoza et al. (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 et al. (2009) with individuals who indicated to be afraid of spiders. Implementation intentions either geared towards ignoring presented spider pictures or towards staying calm in the face of such pictures both helped reduce the arousal in these participants (even though spider phobic individuals are known to reflexively show fear responses when confronted with spider pictures). Actually, both types of implementation intentions reduced the arousal to the degree that was observed with non-phobic control participants. In a final study using dense-array EEG, it could again be shown that implementation intentions specifying an ignore-response in the then-component helped control fear in response to pictures of spiders in participants with spider phobia. Importantly, the ignore-implementation intentions were also found to significantly reduce the (typical for spider phobic individuals) early activity in the visual cortex in response to spider pictures, as reflected in a smaller P1 (assessed at 120 ms after a spider picture had been presented). This EEG finding suggests that implementation intentions indeed lead to strategic automation of the specified goal-directed response (an ignore response) when the critical cue (a spider picture) is encountered, as conscious effortful action initiation is known to take longer than 120 ms (at least 300 ms; see Bargh and Chartrand 2000). Apparently, the strategically automated ignore-response managed to outrun the reflexive fear response that characterizes individuals with spider phobia.

Note that in all of the Schweiger et al. studies, the effectiveness of emotion control by implementation intentions was assessed in terms of down-regulating the targeted emotion itself. Recent research has also assessed the downstream consequences of emotion control by implementation intentions. For instance, Stern et al. (2013) demonstrated that participants who formed implementation intentions successfully reduced performance anxiety; importantly, goal-relevant targets were perceived as physically closer (i.e., a golf hole, a dart board) as a

consequence, which in turn helped participants to make progress on the goal at hand. Moreover, recent research on emotion control by implementation intentions has also moved on to analyzing other emotions than fear and anxiety (e.g., disgust) and examined whether targeting one or another dimension of the emotion at hand (i.e., valence vs. arousal) leads to differential outcomes (Schweiger Gallo et al. 2012a).

Finally, with respect to *behavioral reflexive* responses, the regulation of various kinds of behavioral responses has been analyzed. Cohen et al. (2008, Study 2; see also Miles and Proctor 2008) demonstrated that implementation intentions help reduce the advantage of habitual behavioral responses over non-habitual 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 (habitual response) is faster than classifying it with the non-corresponding hand. Specifying a non-corresponding response in an implementation intention that is geared towards fast responding effectively alleviated the comparative disadvantage (reduced speed) of classifications made by the non-corresponding hand.

Implementation intentions were also found to help people control behavioral priming effects; such effects are known to run off outside a person's awareness (Gollwitzer et al. 2011). In various experiments, we tested whether people can protect their ongoing goal pursuits from antagonistic priming effects by using if-then plans (i.e., implementation intentions). 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 goal intentions to drive only as fast as safety allowed or had formed no goal intentions at all. However, participants who had formed safety-related goal intentions as well as respective implementation intentions no longer evinced any priming effects (i.e., the fast priming manipulation did no longer increase speed and driving mistakes).

Implementation intentions specifying the replacement of a habitual response with an alternative response in a critical situation have been found to break bad snacking habits (Adriaanse et al. 2011a). When the cognitive processes underlying this effect were investigated, using a primed lexical decision task it was found that the habitual means were more accessible than the alternative means on encountering the critical situation. Importantly, this was no longer the case when implementation intentions had been formulated.

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.

If the reflexive response is based on strong habits (Webb et al. 2009), and the if–then guided response is based on weak implementation intentions, the reflexive response should win over the if–then planned response; and the reverse should be true when weak habits are in conflict with strong implementation intentions. This implies that inhibiting responses that are based on strong habits requires the formation of strong implementation intentions.

Such enhancement of if–then plans can be achieved by various measures. One pertains to creating particularly 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 (Papies et al. 2009). Various lines of research indeed found that adding imagery when forming implementation intentions enhances if–then plan effects on goal attainment and that subtracting the imagery component from if–then plans does hurt their effectiveness (e.g., Knäuper et al. 2009, 2011; McDaniel et al. 2008). However, there are other lines of research suggesting that no imagery component is required to make implementation intentions effective (McFarland and Glisky 2012). Apparently, this question can only be answered in a satisfying manner in future research if personal attributes (e.g., impulsivity), situational context variables (e.g., emotional activation), and the content of the goal at hand are considered conjointly (as suggested by Burkard et al. 2013).

