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CHAPTER

3

Decoupling Goal Striving From Resource Depletion by Forming Implementation Intentions

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Is it a good idea to do some painful paperwork before attending a difficult meeting, to start dieting and to quit smoking at the same time, or to make important investment decisions after a strenuous day at work? One theory that offers clear-cut answers to these questions is the strength model of self-control (see Chapter 1). According to this theory, self-control is a limited resource. Exerting self-control in a first task should thus reduce the self-control that is available for a second task. In other words, exerting self-control leaves individuals in a state of ego depletion that in turn reduces the likelihood of succeeding at subsequent self-control tasks.

In the present chapter, we focus on if–then planning (ie, forming implementation intentions; IIs) as an easily applicable self-regulation tool that can help individuals and groups to overcome major threats to self-regulation such as being ego depleted. We start with a short overview of research on ego depletion, addressing the moderators of the depletion effect and recent suggestions to revise the conceptual basis of the ego-depletion theory. We then present an action control perspective on the ego-depletion phenomenon. To this end, we examine research on goal intentions and the limits of intentional action by goal intentions and introduce IIs. Next, we review studies that have directly tested II effects on ego depletion. We differentiate between studies that investigate whether IIs can be applied to avoid becoming depleted from studies that explore whether IIs are effective in helping participants to overcome

the negative consequences of being depleted in subsequent self-control tasks. Because the self-regulation threat of being depleted often cooccurs with other self-regulation threats, we then expand our view to determine whether IIs can have beneficial effects not only on self-regulatory resource depletion but also the other six major threats to self-regulation that have been identified by Wagner and Heatherton (2015): impulse control and cue exposure, emotional and social distress, lapse-activated pattern and abstinence violations, impairments of self-monitoring and self-awareness, the influence of other people, and alcohol intoxication. We also review research on the regulation of detrimental self-states (such as self-definitional incompleteness) by IIs, in addition to research on ways to strengthen self-regulation by combining IIs with strategies that have also been found to reduce depletion effects (such as self-affirmation and setting autonomous goals). Finally, we discuss these findings and their implications for both the original and more recent explications of the ego-depletion phenomenon as well as for II research, and point to venues for future investigation.

THE RESOURCE MODEL OF SELF-REGULATION

In 1998, Baumeister, Bratslavsky, Muraven, and Tice suggested that active self-control can be costly in the sense that it depletes one's self-regulatory resources. The authors hypothesized that the same self-regulatory resource is used for many different tasks, including regulating thoughts, controlling emotions, inhibiting impulses, sustaining physical stamina, persisting in complex cognitive tasks, regulating self-impression, and dealing with stigmas or being the subject of prejudice. After an act of self-control, this resource becomes exhausted, and an individual experiences a state of ego-strength depletion. A metaanalysis conducted by Hagger, Wood, Stiff, and Chatzisarantis (2010) of 83 experimental studies with more than 10,500 participants observed a medium-to large-sized ego-depletion effect (Cohen, 1992) of $d^+ = 0.62$. Although the small sample sizes of many studies have been criticized (eg, Carter & McCullough, 2014) and the growing number of ways that have been discovered to reduce depletion effects (see Chapter 2; Masicampo, Martin, & Anderson, 2014) suggests that they are not as inevitable as initially thought, recent modifications of the original theory (Inzlicht & Schmeichel, 2012; Inzlicht, Schmeichel, & Macrae, 2014; Kurzban, Duckworth, Kable, & Myers, 2013) open up promising venues for future research. These approaches allow a refinement of the basic idea, the application of new methods for testing the processes underlying depletion effects in greater detail, and for developing intentional strategies to overcome depletion effects and depletion-related self-regulation failure.

SELF-REGULATION BY GOALS AND IMPLEMENTATION INTENTIONS—EFFECTS AND PROCESSES

When it comes to ways to reduce the ego-depletion effect, three strategies have been discussed. First, one can increase one's motivation to increase effort. Second, one can decrease the perceived task effort (see Chapter 4). A third option, which is the focus of the present chapter, is to counteract depletion by decreasing the actual task effort by automating the actions in the depletion task (ie, Task 1) or the subsequent task (ie, Task 2). In line with this argument, Goto and Kusumi (2013) observed that participants who engaged in reinforcement learning of habitual actions for a card selection task improved their performance in a subsequent Stroop task. Similar to these habit-formation effects, IIs should reduce the degree of self-control required to perform either the depleting task or subsequent task. However, although both strategies are assumed to automate action control, the acquisition of this automation differs. Whereas automating one's responses in self-control situations by reinforcement learning requires numerous repetitions, the II strategy is thought to be established by a single act of will (Gollwitzer, 1993).

One might argue that forming goal intentions such as "I want to attain goal X!" (eg, Ajzen, 2012) suffice to ensure successful goal attainment and that the automation of action control is not needed. However, research indicates that action control by goals mainly depend on effortful reflective processes, which are known to be slow and effortful (Strack & Deutsch, 2004) and that a substantial gap between even strong goal commitment and subsequent goal attainment exists (eg, Sheeran, 2002). For instance, a medium-to-large-sized change in goal commitment ($d = 0.66$) led to only a small-to-medium-sized change ($d = 0.33$) in behavior in Webb and Sheeran's (2006) metaanalysis. Thus, an alternative strategy is needed to help people to close the gap between their commitment to and their enactment of personal goals.

