Staying on track: Planned goal striving is protected from disruptive internal states

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ABSTRACT

Past implementation intention research focused on shielding goal striving from disruptive internal states (e.g., being anxious) by forming if–then plans that link these very states to instrumental coping responses. In the present line of research, we investigated whether planning out goal striving by means of if–then plans specifying opportunities to initiate goal-directed responses also protects goal striving from the negative impact of disruptive internal states. Indeed, in the face of disruptive internal states, participants who had been asked to form implementation intentions that targeted opportunities for initiating goal-directed responses outperformed participants with a mere goal intention to do well on a focal task goal. Actually, implementation intention participants performed as well as control participants who were not burdened by disruptive internal states such as being in a certain mood (Study 1), ego-depleted (Study 2), or self-definitionally incomplete (Study 3). Results are discussed by pointing to the importance of hypo-egoic self-regulation.

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Introduction

Traditional models of goal pursuit posit that goals fashioned from feasibility and desirability considerations satisfactorily account for the intensity of goal striving (e.g., Ajzen, 1991; Heckhausen, 1991). However, empirical evidence suggests that this effect is moderate at best. A recent meta-analysis indicates that there is a substantial gap between people's goals and their attainment (Webb & Sheeran, 2006). This implies that holding a strong goal ("I intend to reach Z!") does not guarantee goal achievement as people may fail to effectively deal with self-regulatory problems associated with translating a goal into its attainment.

Gollwitzer and Sheeran (2006) differentiated various self-regulatory problems of effective goal striving. For instance, there is the issue of getting started. Often opportunities to act are not used because one is dealing with many things at once or preoccupied with competing tasks; in addition, such opportunities often present themselves only briefly, thus requiring swift action. Also, people may fail to initiate goal-directed action because they need to overcome an initial reluctance to act (e.g., when it comes to vigorous exercising in order to meet the goal of physical fitness). But even if a person has successfully initiated goal striving, a successful ending is yet to be achieved as people

need to stay on track. Certain internal and external conditions are not conducive to shielding one's started goal striving but could actually derail it. Thus people need to protect the ongoing goal striving from attending and responding to distractions from inside and outside the person.

Successfully shielding one's goal striving implies staying on track by abstaining from performing antagonistic attention and behavioral responses to these events. So far, research on controlling such responses for the purpose of shielding goal striving has analyzed disruptions that are anticipated by the individual. For instance, Patterson and Mischel (1975) warned children participants that their performance of a rather tedious task (i.e., putting pegs in a peg board) might be disrupted by seductive comments of a Clown Box to stop their work, walk over to him, and talk to him. Children thus had a chance to make plans on how to deal with Mr. Clown Box once he spoke up (e.g., ignoring him or increasing their effort on the task at hand).

In the present paper, we analyze a different way of protecting an ongoing goal striving from getting derailed. We argue that spelling out goal striving in advance by using if–then plans that specify opportunities to act will stabilize this striving to such a degree that distracting stimuli can no longer intrude. When using this strategy people do not have to anticipate potential disruptions, nor do they need to know how these are to be dealt with most effectively. After all, this strategy does not focus on coping with distractions; rather, it focuses on laying down the details of one's goal striving by linking opportunities to act towards the goal with instrumental goal-directed responses.

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Implementation intentions: a strategic attempt to install automatic self-regulation

Implementation intentions are if–then plans formed in the service of goal intentions (e.g., "I want to exercise more!"; Gollwitzer, 1993, 1999). Such plans create a strong link between a critical cue (e.g., "When I get out of bed in the morning, . . .") and a goal-directed behavior (e.g., ". . ., then I will put on my running shoes!") by one single conscious act of will. Studies in different domains (e.g., academic, health, interpersonal) have shown that goal attainment is fostered by implementation intentions (for summaries, see Achtziger & Gollwitzer, 2010; Gollwitzer, Gawrilow, & Oettingen, 2010; Gollwitzer & Sheeran, 2006). For example, implementation intentions support goal attainment even when goal-directed behavior is inconvenient (e.g., Gollwitzer & Brandstätter, 1997) or unpleasant (e.g., Orbell & Sheeran, 2000). These effects of implementation intentions are explained by the fact that implementation intentions delegate the control of goal-directed behavior to critical cues. Accordingly, implementation intentions turn the control of goal-directed responses from conscious and effortful top-down control by the goal intention into a direct, bottom-up stimulus control.

The effects of implementation intentions are based on the following processes (see Gollwitzer, 1993, 1999). One process concerns the specified critical cue (i.e., the if–component); forming an implementation intention leads to an increased activation of the mental representation of the critical cue. Thus the critical cue is more easily detected, readily attended to, and successfully remembered (e.g., Aarts, Dijksterhuis, & Midden, 1999; Parks-Stamm, Gollwitzer, & Oettingen, 2007; Webb & Sheeran, 2004, 2006). A further process concerns the goal-directed behavior that is linked to the critical cue in the then–component. Automatic initiation of the goal-directed behavior occurs once the critical cue is encountered, as evidenced by immediate and efficient action initiation that needs no further conscious intent (e.g., Bayer, Achtziger, Gollwitzer, & Moskowitz, 2009; Brandstätter, Lengfelder, & Gollwitzer, 2001; Gollwitzer & Brandstätter, 1997).

Implementation intention research has not only studied getting started with goal striving but also the shielding of an ongoing goal striving (Gollwitzer, Bayer, & McCulloch, 2005). So far, implementation intention research on goal shielding however has mostly followed Patterson and Mischel's (1975) lead; it studied the suppression of unwanted attention responses to distractors (Achtziger, Gollwitzer, & Sheeran, 2008; Gollwitzer & Schaal, 1998). Gollwitzer and Schaal (1998) asked participants to perform arithmetic problems for a period of 15 min while being distracted by interspersed exciting film clips. Participants who had formed implementation intentions that specified the onset of a film clip in the if–component (i.e., "As soon as I see moving pictures or hear some sound, . . .") and a coping response in the then–component (i.e., ". . ., then I will ignore them!" or ". . ., then I will concentrate on the math problems!") performed better on the math problems than mere goal intention participants who only set themselves the goal to not get distracted by the film clips.

Recently, Achtziger et al. (2008) analyzed the shielding of goal striving from anticipated critical internal states. In Study 1, college students with the goal to suppress fast food consumption were enrolled in a study on eating fewer snacks. As compared to a no-treatment control condition, implementation intention participants who prepared themselves against eating high fat snack food by planning out how to suppress their craving-related thoughts did indeed reduce their snack food consumption in the following week. In Study 2, participants were tennis players who prepared themselves for an upcoming competitive match. As compared to a no-treatment control group, goal intention participants were asked to form the goal to perform as well as possible in this match.