Alternatively, Adriaanse et al. (2009) suggested tailoring the critical cue specified in the if-part of an implementation intention to personally relevant reasons for the habitual behavior one wants to overcome, and then link this cue to an antagonistic response. Also, certain formats of implementation intentions (i.e., replacement and ignore implementation intentions) seem to be less effective in fighting habits than others (e.g., negation implementation intentions; Adriaanse et al. 2011b). And there also seems to be the option of forming implementation intentions that target the elicitation of a reflective mindset when the critical situation is encountered; this mindset can be assumed to be incompatible with automatic responding and thus should hamper reflexive responding (Martiny-Hünger et al. 2011).

In sum, then, if–then plans have the potential to reduce the disruptive influence of reflexive antagonistic responses. This seems to hold true for cognitive, affective, and behavioral responses. The disruptive behavioral responses may originate from innate action tendencies, priming, or bad habits. But note that the if–then plans studied so far specified responses meant to outrun the disruptive response (horse race model). Future research may want to analyze whether if–then plans that trigger the reflective system which in turn undermines the impulsive system (system switch model) may also be effective in curbing reflexive

responding. How this is done best still needs to be explored in future research.

### New lines of implementation intention research

One new line of research on implementation intentions is 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, see Achtziger et al. 2008; for weight loss goals, see Armitage et al. in press) is creating extensive lists of both critical situational cues and instrumental goal-directed responses and providing these lists to people 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 those listed responses that one feels capable of executing in the selected critical situation.

A quite different approach of developing behavior change interventions using implementation intentions is teaching the formation of implementation intentions in terms of a meta-cognitive strategy (i.e., content-free principles of plan formation are explained in detail that can then be used by the individual for any of the goals she wants to attain). An intervention that does this very effectively is mental contrasting (summary by Oettingen 2012). Mental contrasting (Oettingen 2000; Oettingen et al. 2001) implies juxtaposing fantasies about desired future outcomes with obstacles of present reality. This strategy not only creates strong goal commitments 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; it also helps to identify instrumental means to overcome these obstacles that then 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 behaviors. As implementation intentions are known to unfold their beneficial effects in particular when both goal and implementation intention commitments are high (Sheeran et al. 2005a, b; Achtziger et al. 2012), MC guarantees that these prerequisites are in place.

Mental contrasting interventions have recently been enriched with explicit instructions to form if–then plans. Such mental contrasting with implementation intentions (MCII) intervention studies observed lasting behavior change (summary by Oettingen et al. 2013). For instance, MCII was found to help chronic back pain patients to improve their physical capacity (Christiansen et al. 2010). With regard to physical exercise and healthy eating (i.e., eating more fruits and vegetables) in middle-aged healthy

adults drastic improvements were observed that lasted over the extended time periods of 4 months and 2 years, respectively (Stadler et al. 2009, 2010). Moreover, Adriaanse et al. (2010) showed that MCII helped to control the negative eating habit of 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 had beneficial effects outside of the health area as well. For example, it enhanced study efforts in adolescents preparing for standardized tests and it also improved academic performance at home and at school (Duckworth et al. 2011, 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 both mental contrasting and implementation intentions alone (Kirk et al. 2013).

However, sticking two behavior change tools together (as was done with mental contrasting and implementation intentions) may not always be beneficial. For instance, there are various studies that explored whether combining self-affirmation procedures 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 et al. 2012; eating more fruits and vegetables; Harris et al. in press), it backfired in others (e.g., promoting exercise behavior; Jessop et al. 2014). Possibly, whenever the information provided with regard to the behavior change at issue turns out to threaten the person's self-integrity (e.g., when the reduction of the person's excessive alcohol consumption is requested), a self-affirmation exercise prior to the formation of implementation intentions may be helpful as it reduces self-defensiveness and thus encourages the formation of binding implementation intentions. If the information is non-threatening (as with promoting exercise behavior), however, self-affirmation may curb the perceived necessity to make goal-promoting if-then plans as one feels already pretty good about oneself (goal striving does not need a boost). Interestingly, a recent study on the reduction of alcohol consumption in adolescents shows that self-affirmation exercises themselves can be strengthened by using implementation intentions ("If I feel threatened or anxious, then I will think about the things I value about myself!"), and that implementation intention guided self-affirmation created particularly strong behavior change effects (Armitage et al. 2014).