One effective strategy is the formation of IIs (Gollwitzer, 1999). These IIs support individuals (Gollwitzer & Sheeran, 2006) and groups (Thürmer, Wieber, & Gollwitzer, 2015a; Wieber, Thürmer, & Gollwitzer, 2012) in the translation of their intentions into action. Various metaanalyses have demonstrated that IIs have medium-to large-sized effects on healthy eating (Adriaanse, Vinkers, De Ridder, Hox, & De Wit, 2011), exercising (Bélanger-Gravel, Godin, & Amireault, 2013), prospective memory (Chen et al., 2015), and goal pursuit in individuals with mental-health problems (Toli, Webb, & Hardy, 2015). Recent research shows that they can even help individuals to change their personality attributes (Hudson & Fraley, 2015).

It has been demonstrated in various ways (Gollwitzer, 2014) that action control by IIs is fast and efficient; this makes it possible to effectively shield

a focal goal pursuit from many different threats to successful self-regulation. IIs spell out the when, where, and how of goal striving in advance using the format of an if (*critical situation*)–then (*goal-directed response*) plan. For instance, if an individual has the goal of performing well on a series of tasks, she or he could form the if–then plan "And if I finish one task, then I will immediately start working on the next task!" to avoid procrastinating between the tasks. Thus, rather than simply committing to a desired end state (ie, forming a strong goal intention to finish as many tasks as possible), making an if–then plan commits the person to performing a certain goal-directed behavior (the then-part) when the specified critical situation (the if-part) is encountered.

IIs facilitate the attainment of personal goals through psychological mechanisms that pertain to the specified situation in the if-part, as well as to the mental link forged between the if-part and the specified goal-directed response in the then-part of the plan (overview by Wieber, Thürmer, & Gollwitzer, 2015b). Because forming an II entails the selection of a critical future situation, the mental representation of this situation becomes highly activated and hence more accessible. This heightened accessibility of the if-part of the plan has been observed in several studies using different cognitive task paradigms such as lexical decision and flanker tasks (eg, Aarts, Dijksterhuis, & Midden, 1999; Wieber & Sassenberg, 2006). Forming IIs not only heightens the activation (and thus the accessibility) of the mental representation of the situational cue specified in the if-component, but also forges a strong associative link between the mental representation of this cue and the mental representation of the specified response. These associative links are quite stable over time (Papies, Aarts, & de Vries, 2009) and ensure that the critical situational cues specified in the if-component will—when encountered—activate the mental representations of the responses specified in the then-component (eg, Webb & Sheeran, 2007).

As a consequence of the strong associative links between the if-part (situational cue) and the then-part (goal-directed response) created by forming IIs, the initiation of the goal-directed response exhibits features of automaticity. These features include immediacy, efficiency, and redundancy of conscious intent (Bargh, 1994). Compared to goal intentions, IIs have been found to facilitate the immediate initiation of goal-directed responses (eg, presenting counterarguments to racist comments more quickly; Gollwitzer & Brandstätter, 1997, Study 3) and to help people to deal more efficiently with cognitive demands (ie, speed-up effects are still evident under high cognitive load; eg, Brandstätter, Lengfelder, & Gollwitzer, 2001). Moreover, action control by IIs does not require a conscious intent to act in the critical moment (eg, II effects are still evident when the critical cue is presented subliminally or when the respective goal is activated outside of awareness; Bayer, Achtziger, Gollwitzer, & Moskowitz, 2009; Sheeran, Webb, & Gollwitzer, 2005). This strategic automation hypothesis (ie, in a conscious act of will, the person delegates action

control to situational cues that produce fast and efficient action initiation without the need for further conscious intent) has recently received further support from brain studies on the localization and timing of action control by IIs and from studies addressing the modification of already existing automatic responses (Schweiger Gallo, Cohen, Gollwitzer, & Oettingen, 2013; Wieber et al., 2015b).

Together, these findings suggest that IIs indeed lead to strategic automation of the specified goal-directed response when the critical cue is encountered. This automation of action control should allow individuals to strategically decouple their goal pursuits from limited self-regulatory resources. IIs should reduce the amount of self-control required to perform a task, which should in turn help to (1) avoid depletion when IIs are directed at Task 1, and (2) avoid the negative consequences of being depleted when IIs are directed at Task 2. We now review the empirical evidence for this proposition in the context of critical self-regulation threats.

MITIGATING THE SEVEN "DEADLY" THREATS TO SELF-REGULATION

The detrimental self-state of depletion has been classified as one of the seven "deadly" threats to successful self-regulation (Wagner & Heatherton, 2015). As these threats commonly emerge bundled together rather than occurring in succession, it seems crucial to determine whether each of them can be successfully overcome by IIs. In the following section, we will therefore review studies that have tested II effects on each of these threats, starting with ego depletion and continuing with impulse control and cue exposure, emotional and social distress, lapse-activated pattern and abstinence violations, impairments of self-monitoring and self-awareness, the influence of other people, and alcohol intoxication.