Implementation intention participants additionally were asked to form four if–then plans on their own, each of the if–then plans specifying an anticipated disruptive internal state (e.g., being anxious) that had to be linked to a preferred coping response (e.g., increasing concentration). Only implementation intention participants evidenced better physical fitness and performance compared to prior matches as rated by their coaches and team-mates.

Note that the experimental paradigms used by Gollwitzer and Schaal (1998) and Achtziger et al. (2008) both put participants in a position to anticipate potential disruptions to their goal striving. In the Gollwitzer and Schaal studies, the experimenter told the participants about the upcoming external distractions; in the Achtziger et al. studies, the participants had to recall exactly those critical internal states that prevented them from meeting their goals in the past. The participants thus could use the anticipated distractions to specify the if–components of their implementation intentions and link them to coping responses in the then–components.

The present research

We wanted to explore whether implementation intentions can shield a focal goal striving from disruptions even if these plans do not specify how to cope with upcoming distracting stimuli, but instead how to use opportunities to act towards attaining the focal goal. The latter implementation intentions thus specify a suitable opportunity to act towards the focal goal in the if–component. Furthermore, in the then–component they describe a response that is instrumental to goal attainment given the presence of the specified opportunity. We postulated that such implementation intentions effectively counteract the negative impact of distractions on focal goal strivings, and we tested this hypothesis by analyzing various internal states that are known to be disruptive to meeting these goals. Specifically, we studied handicapped goal striving stemming from disruptive internal states of an affective (mood, Study 1), volitional (ego-depleted, Study 2), and motivational (an incomplete identity, Study 3) nature. Given the assumption that by forming implementation intentions a person's action control is delegated to specified cues (i.e., anticipated opportunities to act towards the respective goal), potentially disruptive internal states should no longer handicap goal striving.

In the present research, the experimental designs of the three studies conducted all contained control conditions so that we could check whether the induced critical internal state did indeed hamper goal attainment (i.e., qualifies as disruptive). Also, we established goal intention and implementation intention conditions for those participants who were induced into disruptive internal states in order to test whether adding implementation intentions prevents impaired performance. In Study 1, it was assessed whether implementation intentions can ameliorate the enhanced stereotyping in judging others that is induced by being in a positive mood. In Study 2, we tested whether the negative effect of reduced self-regulatory capacity (i.e., ego depletion) on academic task performance vanishes when implementation intentions have been formed. In Study 3, we analyzed whether implementation intentions can weaken the negative effect of self-definitional incompleteness on interacting with others in a sensitive, perspective taking manner.

Study 1: preventing stereotypical judgments induced by positive mood

Theories on mood and cognition (for an overview see Martin & Clore, 2001) postulate that being in a positive mood favors the use

of heuristics in judgments and decision making (e.g., Beukeboom & Semin, 2005; Bless, 2001). In support of this claim, positive mood has been found to be associated with increased stereotyping (e.g., Bodenhausen, Kramer, & Suesser, 1994; Park & Banaji, 2000). It appears then that positive mood qualifies as a disruptive internal state for any person who tries to meet the goal to judge members of a stereotyped group in an accurate manner. Accordingly, we investigated whether implementation intentions that furnish the goal to judge others accurately would protect these judgments from the negative effects of positive mood (i.e., the stereotypicality of these judgments should be reduced). For this purpose, either a positive or neutral mood was induced in male participants. We then measured gender stereotyping of female target persons implicitly by assessing the linguistic expectancy bias (LEB; Maass, 1999; Wigboldus, Semin, & Spears, 2000). We predicted that participants in a positive mood should engage in more stereotyping of these target women compared to participants in a neutral mood. More importantly, we postulated that mere goal intentions to be non-stereotypical in one's judgments should control stereotyping to a lesser degree than when such goal intentions are furnished with implementation intentions spelling out how to arrive at non-stereotypical judgments.

Method

Participants

Participants were 81 male students at a German University; they received 5 Euros for their participation. Their age ranged from 18 to 32 ($M = 23.29$; $SD = 2.65$) years. One participant was excluded after reporting that he did not like film clips presenting comedians (i.e., the positive mood manipulation had failed in this case; see below).

Design

Participants were randomly assigned to one of four conditions (control-neutral mood, control-positive mood, goal intention-positive mood, implementation intention-positive mood). The linguistic expectancy bias was assessed as the dependent variable of stereotyping.

Procedure

Participants were individually invited to take part in two independent experiments run by the media psychology department and the social psychology department. First, participants watched 13 min film clips that had been extensively piloted. In the positive mood condition, a film clip with four different German stand-up comedians (i.e., Thomas Herrmanns, Jürgen von der Lippe, David Leukert, and Michael Mittermeier) was presented. In the neutral mood condition, participants saw a documentary (i.e., neutral film) about the education of trainees. After viewing the film clip, participants were asked how they felt at the moment (9-point answer scale; 1 = *very bad* to 9 = *very good*). They were informed that a memory test on the film clip would follow later and that in the meantime they would take part in a second study on impression formation, and therefore they had to complete an impression formation task. Control participants did not receive any further instruction. Goal condition participants were also instructed to set the following goal: "I want to form a non-stereotypical impression!" In addition to this goal intention, implementation intention participants were instructed to adopt the additional plan: "Whenever I analyze a given person, then I will ignore her gender!" Goal and implementation intention participants were asked to quietly repeat their instructions three times.

Finally, participants worked on the impression formation task (see below) and thereafter answered items assessing their goal commitment ("How strongly do you intend to come up with a non-stereotypical impression?" and "How committed do you feel to this intention?"; 1 = *not at all* to 9 = *very much*). We computed a mean score for goal commitment (Cronbach's $\alpha = 0.76$). Finally, we asked about any suspicions regarding the study, and then debriefed, thanked, and paid participants.

Implicit stereotyping

Participants judged two women (i.e., Sabine and Gerda) depicted in hand-painted sketches. Sabine was sitting in front of a mirror combing her hair, and Gerda looked after a child climbing a rope bridge on a playground. Participants were asked to check one of four possible descriptions of the depicted persons. These descriptions were constructed in accordance with the linguistic category model by Semin and Fiedler (1991); this model differentiates four abstraction levels of the conceptualization of behaviors and personal attributes. These levels are: (1) descriptive action verb (DAV; the most concrete level), (2) interpretative action verb (IAV), (3) state verb (SV), and (4) adjective (ADJ; the most abstract level). Research on the linguistic expectancy bias (LEB) found that in general, expectancy-consistent behavior is described at a higher level of abstraction (e.g., Maass, 1999; Wigboldus & Douglas, 2007).