A further new line of implementation intention research pertains to the use of implementation intentions in groups. The questions addressed in this research are twofold: First, it is asked whether individual group members can use implementation intentions to promote collaboration and

thus improve group performance. Second, it is asked 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 (Wieber et al. 2013; Thürmer et al. in press). In one study, Thürmer et al. (in press) analyzed how 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!" Not surprisingly, panels that made no if-then plan chose the superior candidate only 18 % of the time. Panels with if-then plans were much more likely to make the right decision, selecting the superior candidate 48 % of the time.

A final new line of implementation intention research explores whether if-then plans can be used to benefit one's social interactions. For instance, Stern and West (2014) report that implementation intentions specifying how to act when feeling anxious boosts interest in sustained contact and close interpersonal distance in interracial interactions. They argue that interactions with new acquaintances are often filled with anxiety that can reduce the desire for long-term contact. Accordingly, they tested in a series of studies whether providing participants with if-then plans that specify how to act when feeling anxious boosted interest in sustained contact and close interpersonal distance. Indeed, implementation intentions increased interest in sustained contact during anxiety-provoking interactions in the laboratory and daily interracial interactions. They also led to closer interpersonal distance in anticipation of interracial interactions. Moreover, their positive effects persisted over multiple interactions and across time, despite being formed only once. Interestingly, forming if-then plans did not reduce levels of anxiety but rather shielded individuals from the negative effects of anxiety during social interactions.

Przybylinski and Andersen (2012) studied implementation intentions with respect to another social phenomenon commonly referred to as transference: prior relationships



readily play out in present ones, often without awareness and even when problematic for an individual. Transference has been studied extensively in social psychology, but little is known about how individuals might be able to prevent this influence, if at all. The social-cognitive process of transference is a mechanism by which past relationships emerge in the present through the relatively automatic use of significant-other (SO) representations in judging and remembering others.

In two experiments, the authors tested whether this process can be strategically regulated by the use of implementation intentions. Participants motivated to prevent transference learned about three individuals, one subtly resembling their own SO, and were provided either with no-additional strategy or with a goal intention to prevent transference, or crucially, with an implementation intention to prevent it. Across both experiments, response latencies in a primed lexical decision task showed that, regardless of strategy, the SO representation was activated with the relevant new person. Yet, in terms of recognition memory, only those participants in the no-additional strategy and the goal-intention conditions showed the transference effect—i.e., the application of the knowledge that was activated by SO resemblance. However, those in the implementation-intention condition did not; apparently, they successfully blocked the transference effect. These experiments provide the first evidence that individuals can use a self-regulation regulation strategy (i.e., forming if-then plans) with which to effectively regulate transference.

And finally, Wieber et al. (2014a) demonstrated that mimicry effects on social interactions can also be controlled by forming implementation intentions, 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 mimicry 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 the studies reported by Wieber et al. (2014a), participants formed 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 to spend the money they had earned for participating in the experiment on some left-over coffee vouchers and chocolate bars. Control group participants showed the common mimicry effect (i.e., a higher readiness to spend one’s money when being mimicked by the salesperson). Implementation intentions to be thrifty 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. Apparently, the strategic automaticity accomplished by implementation intentions allows people to block mimicry effects so that they can better live up to their goals.

## 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 introduced (Gollwitzer 1993), there is still a host of unanswered questions. Some of these I will discuss in the next section.

Will if-then plans always work?

This question can be answered by looking at the features of the implementation intentions formed, the superordinate goal, the person, and the context in which implementation intentions are formed and expected to affect the rate of goal attainment.

### *Features of the implementation intention*

It is important to recognize that people can commit to their plans to a different degree. If for instance a person only weakly commits to the plan to reject the invitation of a colleague to have a drink after work, a firm request to join having a drink will be hard to resist. In other words, people need to form their if-then plans in a binding manner for these plans to be effective (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 (i.e., the rejection of the invitation) will be triggered directly by the specified cue (i.e., the received invitation).

The effectiveness of an implementation intention may also depend on its format. For instance, when it comes to shielding an ongoing goal pursuit from internal and external disruptions quite different formats 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 (this type of plans have been referred to by Mischel 1976, as temptation-inhibiting plans), 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 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!”). Recent research (Adriaanse et al. 2011b) suggests that negation implementation intentions are less effective than the latter two types of implementation intentions (i.e., replacement and ignore implementation intentions).