SELF-REGULATORY RESOURCE DEPLETION

The threat to self-regulation most central to the present chapter is the depletion of individuals' self-regulation resources. As with other self-regulation threats, II studies have tested (1) whether IIs empower individuals to avoid depletion effects, and (2) whether the negative consequences of being depleted on subsequent goal pursuits can be counteracted.

Avoiding a State of Depletion Through Implementation Intentions

Using a sequential task paradigm, Webb and Sheeran (2003) investigated whether forming IIs allows individuals to overcome the ego-depletion

effect. Building on the idea that exerting cognitive control in a first task will impair individuals' performance in a second task, they selected a paper-based Stroop task as their first task. In each single-participant session, participants received a list of 154 words. Each word was printed in an ink color (ie, green, red, yellow, or blue) that was incompatible with the meaning of the respective word (ie, "green," "red," "yellow," or "blue"). The participants' task was to correctly name the ink color of as many words as possible in 10 min. This task requires one to override the automatic habitual response to read the words (see horse race model of response inhibition; eg, Verbruggen & Logan, 2009). Because IIs have been found to effectively change even automatic associations (eg, Adriaanse, Gollwitzer, De Ridder, de Wit, & Kroese, 2011) and to shift information processing from effortful top-down to automatic bottom-up action control (eg, Gilbert, Gollwitzer, Cohen, Oettingen, & Burgess, 2009), participants should be less depleted after having performed the Stroop task when bolstered by IIs rather than mere goal intentions.

Before actually working on the Stroop task, participants were randomly assigned to one of three experimental conditions that differed only in the Stroop task instructions. Participants in the depletion condition with goal intentions were asked to name the ink color of each word as quickly as possible (ie, they should try to override the automatic response). II participants in the depletion condition received the same goal instructions but added the if–then plan "As soon as I see a word, I will ignore its meaning (eg, by concentrating on the second letter only) and I will name the color of ink the word is printed in!" Participants in the no-depletion control condition were asked to simply read the words (ie, not fight against the automatic response).

The differences in depletion were measured in an unsolvable puzzle task that followed the Stroop task. This puzzle task, adapted from Baumeister et al. (1998), sought to measure participants' persistence. Because the participants did not know that the task was in fact unsolvable, being more persistent qualifies as adaptive goal-directed behavior, given that maintaining or increasing effort in the face of obstacles most often increases one's chances of successful goal attainment (eg, Brandstätter & Schüler, 2013; Heckhausen, 1991). In each of the three puzzles presented, participants were asked to trace the lines of a geometric shape. They were not allowed to retrace any line or to remove their pen from the piece of paper. To familiarize participants with the task, the experimenter demonstrated a solvable puzzle to them and explained that only the number of puzzles they finished would be judged, not the number of their unsuccessful attempts. Participants were also told that they could knock on the table when they solved all the puzzles or wanted to stop before they finished. While performing the puzzle task, participants listened to a 15-s loop of loud experimental music through a set of headphones; this served to increase the demands on their self-regulation.

Participants' self-reports indicated the success of the depletion manipulation. Those in the depletion conditions rated the difficulty of the Stroop task and the required effort as higher than those in the no-depletion control condition. The persistence results showed that ego-depletion participants fortified with a goal intention were less persistent in the puzzle task (16.55 min) than both no-depletion control participants (23.77 min) and II depletion participants (23.11 min). Although all participants reported lower motivation after the second task than after the first task, those in the goal-intention depletion condition reported being more tired on the physical fatigue subscale of the multidimensional fatigue inventory (Smets, Garssen, Bonke, & de Haes, 1995) than those in the II depletion and no-depletion conditions.

In sum, in comparison to simply reading the words in the Stroop task, naming the ink color of the words was found to reduce performance in a subsequent persistence task. Importantly, however, this reduction was diminished when individuals had formed IIs to automate their response to name the ink color, but not when participants had only formed mere goal intentions. In line with these findings, participants with mere goal intentions to name the ink color also reported being more depleted after the two tasks than II participants. Thus, forming IIs allowed individuals to successfully overcome the depletion effect.

The question of whether IIs directed at a first task can reduce depletion effects in a subsequent task has also been addressed by Bayer, Gollwitzer, and Achtziger (2010, Study 2). Extending the Webb and Sheeran findings, the authors applied an emotion-regulation depletion manipulation and a cognitive performance test (ie, an anagram task) as a second task. In a replication of the classic ego-depletion effect, participants who had to control their emotions in the first task aided by a mere goal intention were predicted to perform worse in the second anagram task in comparison to a control condition in which participants were not asked to control their emotions. However, because IIs have been found to automate emotion regulation (eg, Schweiger Gallo, Keil, McCulloch, Rockstroh, & Gollwitzer, 2009), it was expected that participants who added an II to their goal intention would not exhibit an ego-depletion effect in the second task but would instead perform at the level of control participants. Participants were invited to take part in two ostensibly unrelated experiments. Experiment 1 was purported to investigate mood effects on long-term memory, and experiment 2 was introduced as a concentration test that had to be performed twice for reasons of reliability and validity.