In constructing our stereotyping measure, the following four multiple choice answers were presented for the picture "Sabine is sitting in front of the mirror": Sabine combs her hair (DSV); Sabine makes herself pretty (IAV); Sabine admires herself in the mirror (SV); and Sabine is vain (ADJ). The four possible answers for the picture "Gerda looks at a climbing child" were: Gerda hails to Martina (DAV); Gerda cautions Martina (IAV); Gerda is worried about Martina (SV); and Gerda is caring (ADJ). Note that the two pictures promote traits that are typical of the stereotype of "women" (i.e., vain and caring). To calculate the stereotyping score, we coded participants' answers to the two pictures in the following way: DSV = 1, ADJ = 2, DAV = 3, and ADJ = 4, and then computed the mean score.

Results

Mood manipulation check and goal commitment

As expected, participants' mood ratings differed significantly between the positive and neutral mood condition: positive mood ($M = 6.43$, $SD = 1.37$) vs. neutral mood ($M = 5.60$, $SD = 1.53$), $F(1,78) = 5.25$, $p < 0.05$, $\eta^2 = 0.06$. Moreover, participants in the three positive mood conditions (control-positive mood, goal intention-positive mood, and implementation intention-positive mood) reported similar mood ratings ($F < 1.5$, *ns*), indicating that the mood manipulation was successful. Participants' goal commitment did not significantly differ between the goal intention ($M = 5.67$, $SD = 2.11$) and the implementation intention ($M = 6.65$, $SD = 1.75$) condition, $F(1,38) = 2.46$, $p = 0.13$, $\eta^2 = 0.06$. This finding is in line with prior implementation intention research showing that forming implementation intentions does not increase the commitment to the respective goal intention (e.g., Achtziger et al., 2008).

Dependent variable: stereotyping score

First, we tested whether positive mood influenced stereotyping (see Fig. 1). Therefore, performance for control participants in a positive mood was compared to control participants in a neutral mood. A one-factorial ANOVA on the stereotyping score indicated a significant effect for mood. Positive mood participants reported more stereotypical impressions compared to participants in the neutral mood condition ($M = 2.30$, $SD = 0.65$ vs. $M = 1.92$, $SD = 0.54$), $F(1,38) = 3.08$, $p = 0.05$, $\eta^2 = 0.09$.

Second, we tested whether the control of stereotyping was more successful if participants had furnished their goal intention with implementation intentions. These participants should perform as well as participants not experiencing the disruptive inter-
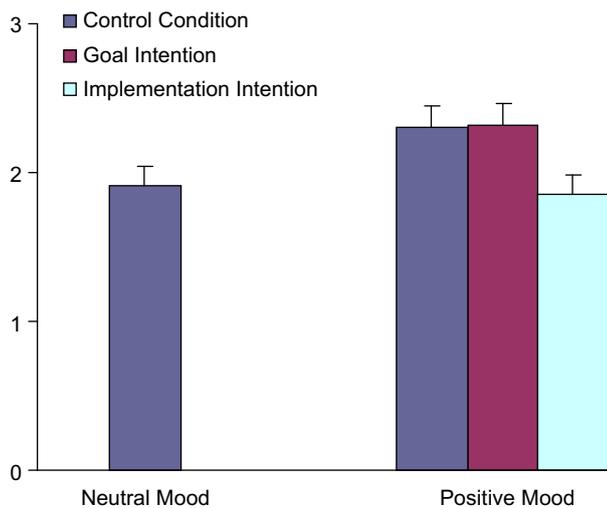
Fig. 1. Mean stereotyping scores and standard errors for the four experimental groups: control-neutral mood, control-positive mood, goal intention-positive mood, and implementation intention-positive mood.

nal state of being in a positive mood (i.e., participants in a neutral mood). To test this hypothesis, we contrasted positive mood participants in the control and the goal intention conditions with positive mood participants in the implementation intention condition and control participants in the neutral mood condition (control-positive mood = 1, goal intention-positive mood = 1, implementation intention-positive mood = −1, control-neutral mood = −1). As expected, the latter two groups showed significantly lower stereotyping scores than the first two groups, $t(76) = 3.18$, $p < 0.01$, $r_{contrast} = 0.34$.

Finally, a one-factorial ANOVA across all four conditions was computed; it also revealed a significant effect for Condition, $F(3,76) = 3.45$, $p < 0.05$, $\eta^2 = 0.12$. Planned t-tests indicated that positive mood participants in the implementation intention condition ($M = 1.85$, $SD = 0.55$) showed significantly lower stereotyping scores compared to positive mood participants both in the goal intention condition ($M = 2.32$, $SD = 0.63$), $t(76) = 2.52$, $p < 0.05$, $d = 0.79$, and in the positive mood control condition ($M = 2.30$, $SD = 0.65$), $t(76) = 2.39$, $p < 0.05$, $d = 0.75$. In contrast, participants in the goal intention condition did not significantly differ from the positive mood control condition, $t < 1$. As seen in Fig. 1, only positive mood participants with implementation intentions managed to control the positive mood effect on stereotyping.

Discussion

Participants in a positive mood evidenced stronger implicit stereotyping compared to participants in a neutral mood. This finding is in line with theories on mood and cognition proposing that positive mood enhances top-down processing and the use of heuristics, schemas, and stereotypes (Beukeboom & Semin, 2005, 2006; Bless, 2001; Park & Banaji, 2000). Most importantly, we found that participants instructed to form a fairness goal ("I will form a non-stereotypical impression!") were not able to control the positive mood effect on their impression formation ratings; the adoption of an additional implementation intention ("Whenever I analyze a person, then I will ignore her gender!") was necessary. According to implementation intention theory, this is possible because planning out in advance how one will handle the impression formation task puts task performance on automatic pilot (i.e., makes it stimulus controlled). There was no support for an alternative process hypothesis in terms of enhanced goal commitment after implementation intention formation.

Enhanced stereotyping in a positive mood was assessed implicitly by the use of the linguistic category model (Semin & Fiedler, 1991). In line with the expectancy-based explanation of the linguistic intergroup bias (see Maass, 1999; Wigboldus & Douglas, 2007), we observed more abstract language for describing stereotypical behavior in positive mood, regardless of the valence of the stereotypical behavior. As participants were probably not aware of the fact that the four answers presented for each of the two pictures were actually designed to assess the stereotypicality of their impressions (Maass, 1999), the present findings also suggest that the observed implementation intention effect is void of conscious efforts to control the use of stereotypes (for related findings on the issue of automatic action control by implementation intentions see Bayer et al., 2009; Brandstätter et al., 2001; Gollwitzer & Schaal, 1998; Mendoza, Gollwitzer, & Amodio, in press; Stewart & Payne, 2008).