But one can also form implementation intentions geared towards stabilizing the ongoing focal goal pursuit (e.g., “If the first part of my paper is finished, then I’ll immediately turn to the second part!”; this type of plans have been referred to by Mischel (1976) as task-facilitating plans. Bayer et al. (2010) demonstrated the effectiveness of this strategy in a series of studies analyzing whether making if-then plans that stabilize an ongoing goal pursuit effectively blocked the disruptive effects of self-doubts, inappropriate mood, and ego depletion. Recent research shows that the ongoing goal pursuit can also be stabilized in a more general way (Kroese et al. 2011; van Koningsbruggen et al. 2011). Such if-then plans specify the disrupting 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 goal is to stay friendly with my neighbor!”).

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 high on test anxiety using implementation intentions that increase the focus on the ongoing task (i.e., doing well on an achievement test) was demonstrated to be harmful to task performance (Parks-Stamm et al. 2010). And Gollwitzer and Schaal (1998) observed that individuals who were highly motivated to do well on the focal goal (i.e., to perform well on an arithmetic task) showed a reduced performance (as compared to a no plan control group) when using assigned if-then plans that specified “to increase one’s efforts” on the task at hand once the disruptive stimuli (i.e., attractive video clips) are encountered. The authors explained this performance debilitation effect in terms of over-motivation.

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 the format of explicit if-then statements. 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. Chapman et al. (2009) observed that for the goal to increase one’s fruit and vegetable intake an if-then implementation intention 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 a way so 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) may know exactly what is implied and recognize this state when it occurs. When it comes to appropriate specifications of the then-component of an if-then plan, it seems important that people choose a response that is highly instrumental to moving forward in the direction of goal attainment. Also, it needs to be an instrumental response the person feels capable to execute in the critical situation (i.e., self-efficacy for this response should be high; Wieber et al. 2010).

Finally, there is the question of how many if-then plans should one form for a given goal? Verhoeven et al. (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. Importantly, when making additional plans in an unrelated domain, the negative effects of making multiple plans were absent. These findings suggest that formulating multiple implementation intentions may not be the best route to changing unwanted behaviors such as snacking. The reduced effects of multiple implementation intentions do not seem to originate from faulty plan making but are rather due to interference in the plan enacting phase.

#### *Features of the person*

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 et al. 2005). Possibly, social perfectionists fail to commit and stick to implementation intentions because they are very sensitive to the fact that the expectations and standards prescribed by others often change unexpectedly, and that their high readiness to respond to such changes in a flexible manner may be hindered by strong commitments to a fixed if-then

plan. Moreover, the willingness to make if–then plans and reliably enact them seems 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; Burkard et al. 2013; see also Churchill and Jessop 2010, 2011), whereas it seems to be heightened in individuals high in conscientiousness (Webb et al. 2007) and those with a strong propensity to manage their time and money effectively (Lynch et al. 2009).

But aren't there also features of the person that undermine the effects of implementation intentions simply because they do not have the cognitive capacities to form and enact if–then plans? Research on this question has turned to critical clinical samples: children with ADHD (summary by Gollwitzer et al. 2010), frontal lobe patients (e.g., Lengfelder and Gollwitzer 2001; McFarland and Glisky 2011), and schizophrenic patients (Chen et al. 2014; Brandstätter et al. 2001) who are known to suffer from cognitive deficits related to executive functions. All of these samples benefited from forming implementation intentions showing enhanced goal attainment. For instance, children with ADHD who were taught the Mental Contrasting with Implementation Intentions (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 et al. 2013). This indicates that even though children with ADHD are known to suffer from reduced executive functions they can benefit from having formed implementation intentions 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 be targeted directly by forming respective implementation intentions. For instance, it was demonstrated (Gawrilow and Gollwitzer 2008) that children with ADHD who furnished a suppression goal with implementation intentions improved inhibition of an unwanted response on 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 benefitted from if–then plans in solving math problems that required both working memory and the inhibition of distractions (Gawrilow et al. 2011a). And finally, children with ADHD could successfully use implementation intentions to enhance their delay of gratification performance (Gawrilow et al. 2011b). It appears, then, that people with handicapped executive functions can still use implementation intentions as a self-regulation tool

for their daily goal pursuits, and they can even form implementation intentions to support exactly those executive functions that they are weak in.