All participants first worked on a paper-based anagram task. Ten difficult anagrams had to be solved in 160 s. The number of correct solutions served as a baseline measure to control for interindividual differences in anagram performance. An adapted version of the emotion regulation task developed by Baumeister et al. (1998, Study 1) followed. Participants were

randomly assigned to one of three experimental conditions that differed only in the task instructions. Participants in the depletion condition with goal intentions formed the goal to not show any emotions ("I do not want to laugh or to show any emotional response during the movie!") while watching a funny movie for 10 min (ie, overriding their impulse to laugh at funny scenes). Participants in the depletion condition with IIs set the same goal but added the if–then plan "And if I see a funny scene, then I will tell myself: These are only silly and ridiculous jokes!" Participants in the no-depletion control condition received no further instructions (ie, they could freely express their emotions).

With their consent, the participants were recorded on videotape while watching the movie. After the movie, participants filled out a questionnaire measuring mood, vivacity, and anger to rule out differences in participants' affects as an alternative explanation. Finally, all participants were again asked to work on anagram tasks for 10 min and to find as many solutions as possible. This time, the tasks were presented on a computer screen. The number of correct solutions served as the dependent variable. At the end of the experiment, all participants filled out a final questionnaire on the subjective experience of the second task (ie, task difficulty and commitment).

The analysis of participants' emotional expressions during the first task revealed that all participants followed the respective task instructions: Independent raters confirmed that those in the goal and II conditions smiled and laughed less often than those in the free expression control condition. Regarding performance in the second task, the analysis of the mean number of correctly solved anagram tasks demonstrated the expected differences between the experimental conditions. Replicating the classic-depletion effect, participants in the emotion control condition with mere goal intentions solved fewer anagrams ($M = 4.73$) than those in the free expression condition ($M = 7.35$). Importantly, this depletion was not found in the emotion control with II condition ($M = 7.66$). These differences between the three experimental conditions were also observed when adjusting for individual differences by including baseline anagram performance as a covariate. Moreover, participants in all conditions rated the difficulty of the anagram task as high and reported being highly committed to performing well on the anagram tasks, thus confirming that the anagram task required participants to exert cognitive control and ruling out motivational differences as an alternative explanation.

In sum, participants performed worse on a subsequent anagram task if they had tried to control their emotional responses to a humorous movie in comparison to participants in a no-emotion regulation control condition, replicating the classic ego-depletion effect (Baumeister et al., 1998; Muraven, Tice, & Baumeister, 1998). Emotion regulation, however, did not impair participants' performance on the subsequent anagram task when

the participants had planned in advance how they wanted to control their emotions using IIs. These findings provide support for both the ego-depletion effect and the power of IIs in helping to avoid depletion.

Avoiding the Consequences of Being Depleted Through Implementation Intentions

Webb and Sheeran (2003, Study 2) addressed the complementary question of whether IIs can also mitigate the depletion effect of exerting cognitive control in a first task by automating action control in the subsequent second task. To manipulate depletion in their first task, they adapted a test that is used to measure automation deficits in dyslexics (Fawcett, Nicolson, & Dean, 1996). In the depletion condition, participants were asked to stand on their weaker leg and to count down in sevens from 1000. In the control condition, participants were asked to stand normally and count to 1000 in multiples of five. After this depletion manipulation, the intention manipulation and paper-based Stroop task that had been used in their first study followed (see above; Webb & Sheeran, 2003; Study 1). In contrast to the first study, Study 2 applied a full 2×2 design with goal intentions versus IIs and depletion versus no depletion as between-subject factors, thus allowing an investigation of the II effect in the no-depletion condition. Finally, participants were asked to report their mood, the perceived difficulty of the first task, and their level of physical fatigue after the second task.

In support of the success of the depletion manipulation, both the goal intention and II-depletion conditions rated the difficulty of the first math task and their physical fatigue as higher than those in the no-depletion control condition. Replicating the classic depletion effect, goal intention participants in the depletion conditions took longer to perform the Stroop task ($M = 13.91$ min) and made more errors ($M = 27.57$) than those in the no-depletion control condition ($M = 10.88$ min and $M = 15.71$, respectively). Importantly, IIs successfully reduced this impact of being depleted on Stroop performance. II participants in the depletion conditions were as fast ($M = 11.62$ min) and made as few errors ($M = 17.15$) as those in the no-depletion condition. Interestingly, no II effects on speed ($M = 11.12$ min) or errors ($M = 15.38$) in the Stroop task were observed in the no-depletion condition. Most likely, it was easy enough for participants in the no-depletion conditions to perform well on the Stroop task that IIs were not necessary.