One might want to argue that implementation intention compared to goal intention participants were additionally provided with a helpful strategy to attain their goal of forming non-stereotypical impressions (i.e., avoiding stereotypes related to gender), and that knowledge of this strategy might have caused the observed beneficial effect of the formed implementation intention. However, as both goal intention and implementation intention participants had to judge depicted women, we thought that this difference in specification should not matter as the goal intention participants would readily translate the goal to avoid stereotyping into the goal to avoid gender stereotyping. We tested this assumption in a follow-up study, where we had goal vs. implementation intention participants rate how much they would try to judge women fairly and how useful the received instructions would be for controlling gender stereotypes. As expected, concerning both questions goal intention participants did not differ from implementation intention participants, $ts(58) < 1.02$, $ps > 0.32$.

In sum, in Study 1 we could show that the influence of a disruptive internal state that is known to impair goal striving can be controlled by an implementation intention that is geared towards goal attainment. Note that implementation intention participants did not expect this disruptive internal state (i.e., a positive mood) to originate and that their implementation intentions did not target this state by linking it to a coping response. In order to investigate whether the present finding holds true for other unexpected disruptive internal states of a different nature (i.e., volitional and motivational), we run Studies 2 and 3.

Study 2: preventing ego depletion effects on anagram task performance

Recent findings suggest that the executive self is a resource of limited capacity and that self-control consumes this resource inducing a state of ego depletion that hampers subsequent self-regulation performances (Baumeister, 2002; Baumeister, Vohs, & Tice, 2007; Muraven, Tice, & Baumeister, 1998). It is assumed that the same self-control resource is used for many different tasks, including thought control, controlling emotions, inhibiting impulses, and persisting on complex cognitive tasks; any act of self-control (e.g., resisting desirable food) can thus induce ego depletion. Evidence for the limited resource model is indicated through decrements in subsequent self-control performance tasks as a function of prior exertion (e.g., Muraven et al., 1998). For example, participants who had to control their attention on a first task performed worse on a second task (reasoning task) as compared to participants who did not have to control their attention (Schmeichel, Vohs, & Baumeister, 2003, Study 1). As ego depletion effects are ubiquitous, it is important to investigate how people can reduce or overcome them.

Following a paradigm by Baumeister, Bratslavsky, Muraven, and Tice (1998), Study 3, we put participants in a state of ego depletion by having them to perform an emotion-control task and then tested their performance on a subsequent task that also demanded self-regulation (i.e., solving difficult anagrams). We predicted the classic ego depletion effect (i.e., a performance decrement) for participants who approached the second task with the mere goal intention to perform well. For participants who had furnished this goal with implementation intentions however the performance level should not decrease, but should be as high as that of control participants who were not ego-depleted by prior emotion control.

Method

Participants

Sixty-four students at a German University (34 males, mean age $M = 23.78$ years, $SD = 2.78$) participated for a payment of 6 Euros. We excluded one student from the data analysis because he did not find comedies funny in general (see below); thus, the data of 63 students were analyzed.

Design

The study followed a 2 (Emotion Control: emotion control vs. no emotion control) × 2 (Intention: goal intention vs. implementation intention) between-subjects factorial design. We took a baseline measure of participants' anagram performance at the beginning of the experiment. In addition, we assessed participants' anagram performance a second time (i.e., once the emotion-control task had been completed).

Procedure

Participants were informed that they would take part in two unrelated experiments: The first was introduced as a study on mood-effects on long-term memory, whereas the second was introduced as a new concentration test (i.e., the anagram task) that had to be performed twice for reasons of reliability and validity. All participants then worked on the first anagram task. The correct solutions were counted, forming a baseline score. Subsequently, participants saw a 13 min film clip consisting of four German stand-up comedians (the same film clip used in Study 1). Prior to this clip, participants in the emotion control condition were asked not to laugh or to show any emotions. Participants in the no control condition received no further instructions. Afterwards participants were asked to answer a mood questionnaire (Becker, 1988) including 17 items (e.g., happy, depressed, active) on a 4-point scale (1 = *not at all* to 4 = *very much*).

Finally, participants were asked to work for 10 min on the second anagram task with the assigned goal intention: "I will find as many solutions as possible!" Participants in the implementation intention condition added the following if–then plan: "And if I have solved one anagram, then I will immediately start to work on the next!" All participants were asked to memorize these self-instructions by repeating them aloud. The tasks were presented on a computer screen and the number of correct solutions was computed.

At the end of the session, participants received a final questionnaire with the following items: "How difficult did you find the anagrams?", and "How committed were you to the goal to solve as many anagrams as possible?" Participants answered on 10-point scales (0 = *not at all* to 9 = *very much*); they were then debriefed, thanked, and paid.

Baseline measure (anagram task 1)

Participants received 10 solvable anagrams presented as a paper and pencil task. They were given 2 min and 40 s to find as many solutions as possible. Test performance was used as a baseline measure of anagram solving competence.

Facial emotional reactions

During the film clip presentation, a camera videotaped participants' facial expressions. Each participant's videotape was coded by two independent raters blind to experimental conditions. The raters noted how many times per minute each participant laughed and smiled. Interrater reliabilities were high (Cronbach α's was 84 and 0.96).

Final anagram task (anagram task 2)

Participants read the anagrams on a computer screen. 30 solvable anagrams were presented. If participants could not find the solution for a given anagram, they were instructed to press a move-on button, and the next item appeared. The computer recorded each answer and then the number of correct solutions was computed.

Results

Background variables and manipulation checks

First, we checked whether the participants had followed the emotion control instructions while watching the film clip. As expected, participants' smiles and laughs were significantly lower when asked to control their emotions (smiles: $M = 15.78$, $SD = 9.61$ vs. $M = 2.62$, $SD = 3.13$, $F(2,52) = 45.83$, $p < 0.001$, $\eta^2 = 0.47$; laughs: $M = 5.73$, $SD = 6.99$ vs. $M = 1.16$, $SD = 2.16$, $F(1,52) = 10.55$, $p < 0.01$, $\eta^2 = 0.17$).