#### *Features of the targeted goal*

In line with the proposition of the present paper that making if–then plans creates effective goal striving on the spot, many studies report that implementation intention formation has its strongest effect on goal attainment when the goals are difficult rather than easy (summary by Gollwitzer and Sheeran 2006). Apparently, for easy goals having a strong goal intention in place (i.e., a strong intention to attain the goal) already suffices to cope with challenges and set-backs.

But note that having a strong goal in place is also a prerequisite for implementation intention effects to accrue when people are striving for challenging goals. Sheeran et al. (2005b, Study 1) report that weak goal commitments undermine the effectiveness of if–then plans; people do not act on their plans when the superordinate goal is weak. This observation is in line with findings by Koestner et al. (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. 2005b, Study 2). It seems important therefore to establish strong goal commitments (e.g., by asking people to engage in mental contrasting of their wishes; Oettingen 2012) and make it clear to people that the given situational context calls for acting on the goal.

Finally, there is the question of multiple goals. 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 and 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 thus help people accomplish the various goals they have furnished with if–then plans.

#### *Features of the situational context*

There are also some contextual features that matter. One is the emotional state the person finds herself in when forming if–then plans and when enacting them. An emotional state that has positive effects on plan formation and enactment seems to be the emotion of anger (Maglio et al.

in press). Apparently, anger creates a strong sense of being in control that facilitates both the making of firm plans and the decisive acting on them.

Another contextual feature seems to be the person's mindset. When a person is deliberating on the pros and cons of the goal at hand (i.e., is in a deliberative mindset; Gollwitzer 2012) this mode of thinking should spill over to goal striving guided by if-then plans. As implementation intentions affect behavior by automatic bottom-up action control processes triggered by the specified situational cues, being in a deliberative mindset should eliminate the common beneficial effects implementation intentions have on goal pursuit. Testing this hypothesis, Wieber et al. (2014b) found that performance on a handgrip task as well as on a dual task (i.e., a simultaneous go/no-go task and a tracking task; Brandstätter et al. 2001) was no longer enhanced by forming implementation intentions when research participants were placed in a deliberative mindset.

In sum, there are many factors that 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. An example of such a more comprehensive approach is a recent set of studies reported by Hall et al. (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 towards enhancing physical exercise. In two studies, participants were randomly assigned to implementation intentions or control conditions. Individual differences in ECRs, goal intention strength and physical activity behavior were measured at baseline in the laboratory; follow-up physical activity was measured via an online questionnaire 7 days after the baseline laboratory session. Study 1 was conducted under activity-supportive environmental conditions (i.e., warm weather, little precipitation), whereas Study 2 was conducted under non-supportive environmental conditions (i.e., cold weather, moderate precipitation). In Study 1, those with relatively stronger ECR demonstrated stronger goal attainment than those with relatively weaker ECR; this effect was invariant across experimental conditions. In Study 2, a significant 3-way interaction was observed, such that those with lower ECRs showed greater goal attainment in the implementation intention group compared to the control. Together these findings suggest that the beneficial effects of implementation intentions may be more potent under challenging environmental conditions, and that they may be of special benefit for those with initially low ECRs. Recent research by Hall et al. (2014) also examines the interaction of potentially

undermining factors of implementation intention effects and shows that with old to very old people low ECRs do manage to undermine the positive effects of implementation intentions on physical activity.

Aren't there any costs in flexibility?

Given the many benefits of forming if-then plans, the reader may start to wonder whether there are any 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 goal in the lab either with sufficient or insufficient time, the specific plan hindered participants to capitalize on a presented alternative opportunity for achieving the goal. Past research in our lab also showed that the specified situational cues have an advantage to be seized (their mental representations become highly activated and the mental representations of competing situational cues become deactivated; Parks-Stamm et al. 2007). But recent research shows that this lack of flexibility is dependent on the person's counterfactual mindset (McCulloch and Smallman in press). More specifically, subtractive counterfactual mindsets (i.e., counterfactual thoughts focus on removing an existing action that could change the outcome) that are known to increase the consideration of alternatives were found to enhance the flexibility associated with implementation intentions. In contrast, additive counterfactual mindsets (i.e., counterfactual thoughts focus on imagining new actions that could change the outcome) that are known to be distractive were found to enhance rigidity.