The formation of an II thus removed the drain on cognitive control that is usually imposed by the Stroop task. Although participants in the depletion conditions were in a more negative mood after the second task, adjusting for these differences by including mood as a covariate did not change the observed effects. In sum, these findings show that IIs can be used to avoid the negative effects of being depleted on subsequent task

performance. This is especially remarkable because participants formed the IIs when they were already depleted, rather than before the actual depletion task. Thus, the formation of IIs as well as the execution of IIs is not limited by the state of being depleted. We now turn to the other critical threats to self-regulation that have been outlined by Wagner and Heatherton (2015) and examine whether IIs can also be used to overcome them.

CUE EXPOSURE AND IMPULSE CONTROL

Controlling impulses has been found to be the most frequent self-regulation task. About 75% of the time during the day, people report experiencing desires that conflict with their goals (eg, leisure, media use; Hofmann, Vohs, & Baumeister, 2012). Whereas most of these impulses, such as the urge to have a cup of coffee or to relax, have a fairly high probability of being successfully controlled (about 90% of the time), others, such as eating or media use, are less-easily controlled (about 75% of the time or less).

Studies on IIs have addressed many of these impulses by focusing on elementary cognitive processes, as well as by examining the ecological validity of II effects in applied contexts. With regard to cognitive processes, for instance, IIs have been shown to help individuals to improve the executive control demanded by task switching and the Simon task (Cohen, Bayer, Jaudas, & Gollwitzer, 2008) and to gain control over the activation and expression of attitudes (Webb, Sheeran, & Pepper, 2012), stereotypes (eg, Stewart & Payne, 2008), and priming effects (eg, Gollwitzer, Sheeran, Trötschel, & Webb, 2011). In addition, with the assistance of IIs, young children managed to better resist tempting distractions while working on a tedious categorization task (Wieber, Suchodoletz, Heikamp, Trommsdorff, & Gollwitzer, 2011).

With regard to II effects in applied contexts, IIs have been found to help individuals to overcome unhealthy eating patterns and to increase physical exercise (metaanalyses by Adriaanse, Vinkers, et al., 2011; Bélanger-Gravel et al., 2013). IIs have also been shown to improve self-regulation with respect to behaviors that are known to be affected by impulsivity, such as drinking alcohol (eg, Hagger et al., 2012), smoking (eg, Armitage, 2008), engaging in unprotected sex (eg, Martin, Sheeran, Slade, Wright, & Dibble, 2011), and spending money (Wieber, Gollwitzer, & Sheeran, 2014; Study 2).

In addition to these investigations of impacts on situations and cues that foster impulsive behaviors, II effects have also been examined in samples that suffer from impaired impulse control. For example, children with ADHD improved their performance in delay-of-gratification (Gawrilow, Gollwitzer, & Oettingen, 2011) and go/no-go tasks (Gawrilow & Gollwitzer, 2008), and these improvements in self-regulation by IIs are also reflected in physiological correlates such as increased P300 responses in

EEG measurements (Paul et al., 2007). Moreover, drug users (Nydegger, Keeler, Hood, Siegel, & Stacy, 2013) and opiate addicts undergoing withdrawal (Brandstätter et al., 2001; Study 1) were found to improve their self-regulation with the help of IIs. However, some findings suggest that trait impulsivity levels moderate these II effects. Whereas IIs successfully increased the fruit and vegetable intake in participants with low and moderate scores on the "urgency" impulsivity subscale, they did not affect the intake of those with high scores (Churchill & Jessop, 2010, 2011). Nonetheless, research also indicates that IIs can be used to boost self-control in response to temptations. In a cleverly designed set of studies, van Koningsbruggen, Stroebe, Papies, and Aarts (2011) demonstrate that an II to think of one's dieting goal when encountering chocolate, cookies, pizza, french fries, or chips successfully activated participants' dieting goals when they were exposed to tempting food cues (Study 1), and it helped them to reduce their calorie intake across 2 weeks (Study 2). Thus, the combination of IIs that act as (dieting) goal primes and IIs that specify an intended response (eg, "then I will grab an apple!") might be effective in reducing self-regulation failure even in impulsive individuals.

EMOTIONAL AND SOCIAL DISTRESS

Emotional and social distress has been pointed to as a major threat to self-regulation. Being in a negative mood increases the likelihood of self-regulation failure, such that dieters eat more, alcoholics report a greater craving for alcohol, and smokers experience a greater desire to smoke. Emotionally distressed people are generally more likely to engage in unprotected sex or problematic gambling, spend too much money, and behave aggressively (see Wagner & Heatherton, 2015; Chapter 9).

However, II studies have found that the detrimental effects of negative moods can be overcome or avoided by forming if–then plans. For example, IIs to control one's mood helped participants to overcome the detrimental effects of negative moods on risky behavioral choices (eg, willingness to drive a car despite knowing that the brakes may suddenly fail; Webb, Sheeran, Totterdell, et al., 2012, Study 1). Moreover, IIs aimed at focusing on the odds of winning in a gambling task reduced the maladaptive effects of being aroused on participants' betting behavior: Participants were more aware of risks and made better decisions in the gambling task (Webb, Sheeran, Totterdell, et al., 2012; Study 2). In addition to self-regulating the effects of negative moods and arousal, IIs have also been observed to diminish the detrimental effects of positive moods on goal pursuit (Bayer et al., 2010; Study 1). In participants who added an II to their goal intention to ignore a person's gender when forming an impression of women depicted in hand-painted sketches, positive moods did not increase stereotyping,

whereas being in a positive mood led participants who were not assigned any goal to form a nonstereotypical impression as well as those who formed a mere goal intention to select more stereotypical descriptions of the women's activities than participants in a neutral mood. Other studies have shown that IIs can also be used to avoid slipping into a negative mood in the first place (eg, Schweiger Gallo et al., 2009).