Next, we checked participants' commitment to the goal of solving as many anagrams as possible. A 2 (Emotion Control: emotion control vs. no emotion control) × 2 (Intention: goal intention vs. implementation intention) ANOVA did not reveal any significant main or interaction effects on participants' goal commitment (ps > 0.14); all participants reported a rather high goal commitment ($M = 6.68$, $SD = 1.95$). Finally, participants' difficulty ratings of the anagrams were analyzed. All participants assessed the anagrams as rather difficult ($M = 6.44$, $SD = 1.16$); again, no significant main or interaction effects were found ($p > 0.25$).

Dependent variable: anagram performance

A 2 (Emotion Control: emotion control vs. no emotion control) × 2 (Intention: goal intention vs. implementation intention) ANCOVA using the baseline performance scores as the covariate and the performance on the second anagram task as the dependent variable revealed that baseline was a significant covariate, $F(1,58) = 13.78$, $p < 0.001$, $\eta^2 = 0.19$. Furthermore, a significant main effect of Emotion Control, $F(1,58) = 4.16$, $p < 0.05$, $\eta^2 = 0.07$, but not of Intention ($F < 1$) was observed; most important, the interaction between Emotion Control and Intention approached significance, $F(1,58) = 3.08$, $p = 0.08$, $\eta^2 = 0.05$ (see Fig. 2).

As our hypothesis predicted a certain kind of interaction pattern (i.e., only the emotion control condition – goal intention group was expected to show a reduced anagram performance, whereas the other groups were not), we also computed the following planned contrast: emotion control – goal intention group = −3, emotion control – implementation intention group = 1, no emotion control – goal intention group = 1, no emotion control − implementation intention group = 1. As expected, this contrast turned out to be significant, $F(1,58) = 6.99$, $p = 0.01$, $\eta^2 = 0.12$.

To test our predictions more critically, we further computed planned t-tests. As the dependent variable of anagram performance we used standardized residuals obtained by regressing the number of solved anagram tasks on their baseline anagram performance. First, goal intention participants performed comparatively worse when they had controlled their emotions ($M = 0.33$,
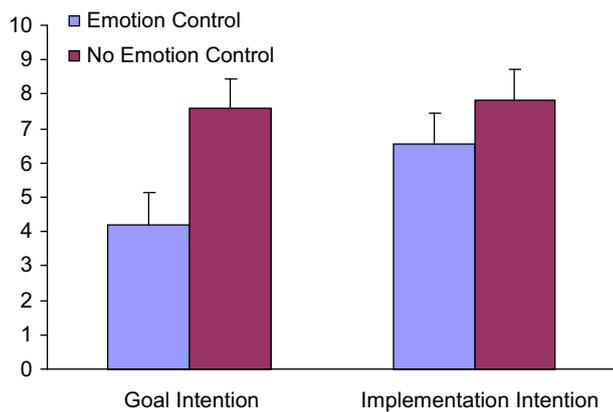
Fig. 2. Mean anagram performance (controlled for baseline anagram performance) and standard errors by emotion control and intention.

$SD = 1.28$ vs. $M = -.57$, $SD = 0.74$), $t(59) = 2.66$, $p < 0.01$, $d = 0.85$), thus replicating the classic ego depletion effect. However, implementation intention participants showed a similarly high performance no matter whether they had to control their emotions or not (i.e., $M = 0.06$, $SD = 0.88$ vs. $M = 0.12$, $SD = 0.76$), $t < 1$, suggesting that implementation intentions successfully averted the ego depletion effect on anagram performance. In line with this interpretation, within the emotion control condition, implementation intention participants showed a higher performance than goal intention participants ($M = 0.06$, $SD = 0.88$ vs. $M = -.58$, $SD = 0.74$), $t(59) = 1.82$, $p < 0.05$ (one-sided), $d = 0.76$. Actually, implementation intention participants in the emotion control condition performed as well as goal intention participants who were not asked to control their emotions, $t < 1$.

Do mood differences between conditions explain these results?

Becker's (1988) questionnaire describes three mood components (i.e., positive mood, vivacity, and bad temper). A 2 (Emotion Control: emotion control vs. no emotion control) × 2 (Intention: goal intention vs. implementation intention) ANOVA on positive mood ratings revealed only a significant main effect for Emotion Control (no emotion control: $M = 2.91$, $SD = 0.60$; emotion control: $M = 2.52$, $SD = 0.68$), $F(1,59) = 5.30$, $p < 0.05$, $\eta^2 = 0.08$ (all other Fs < 1.3, ns). For the vivacity and the bad temper scales no significant main or interaction effects were observed at all. Moreover, we analyzed the influence of participants' positive mood on their anagram performance. An ANCOVA showed that positive mood did not qualify as a significant covariate ($F < 1$); this was also true for the other mood scales (vivacity, bad temper). Therefore, differences in participants' mood did not qualify as an alternative explanation for the observed pattern of performance.

Discussion

Using an ego depletion paradigm reported by Baumeister et al. (1998, Study 3), we found that self-regulation on a first task leads to impaired performance on a second task that also demands self-regulation. This finding supports Baumeister's (2002) assumption that any kind of specific self-regulation reduces people's general self-regulatory capacity and creates a state of ego depletion that in turn hampers subsequent performances, even if those require a different type of self-regulation (in the present case holding up persistence in solving difficult anagrams). However, participants who had in advance spelled out how to implement the subsequent task goal of performing well on anagrams escaped ego depletion effects and performed as well as those who were not ego-depleted.

The present findings speak to ego depletion research by addressing the question of how ego depletion effects can be overcome. In comparison to other strategies like providing motivational incentives (e.g., Muraven & Slessareva, 2003), cognitive reframing techniques (e.g., by changing people's expectations; Martijn, Tenbült, Merckelbach, Dreezens, & de Vries, 2002), using persistence priming techniques (e.g., Alberts, Martijn, Greb, Merckelbach, & de Vries, 2007), inducing positive mood (Tice, Baumeister, Shmueli, & Muraven, 2007), and feeding people glucose (Gailliot et al., 2007), suggest a further rather simple and parsimonious strategy that only requires linking task-goal-directed responses to certain cues that present themselves during task performance.

This benefit of implementation intentions to overcome ego depletion effects was also observed by Webb and Sheeran (2003, Study 2). In their study, ego depletion was induced by having participants stand on their weak leg and count down in sevens from 1000; again, by forming implementation intentions participants managed to attenuate ego depletion effects (this time assessed in terms of a reduced Stroop-task performance). The major difference to the present study rests in the fact that Webb and Sheeran did not explicitly establish a goal intention condition; rather, they only used a control condition (i.e., control participants were given the classic Stroop-task instructions but not asked to set themselves the goal to perform as well as possible on this task; Webb & Sheeran, 2003, p. 281). Additionally, the implementation intention to be formed referred to an instrumental task strategy that was not mentioned to control participants ("As soon as I see the word, I will ignore its meaning (for example, by concentration on the second letter only) and will name the color ink it is printed in!" Webb & Sheeran, 2003, p. 281).