But is this type of rigidity (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 (i.e., an opportunity that leads to easier or more beneficial goal attainment) 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 problem with making effective use of unexpectedly arising better opportunities (Gollwitzer et al. 2008). Analogous research analyzing the use of alternative goal-directed responses (as compared to the specified response) 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 (Gollwitzer et al. 2008).

Moreover, as said above, implementation intentions respect the strength (commitment) 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 (i.e., when goal strength is reduced) and halt striving in inappropriate contexts (i.e., the goal is not activated). 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 so that it is noticed by the person acting on an if–then plan.

It seems, then, that when I was referring to if–then plans many years ago as creating *instant habits* (Gollwitzer 1993, 1999), I was anticipating that if–then plans may carry at least some of the hard-to-be-extinguished feature of real habits (acquired by repeated and consistent acting in the same situation and not by a single act of willing; Wood and Neal 2007). Future research might thus want to investigate how if–then plans can be worded in a way so that rigidity is kept at a minimum. One route I can imagine to be effective is using if- and then-specifications that are rather abstract (e.g., “If I get anxious, then I will tell myself: Be confident!”) and thus very inclusive (i.e., cover many different critical situations and many instrumental responses).

Aren’t there any simpler alternative process explanations?

When presenting research on goal striving that is guided by implementation intentions the question of alternative explanations is raised as soon as I have discussed the extensive research on the assumed cognitive processes underlying if–then plan effects. The alternative explanation that is presented most frequently pertains to the possibility that forming if–then plans may increase a person’s commitment to the goal (produce heightened goal strength) or increase the person’s self-efficacy with regard to attaining the goal at hand. But a critical meta-analytic analysis of these alternative explanations (Webb and Sheeran 2008) does not render them viable. A further alternative explanation that is often suggested 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 strategy information at all (i.e., the instructions given in the goal intention condition are simply worded in an if–then format). Even under these very controlled circumstances, if–then plan participants show higher rates of goal attainment as compared to the respective mere goal participants (e.g., Wieber et al. 2014a, b, c).

There is also a suspicion 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 evinced between mere goal and implementation intention participants. 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 implementation intention participants.

Finally, at times I am confronted with the argument that implementation intentions are nothing but specific goals. And don’t we know since Locke and Latham’s (1990) goal setting theory that specific goals lead to better performance than “do your best” goals? But note that the specificity that Locke and Latham are referring to in their extensive research refers to the standards that people want to ultimately meet in their goals (and in the sub-goals that lead up to the superordinate goal), and it is high standards defined in specific (concrete) terms that are found to promote goal attainment (summary by Locke and Latham 2013). In the case of implementation intentions, in contrast (Oettingen et al. 2013), 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 not the level of goal standards that are specified (e.g., for a tree cutter, exactly how many trees he wants to cut in the morning and the afternoon of a given day to reach his ultimate goal of cutting 50 trees per day).

## Conclusion

In the present paper, it is suggested that the negative consequences of weakness of the will with regard to goal striving can be ameliorated by a simple planning strategy to be used on the spot. Certainly, there are other routes people may take to cope with weakness of the will when striving for their goals. These pertain to training one’s willing (as suggested in the limited resource model; Baumeister and Vohs 2007) and changing one’s beliefs on how willing works from a limited resource model to an unlimited



resource model (Job et al. 2010, 2013); moreover, one can heighten the desirability and feasibility of the goal at hand (Gollwitzer 1990, 1993) or change the framing of one's goal in a way so that one becomes more willing to strive (e.g., by focusing on autonomous rather than controlled rewards, Ryan and Deci 2000; by adopting a promotion rather than a prevention focus, Higgins 1997; by setting learning goals rather than performance goals, Dweck and Leggett 1988). The named alternative approaches have in common that they understand weakness of the will as either a lack of the capability for effective goal striving or a lack of respective wanting; as a consequence, weakness of the will is to be dealt with by enhancing the strength of a person's willing in terms of capability and wanting. In contrast, the presented research on implementation intentions suggests that goal striving should be strategically automated so that weakness of the will is no longer an issue. This can be achieved by making if–then plans that hand over goal striving to specified if–then contingencies that in turn establish bottom-up regulation of one's goal striving that does not require a strong willing in the traditional sense.

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