In addition to mood effects, studies have examined the effectiveness of IIs when emotional distress and an additional threat to self-regulation endanger individuals' goal attainment. These studies, however, have observed mixed results. When cue exposure and impulse control threats challenge individuals' self-regulation, IIs have been found to improve response inhibition, but only when emotional activation is low (Burkard, Rochat, & Van der Linden, 2013). Thus, the combination of two threats (ie, impulse control and emotional distress) may overextend the capability of IIs to prevent self-regulation failure.

In addition to the regulation of emotional distress, studies have also tested whether IIs protect self-regulation when social distress threatens goal pursuit. For example, in a study conducted by Palayiwa, Sheeran, and Thompson (2010), female participants received either negative appearance-related comments or not, and either formed IIs or mere goal intentions to ignore these comments during an ongoing d2 attention-concentration task (Brickenkamp, 1994). Whereas negative comments impaired goal intention participants' performance, II participants performed as well as those who were not confronted with negative comments. Thus, IIs allowed the female participants in the study to shield their task performance from the stigmatizing comments.

Finally, in addition to mood and social distress, the impact of being stressed on II effects has also been investigated. For example, planning to eat healthy snack alternatives in stressful situations helped participants in a study on stress-related unhealthy snacking (O'Connor, Armitage, & Ferguson, 2015). Whereas daily stressors were associated with the consumption of unhealthy snacks in the control condition, no such correlation was observed for II participants, who managed to increase their consumption of healthy snacks on stressful days. In line with these findings, being stressed (as indicated by higher cortisol and heart rate levels) did not compromise the beneficial effects of IIs on go/no-go task performance (Scholz et al., 2009).

LAPSE-ACTIVATED PATTERN AND ABSTINENCE VIOLATIONS

The well-known "what the hell effect" (eg, Heatherton, Herman, & Polivy, 1991) whereby dieters are more likely to indulge in forbidden food once they break their diet is a well-established threat to self-regulation. Although there are no studies that have directly tested whether IIs can

offset the negative consequences of violating one's abstinence rules, there is indirect evidence that IIs can be used to counteract the threat of violating one's abstinence intentions. For example, there are studies showing that IIs can help people to overcome unhealthy eating patterns (meta-analysis by Adriaanse, Vinkers, et al., 2011) such as breaking unwanted snacking habits (Adriaanse, Gollwitzer, et al., 2011); attempting to overcome unhealthy eating patterns can be assumed to involve some sort of abstinence violations. Moreover, because distress is assumed to be one of the mediators of the effects of abstinence violations on subsequent self-regulation failure, studies that demonstrate II effects even under stressful conditions (eg, O'Connor et al., 2015; Scholz et al., 2009) provide indirect evidence for the hypothesis that IIs should also mitigate the detrimental consequences of lapses and abstinence violations. However, future research should test whether IIs can strengthen one's self-control voice when there is the temptation to simply declare "What the hell!"

IMPAIRMENTS OF SELF-MONITORING AND SELF-AWARENESS

In addition to issues of impulse control, reduced self-monitoring and self-awareness have been suggested as a second axis of threats that contribute to self-regulation failure (Wagner & Heatherton, 2015). When addressing these threats, two routes seem viable from an action control perspective: IIs may either be used to raise self-awareness in a critical situation or to improve self-regulation under conditions of low self-awareness.

With regard to the first route mentioned earlier (ie, increasing self-awareness), recent II research provides indirect evidence by showing that IIs can trigger self-relevant processes. In a study on the escalation of commitment, IIs helped groups to successfully initiate a self-distancing response when making important decisions in an escalation of commitment situation (Wieber, Thürmer, & Gollwitzer, 2015a). IIs to take the perspective of a neutral observer helped groups to reduce their commitment to a self-chosen project after negative feedback. Similarly, the use of IIs as goal primes (van Koningsbruggen et al., 2011) that trigger deliberative thoughts about one's goals exemplifies how IIs may be used to increase self-awareness.

With respect to the second route (ie, improving self-regulation under conditions of low self-awareness), II studies that have attempted to boost self-regulation when individuals are not consciously aware of a critical situation indicate that this method of overcoming the threat of low self-awareness through IIs is also possible. For example, Bayer et al. (2009) examined whether the actions specified in IIs are triggered when the stimulus is presented subliminally. Participants who were insulted by an

experimenter and formed IIs to complain read aloud instrumental words related to complaining more quickly after the subliminal presentation of a photo of the experimenter (Study 1). They were also faster at categorizing geometric shapes by pressing different buttons when subliminally presented shapes preceded the categorization trial (Study 2). These results suggest that IIs trigger actions automatically without individuals being aware of it, thus potentially triggering self-regulation responses even when individuals are not self-aware.