One might argue that the observed implementation intention effect in the present study is due to the fact that implementation intention participants received longer instructions to do well on the anagram task than the other participants. These longer instructions might have increased the persuasive appeal of the instructions in the implementation intention condition and thus the implementation intention effect observed may be based on experimenter demand. This seems unlikely however for the following reasons: First, in the present study implementation intention participants did not report a higher commitment to do well on the anagram task as compared to the goal intention participants. Second, we conducted a follow-up study that explicitly addressed perceived experimenter demand. Participants were asked to read a description of the course of events in either the goal intention or the implementation intention condition, and then answered (1 = *does not apply* to 7 = *fully applies*) the following statements taking the perspective of actual participants: "The participants assume that the experimenter expects them to solve as many anagrams as possible!" and "The experimenter convinces the participants to try to solve as many anagrams as possible!" As expected, the perceived experimenter demand associated with implementation intention instructions did not differ from the perceived demand associated with goal intention instructions, $ts(59) < 1$. This finding suggests that the beneficial effects of implementation intentions on overcoming ego depletion rely on processes other than heightened experimenter demand.

Study 3: preventing social insensitivity induced by self-definitional incompleteness

In Study 1, the disruptive internal state was of an affective nature (i.e., mood), whereas in Study 2 it pertained to volition and the executive self (i.e., ego depletion). In Study 3, we turned to investigate whether implementation intentions are also able to control

the negative effects of disruptive motivational states. A strong disruptive motivational state is described by self-completion theory (Gollwitzer & Kirchhof, 1998; Wicklund & Gollwitzer, 1982, 1983). When a person is striving for a self-definition or identity goal (e.g., becoming a lawyer) but lacks relevant identity-symbols (i.e., licenses, relevant successful performances), he or she experiences a sense of self-definitional incompleteness. Such incompleteness elicits compensatory attempts to strive for the aspired-to identity goal (i.e., self-symbolizing efforts; Brunstein & Gollwitzer, 1996; Gollwitzer, Wicklund, & Hilton, 1982). Self-symbolizing activities focus on indicating the possession of alternative relevant symbols to others (e.g., such as referring to one's titles, showing one's relevant skills and material possessions; Gollwitzer, Sheeran, Michalski, & Seifert, 2009; Harmon-Jones, Schmeichel, & Harmon-Jones, 2009; Ledgerwood, Liviatan, & Carnevale, 2007). Thereby, the self-symbolizing person assigns to others the role of an audience that only has to take notice of the person's self-symbolizing, and thus sensitive social interactions between the incomplete person and his or her audience are no longer possible (Gollwitzer & Wicklund, 1985).

In Study 3, we first wanted to replicate that the motivational state of self-definitional incompleteness induces social insensitivity even if one has the explicit goal of actually getting to know the person who comprises one's audience. Incomplete individuals should no longer succeed with getting to know this person as they impulsively want to show off the possession of identity-symbols. Importantly, we investigated whether implementation intentions spelling out how to get to know this person can help to overcome the social insensitivity promoting effects of self-definitional incompleteness.

Method

Participants

Participants were 71 male law students at a German University. Their age ranged from 19 to 30 years ($M = 24.50$; $SD = 2.51$). They received 2.50 Euros for participation. We excluded one participant's data due to an unsuccessful incompleteness manipulation (see below).

Design

The study followed a 2 (Self-Definitional Completeness: incomplete vs. complete) × 2 (Intention: goal intention vs. implementation intention) between-subjects factorial design. The dependent variable was the degree of self-symbolizing with respect to the presumed conversation partner (i.e., lack of perspective taking; see below).

Procedure

Law students highly committed to becoming successful lawyers were recruited on campus by answering the following two questions on 7-point scales (1 = *not important at all/not bad at all* to 7 = *very important/very bad*): "How important is it for you to graduate successfully in law?" and "Imagine you did poorly on your exam, how awful would that be for you?" Only participants with a mean score higher than 5 were invited to take part in a getting-to-know-another-person study. Participants arrived individually for this study; they were informed that the research focused on perspective taking in getting-to-know-a-stranger conversations. Therefore all participants were asked to form the following goal intention: "I want to take the perspective of my conversation partner!" Half of the participants furnished their goal intention with the following implementation intention: "If my conversation partner announces a conversation topic preference, then I will talk about this topic!".

Participants were then asked to fill out a personal questionnaire designed to manipulate self-definitional completeness. Both questionnaires started by asking for the participants' age, gender, major, and years of study. Half of the participants then received in addition the incompleteness inducing items that asked: "Do you give talks at conferences and professional meetings?", "Have you published any articles?", "Do you work as a tutor?", "Are you a specialized lawyer for tax law/employment law?", "Do you work at a courthouse (as an attorney or judge)?" Law students, as participating in our study, commonly do not engage in such activities and therefore had to admit that they lacked these aspired-to identity indicators (symbols) of becoming successful lawyers. Indeed, only one participant already worked as a substitute teacher and had published articles; he was excluded from further analysis.

Afterwards participants received information about their conversation partner Nadja and her conversation topic preferences. Nadja supposedly loved talking about interesting movies and recent vacation trips, but did not like talking about law and interpersonal conflicts. Participants were given time to memorize Nadja's conversation topic preferences. The experimenter then returned, collected Nadja's conversation topic list, and handed out an additional conversation topic preference list in which the participants themselves had to indicate their conversation topic preferences (see preference assessment below).

Five minutes later, the experimenter returned, collected participants' conversation topic preference lists, and handed out a final questionnaire. Participants were asked to evaluate their interest in meeting her ("How interested are you in the upcoming conversation?"), their goal commitment ("How strong is your intention to take the perspective of your conversation partner?"), and to recall Nadja's conversation topic preferences ("How interested is Nadja in German law?"). Participants responded to each question on a 7-point scale (1 = *not at all* to 7 = *very much*). Thereafter the experiment was over (i.e., participants were not actually given a chance to meet another person) and participants were carefully debriefed about the actual purpose of the study using a funnelled debriefing procedure; they were then thanked and paid.

Preference assessment

A list of six conversation topics was presented, including the topic allowing for self-symbolizing "Do you want to talk about German law?" The five other topics pertained to cultural life, interesting movies, solar eclipses since 1999, recent vacations, and interpersonal conflicts. Participants were required to rank their conversation topic preferences on a 9-point scale (1 = *not interested* at all to 9 = *very interested*). Preference ratings for the law conversation topic were used as the dependent variable.

Results

Background variables and manipulation checks

Participants' interest in the upcoming conversation did not differ between the experimental groups, all $Fs < 1.5$, and can thus be ruled out as alternative explanation for the observed effects on the dependent variable (see below). We also analyzed participants' commitment to the goal intention of taking the perspective of one's conversation partner in a 2 (Self-Definitional Completeness: incomplete vs. complete) × 2 (Intention: goal intention vs. implementation intention) ANOVA. We found a significant main effect for Completeness, indicating that complete participants ($M = 4.22$, $SD = 1.21$) reported a higher goal commitment compared to the incomplete participants ($M = 3.03$, $SD = 1.82$), $F(1,66) = 8.33$,

$p < 0.01$, $\eta^2 = 0.11$. No further effects reached significance. This finding is in line with self-completion theory, as incompleteness should trigger a strong impulse to self-symbolize and thereby undermine committing to the assigned conflicting goal of taking the perspective of the conversation partner.

Next, we checked whether participants correctly remembered that their partner disliked law as a conversation topic. Fifty-four participants correctly recalled her low rating (i.e., a 2 on a 9-point scale), nine participants reported a rating of 1, and five participants reported a rating of 3. Most importantly, no difference between groups was observed ($F < 1$).

Dependent variable: topic preference for law

A 2 (Self-Definitional Completeness: incomplete vs. complete) × 2 (Intention: goal intention vs. implementation intention) ANOVA on participants' topic preference ratings revealed a significant main effect for Intention, $F(1,66) = 3.84$, p = 0.05, $\eta^2 = 0.05$, and a significant main effect of Self-Definitional Completeness, $F(1,66) = 3.92$, p = 0.05, $\eta^2 = 0.06$. Most importantly, these main effects were qualified by a significant interaction effect, $F(1,66) = 5.61$, $p < 0.05$, $\eta^2 = 0.08$ (see Fig. 3). As our hypothesis specifies a certain kind of interaction pattern (i.e., only the incomplete goal intention participants should push German law as the wanted conversation topic, whereas the other groups should not), we also computed the following planned contrast: goal intention-incomplete group = 3, goal intention-complete group = −1, implementation intention-incomplete group = −1, implementation intention-complete group = −1. As expected, this contrast turned out to be significant, $t(66) = 3.61$, $p < 0.01$, $r_{contrast} = 0.42$.

Follow-up *t*-tests revealed that goal intention participants showed significantly more interest in law as a conversation topic in the incomplete condition ($M = 4.94$, $SD = 1.52$) as compared to the complete condition ($M = 3.17$, $SD = 2.04$), indicating a self-symbolizing effect, $t(66) = 3.07$, $p < 0.01$, $d = 0.98$. However, implementation intention participants reported similarly low preference ratings for the law topic in both the incomplete and the complete condition ($M = 3.33$, $SD = 1.61$ vs. $M = 3.17$, $SD = 1.59$), $t < 1$, suggesting that implementation intentions successfully averted self-symbolizing. In line with this interpretation, within the self-definitional incompleteness condition, goal intention participants preferred to talk more about German law (i.e., self-symbolized more) than implementation intention participants ($M = 4.94$, $SD = 1.52$ vs. $M = 3.17$, $SD = 1.59$), $t(66) = 3.31$, $p < 0.01$, $d = 1.13$. Finally, we also analyzed the mean ratings of the other noncritical topics, but we did not observe any significant main or interaction effects (all $Fs < 1$).
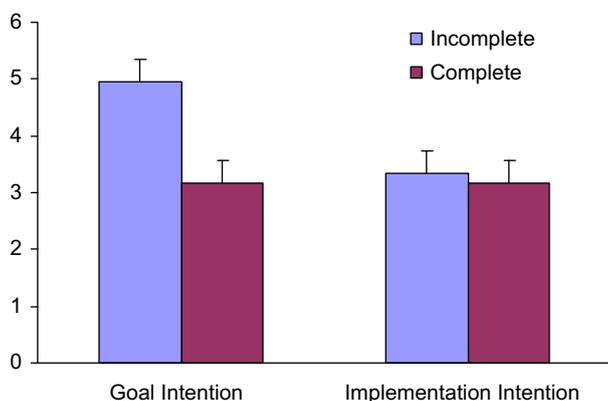

Fig. 3. Mean preference ratings and standard errors for German law as a conversation topic by self-definitional completeness and intention.

Discussion

Self-definitionally incomplete participants failed to take the stranger's perspective in an upcoming conversation even though they had the goal to do so. Apparently, self-definitional incompleteness induces self-symbolizing, whereby a conversation partner is treated as an audience, rather than a person one really wants to get to know. However, when participants furnished their perspective taking goal with an if–then plan that spelled out the goal's implementation, the negative effects of self-definitional incompleteness on social interaction vanished. Incomplete participants with such if–then plans succeeded in taking the conversation partner's perspective nearly as well as control participants. It is important to keep in mind that all participants were able to correctly recall their partner's conversation topic preferences. That is, all participants recognized the conversation partner's topic preferences, but only the control participants and the incomplete participants with if–then plans prevailed in taking her perspective. Apparently, by delegating action control to a specific cue (i.e., the announcement of topic preferences by the conversation partner), participants were able to show goal-directed behavior (perspective taking) even when they were in a state of self-definitional incompleteness. One limitation of the present study is that we only measured preference ratings. Further research needs to address the question of how implementation intention participants will actually behave when starting the conversation or in the course of the conversation.