THE INFLUENCE OF OTHER PEOPLE

Despite the benefits and importance of social support (eg, reducing stress; Eisenberger, Taylor, Gable, Hilmert, & Lieberman, 2007), the influence of other people may also represent a threat to self-regulation. For instance, when individuals become immersed in a group (ie, deindividuation), they become more likely to break social norms not to steal, cheat, or act aggressively (see Wagner & Heatherton, 2015). Such deindividuation is hypothesized to endanger self-regulation by inhibiting individual standards and strengthening the respective group norms that guide people's actions instead (Reicher, Spears, & Postmes, 1995). Moreover, seeing others indulging (eg, in smoking, eating, or drinking alcohol; Hofmann, Baumeister, Förster, & Vohs, 2012) or breaking social norms (Keizer, Lindenberg, & Steg, 2008), or simply being primed with socializing (Sheeran, Aarts, et al., 2005) can increase the likelihood of self-regulation failure. Finally, behavioral mimicry contributes to self-regulation failure when individuals mimic the eating and drinking behavior of their food companions (Hermans et al., 2012).

Although the number of II studies on curbing the negative impact of social groups in terms of self-regulation is still limited, several of the social phenomena described earlier have been examined experimentally. For instance, IIs were found to help groups to improve their decisions by considering more unshared information (Thürmer, Wieber, & Gollwitzer, 2015b), helped individuals to emancipate themselves from unwanted mimicry effects (Wieber et al., 2014), and socially anxious individuals to reduce the attentional bias toward social threat words and to not underestimate their performance in social contexts from (Webb, Ononaiye, Sheeran, Reidy, & Lavda, 2010). Finally, studies have also found that IIs can be used to change social behavior directed at others. For example, IIs have been observed to increase prosocial behavior (Gollwitzer et al., 2011; Study 2), speed up counterarguing in response to racist comments (Gollwitzer & Brandstätter, 1997), and help men or women to defend their intimate relationships in response to threats (Lydon, Menzies-Toman, Burton,

& Bell, 2008). In sum, IIs have been demonstrated to successfully control the potentially negative influence of other people on self-regulation.

ALCOHOL INTOXICATION

Another major threat to successful self-regulation is alcohol intoxication (see Wagner & Heatherton, 2015). Alcohol is involved in about half of the criminal acts in the United States, and increases the likelihood of all of the self-regulatory failures, from smoking to behaving aggressively (see Steele & Josephs, 1990). In addition, it is known to reduce self-awareness and to narrow attention to the immediate situational context (eg, Sevincer, Oettingen, & Lerner, 2012).

Several studies have investigated whether IIs can reduce the frequency and quantity of alcohol consumption. For example, in an intervention study seeking to reduce alcohol consumption according to the recommendations of the World Health Organization, IIs helped undergraduate students from the UK and Estonia to reduce their consumption over the course of 4 weeks, and the intervention reduced the frequency of binge drinking in UK students (Hagger et al., 2012). As a limitation, however, there was no effect on alcohol consumption for students in Finland, and no reduction in binge drinking occasions for students in Estonia and Finland. Moreover, whereas Estonian students managed to meet the WHO recommendations, students in the UK and Finland still drank more units than recommended. Interestingly, although mentally simulated successful coping with critical prospective events has previously been found to enhance action control (eg, Knäuper et al., 2011), combining the II intervention with mental simulation did not improve the effectiveness of the intervention.

Significant effects of IIs on alcohol consumption were also observed in women who were moderate drinkers (but not men; Murgraff, Abraham, & McDermott, 2007) and in the general population in the UK (Armitage, 2009). The latter study also indicated that self-generated IIs were as effective as the IIs provided by the experimenter, allowing for cost-efficient standardized interventions. Thus, with some exceptions, IIs have been shown to help individuals to improve the self-regulation of their drinking behavior. The fact that IIs reduced the frequency of binge drinking also suggests that people succeeded in self-regulating their alcohol intake even after having a number of drinks. Thus, rather than giving in to the "what the hell" justification, individuals managed to successfully halt the escalation of their dinking despite their already reduced self-regulation capacity. These findings are also in line with the observation that individuals with high planning ability and inhibition control exhibit less of a gap between their intentions to reduce their

binge-drinking behavior and their actions than those with low planning ability and inhibition control (Mullan, Wong, Allom, & Pack, 2011), and they highlight the power of planning in tackling the self-regulation threat of drinking.

IMPLEMENTATION INTENTIONS AND THE EFFECTS OF RELEVANT SELF-STATES ON SELF-REGULATION

In addition to the seven deadly threats to self-regulation, IIs have also been tested with regard to their effectiveness to decouple individuals' self-regulation from the consequences of detrimental inner states. For instance, IIs have been shown to mitigate the unwanted effects whereby feeling incomplete with respect to an aspired-to identity goal increases social insensitivity (Bayer et al., 2010; Study 3) and whereby low self-efficacy limits goal attainment (eg, Wieber, Odenthal, & Gollwitzer, 2010). Moreover, IIs counteracted the negative effects of self-handicapping on performance (Thürmer, McCrea, & Gollwitzer, 2013) and even diminished deficits in prospective memory in individuals suffering from early-stage psychosis (Khoyratty et al., 2015).