Considering the results of other studies checking on experimenter demand (e.g., Schweiger Gallo, Keil, McCulloch, Rockstroh, & Gollwitzer, 2009, Study 2; the follow-up study to the present Study 2), heightened experimenter demand does not appear as a viable alternative explanation for the observed implementation intention effect. This is also suggested by the fact that (again in line with Studies 1 and 2) the implementation intention instructions did not produce a heightened goal commitment. However, another alternative explanation for the observed implementation intention effect may be the differential amount of detail on how to act that is provided in the goal intention and the implementation intention instructions. In order to rule out an alternative explanation based on this difference, we followed the lead of a study run by Bayer and Gollwitzer (2007, Study 2) where the goal intention was enriched with the detail provided in the implementation intention. Twenty-seven male law students highly committed to becoming successful lawyers all received the incompleteness manipulation of Study 3. In contrast to Study 3, goal intentions participants were then assigned a very detailed goal intention: "I want to take the perspective of my conversation partner and I want to talk about her announced conversation preferences!" Implementation intention participants, on the other hand, were assigned the same if–then plan as in Study 3. Goal intention participants ($M = 5.47$, $SD = 1.64$) turned out to still prefer law as a conversation topic significantly more than implementation intention participants ($M = 4.15$, $SD = 1.62$), $t(26) = 2.00$, p = 0.05, $d = 0.81$, despite the fact that participants in both conditions intended to take their conversation partner's perspective by talking about her announced conversation topics. Apparently, even when the goal intention instructions provide the same amount of detail as the implementation intention instructions, the latter type of intention is comparatively more effective in breaking the negative effect of self-definitional incompleteness on social sensitivity.

Earlier research on how to overcome self-symbolizing had taken a different approach. For instance, it was observed that putting people in front of a mirror (i.e., creating self-awareness) hindered self-symbolizing, presumably because self-awareness made people recognize the compensatory nature of self-symbolizing as it made them focus on the experienced incompleteness and its reduction

(Wicklund & Gollwitzer, 1983; e.g., for a scientist who is criticized for not publishing enough to actually sit down and write up collected data). It seems important for future research to find out which kinds of strategies to curb self-symbolizing are used best for what kind of situational contexts.

General discussion

Goal shielding through implementation intentions can follow two different routes: First, one can form implementation intentions that specify an anticipated internal or external disruptive stimulus in the if–component and link it to an instrumental coping behavior in the then–component (e.g., "If I hear some noise and see pictures, then I'll ignore them!", see Gollwitzer & Schaal, 1998; or "If I am getting nervous, then I will try to stay calm!", see Achtziger et al., 2008, Study 2). Second, one can form implementation intentions that plan out in advance what course one's goal striving is to take (i.e., when, where, and how one intends to act towards the goal) thus immunizing one's goal striving against intrusions.

In the present research, we have tested this second route to goal shielding, and we studied it by analyzing various disruptive internal states. We observed in Study 1 that when the goal to arrive at non-stereotypical person judgments is furnished with an implementation intention focusing on the when and how to reach this goal, the goal can be attained even under the disruptive internal state of being in a positive mood. In Study 2, we found that an implementation intention (as compared to a mere goal intention) to perform well on a demanding cognitive task (i.e., solving difficult anagrams) blocks the negative effect of the state of ego depletion on task performance. And finally, in Study 3 we found that implementation intentions, in support of the goal to take the perspective of an attractive stranger one is trying to get to know, do facilitate goal attainment, even if people are in a state of self-definitional incompleteness – which is known to be disruptive to the goal of taking the perspective of others (Gollwitzer & Wicklund, 1985). In summary, striving for a focal task goal (e.g., judging persons in a non-stereotypical manner, solving difficult anagrams, taking the perspective of another person) does not suffer any impairments from disruptive internal states when if–then plans have been formed that link an opportunity for goal striving (and not the critical internal state) to a goal-directed response. This goal shielding strategy is very convenient as the emergence of distracting internal states cannot always be anticipated correctly, and in addition, we may often fail to be aware of their disruptive potential.

Implications for implementation intention research

So far, we have shown that the studied shielding strategy helped university student participants. Still, one wonders whether clinical samples with reduced cognitive skills (e.g., reduced executive functions as observed in children with ADHD) and more intensive affective, volitional, and motivational disruptive states (e.g., highly depressed patients) would also benefit from forming implementation intentions. For answering this question, two recent lines of research are relevant. First, it is observed that clinical samples that are known to suffer from action control problems do benefit from forming implementation intentions as well. This is true for heroin addicts during withdrawal and schizophrenic patients (Brandstätter et al., 2001, Studies 1 and 2), but also for frontal lobe patients (Lengfelder & Gollwitzer, 2001) and children with ADHD (Gawrilow & Gollwitzer, 2008). Apparently, implementation intentions serve to strengthen a person's executive functions as has been discovered in recent research by Cohen, Bayer, Jaudas, and Gollwitzer (2008). Second, the effects of implementation intentions do not seem to fade when strong affective states are to be controlled. In a recent line of research on the control of spider fear in arachnophobics, it was observed that implementation intentions can reduce this fear to the level of individuals who are not afflicted with this type of phobia (Schweiger Gallo et al., 2009). Another question for future research relates to the potential costs of controlling disruptive internal states by implementation intentions. Taking Wegner's rebound perspective (1994; Wegner & Wenzlaff, 1996) on thought control, one may argue that, for instance, suppressing self-symbolizing efforts by implementation intentions as in Study 3, may produce a subsequent rebound effect - meaning that participants ultimately show stronger self-symbolizing compared to participants who did not control their impulse to self-symbolise. This issue needs to be addressed empirically in future research.

Hypo-egoic self-regulation

Leary, Adams, and Tate (2006) recently suggested that self-relevant thought may not only fail to facilitate goal-directed behavior, but it can also create problems by interfering with automatic action control, thus unnecessarily producing negative outcomes. Thus, the authors address the question of how people can reduce their efforts to monitor and control their behavior when they desire to do so. Therefore, a state of hypo-egoic self-regulation is postulated in which people relinquish deliberate conscious action control so that they are able to respond more naturally, spontaneously, or automatically. The authors suggest that people can intentionally foster hypo-egoic self-regulation by using two methods: (a) by taking steps to reduce the proportion of time that they are self-aware (i.e., by repeating a behavior until it is automatic or practicing meditation), or (b) by increasing the concreteness of their self-thoughts (such as inducing a concrete action mindset). In both instances, high-level thinking and deliberative self-control are reduced and individual responses become more automatic and unconscious. Thus, by relinquishing self-control people can effortlessly regulate, thus avoiding problems associated with excessive self-attention and improving the quality and effectiveness of their behavior.

How does our approach relate to Leary et al. (2006) approach? We postulated and observed that implementation intentions can be used to attenuate the negative influences of disruptive internal states on focal goal striving when if–then plans gear towards making goal striving more stimulus controlled (i.e., controlled by situational cues). In Leary's approach, using implementation intentions means using the second path to heighten hypo-egoic self-regulation (i.e., fostering hypo-egoic self-regulation by focusing one's attention on the concrete aspects of behavior). On the basis of our findings we agree with this postulate as we could show that the negative influence of different disruptive self- states (e.g., affective, motivational and volitional states) was attenuated when implementation intentions focused participants on when, where, and how to enact the task goal at hand.

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