Complementary to this demonstrated ability to block the influence of detrimental states on self-regulation, a number of studies also indicate that II effects can benefit from certain self-states. For example, forming self-concordant goals (Chatzisarantis, Hagger, & Wang, 2010), combining self-affirmation and IIs (eg, Harris et al., 2014), or combining IIs and mental contrasting (MCII; eg, Oettingen, 2014; Oettingen, Wittchen, & Gollwitzer, 2013) seem very promising venues for the design of more powerful behavior change interventions. However, future research must explore how such combinations can be best structured to achieve maximum behavior change.

IMPLICATIONS

As a conceptual implication of the reported findings on II effects with regard to ego depletion, it can be concluded that these effects and the assumed processes are congruent with the shift from a "have to" to a "want to" motivation, an explanation that has recently been suggested by Inzlicht et al. (2014; see Chapter 18). Because performing the Stroop task or an emotion regulation task subsequent to forming an II should require less self-control (ie, draw less on the "have to" motivation), the shift to a subsequent reluctance to exert self-control (ie, acting in terms of the "have to" motivation) rather than engaging in "want to" activities should be less pronounced. Similarly, the II effects and processes

are congruent with the change in the cost–benefit calculations that has been suggested by Kurzban et al. (2013). IIs should reduce the effort required to perform a self-control task, and consequently there should be no reduction in the deployment of computational mechanisms such as those associated with executive functions in subsequent self-control tasks.

Moreover, comparing II research to depletion research would seem to further our knowledge of the effects, processes, and physiological correlates of successful self-regulation (see Chapter 14), as well as facilitate the conceptual integration and the development of effective interventions. For example, comparing the research findings on the neurological correlates of depletion effects (eg, Inzlicht, Berkman, & Elkins-Brown, 2016) and those of II effects on emotion regulation suggest that IIs should mitigate the detrimental impact of depletion on emotion regulation. Whereas depletion has been found to increase the reactivity of the left amygdala and to reduce the functional connectivity between the left amygdala and the prefrontal cortex during the processing of negative scenes (Wagner & Heatherton, 2012), forming IIs is associated with a more effective modulation of the left amygdala and an improved coupling of the amygdala and the orbitofrontal cortex that is involved in automatic processing (Hallam et al., 2015). Similarly, depletion has been found to impair top-down control of action (Wagner, Altman, Boswell, Kelley, & Heatherton, 2013), whereas IIs have been observed to reduce the need for top-down control, since they establish bottom-up action control (Gilbert et al., 2009).

In addition to directly comparing II and depletion research, the combination of IIs and self-regulation strategies that have been found to moderate ego depletion seems a promising venue for further improving the effectiveness of self-regulation interventions, especially when more than one self-regulation threat is present. For instance, self-affirmation and self-concordant goals have both been found to reduce depletion effects and to boost II effects (see Chapter 4), suggesting that the combination of self-affirmation, self-concordant goals, and IIs should be especially effective in reducing the impact of ego depletion. Similarly, strengthening the belief that willpower is unlimited (see Chapter 11) in individuals who tend to think of willpower as a limited resource should help them to overcome depletion effects. Believing that willpower is limited has been found to activate a rest goal after the exertion of self-control (Job, Bernecker, Miketta, & Friese, 2015). To counteract the effects of this rest goal, people could use IIs to directly address their willpower-related beliefs ("And if I think of quitting my studies, then I will tell myself: Your willpower is unlimited!") or the consequences of these beliefs ("And if I have finished one task, then I will immediately start the next one!").

CONCLUSION

The concept of energy conservation brings together a variety of research areas, such as the formerly separate fields of sleeping habits and self-control (Pilcher, Morris, Donnelly, & Feigl, 2015) and clinical psychology research on addictive behaviors (Baumeister & Vonasch, 2015). This transphenomenal use of the self-control model represents a significant integrative potential to unite different research traditions, as well as an opportunity to refine a theory that can be used both to inspire new research questions and address applied challenges. The present chapter focused on the capability of the self-regulation strategy of forming IIs to decouple individuals' goal pursuits from the state of self-regulatory resources. IIs have been proven to be an easily applicable strategy: A single act of will is sufficient to allow an individual to successfully avoid depletion effects or the consequences of being depleted. The reviewed findings show that IIs can effectively address major threats to self-regulation such as low impulse control and cue exposure, high emotional and social distress, lapse-activated pattern and abstinence violations, impairments in self-monitoring and self-awareness, the influence of other people, and alcohol intoxication. Thus, the likelihood of self-regulation failure might be reduced not only by strategies such as proactive self-regulation (ie, preventing critical situations in the first place) or by performing self-control exercises over an extensive time period, but also by the simple planning strategy of forming IIs.

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