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Overcoming Procrastination through Planning

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Have you ever purposefully delayed or postponed a goal-directed action (for example, writing an essay or filling out tax forms) despite strong intentions to achieve the goal and sufficient opportunities to pursue it? If so, then you are in good company: so has a large percentage of the general (15 to 20 percent)[1] and the academic (80 to 85 percent of American college students) population.[2] In addition to academic examples, procrastination has been studied in the areas of personal health (dieting, exercising), social relationships (contacting friends), work (job-seeking behavior), and financial management (retirement savings).[3] Procrastination is a widespread phenomenon with potentially severe consequences, such as dropping out of school, compromised health, divorce, and job loss.

Intuitively, it would seem relatively easy to classify certain behaviors as procrastination. For example, the fact that a student put off reading a book chapter might at first glance be sufficient to label his or her behavior as procrastination. But after a closer look at the phenomenon, additional criteria that cannot be objectively judged from an outside perspective emerge. Building on the numerous definitions of the commonly used term *procrastination* that can be found in the scientific literature,[4] we suggest four criteria that must be fulfilled in order to classify a behavior or a lack of behavior as procrastination. A person has to (1) commit to the goal in question, (2) have the opportunity to act on the goal, (3) expect to be worse off later in the case of a delay, and (4) voluntarily decide to put off the intended action or inaction until a later point. For example, not

1. Harriott and Ferrari, "Prevalence of Chronic Procrastination."
2. Ellis and Knaus, *Overcoming Procrastination*, 143–149.
3. Akerlof, "Procrastination and Obedience."
4. Van Eerde, "Procrastination"; Ferrari, "Procrastination as Self-Regulation Failure"; Lay and Silverman, "Trait Procrastination."

reading the chapter would qualify as procrastination by our definition when the student intended to read it, had access to the book and an adequate amount of time to read it, knew that not reading the chapter would endanger the course credit (and ultimately degree fulfillment), and voluntarily decided to read the chapter later. To draw a parallel to the definition set out by Piers Steel,[5] procrastination is the voluntary postponement of an intended course of action despite having the opportunity to act and expecting to be worse off as a result of the delay.

In light of the high prevalence of procrastination and building on these four criteria, we now address the question of why people procrastinate from the perspective of the psychology of goals. We will analyze the relationship between procrastination and potential problems people may encounter during both goal setting and goal striving. Subsequently, we will suggest a strategy to overcome procrastination: the formation of *implementation intentions*, which are specific plans detailing when, where, and how one intends to initiate an action that one is prone to put off.[6] After explaining how implementation-intention effects come about and examining several moderators that might limit their effectiveness, we will discuss research on implementation intentions relevant to the problem of procrastination. We will examine whether implementation intentions help people to overcome procrastination in terms of getting started, staying on track, calling a halt to an unsuccessful action, and avoiding overextension. In addition, we will discuss research on the effectiveness of implementation intentions in critical populations (chronic procrastinators and subjects who are known to have problems with self-control), as well as in contexts that do not seem to be amenable to self-regulation, such as when bad habits must be overcome. Finally, we will suggest additional measures to improve motivation as a way of enhancing the effectiveness of implementation intentions.

PROCRASTINATION, GOAL SETTING, AND GOAL STRIVING

Two sequential tasks have been differentiated by the psychology of goals during goal pursuit: goal setting and goal striving.[7] Traditionally, research on goals has focused on goal setting, aiming to illuminate the factors that determine the formation of strong goal intentions (goal-setting theories),[8] as strong goal intentions were regarded as the proximal determinants of goal achievement. Low perceived desirability and/or feasibility of a

5. Steel, "Nature of Procrastination," 66.
6. Gollwitzer, "Implementation Intentions."
7. Oettingen and Gollwitzer, "Goal Setting and Goal Striving."
8. Ajzen, "Theory of Planned Behavior."

potential goal as well as suboptimal framing (e.g., unspecific, distal) may lead to the formation of weak intentions to realize the goal and to subsequent procrastination. One might therefore be tempted to infer that procrastination primarily results from suboptimal goal setting; however, at least two arguments weaken this explanation.

First, numerous research findings demonstrate that even strong goal intentions are not sufficient to guarantee goal achievement (the so-called intention-behavior gap).[9] Second, procrastinators do not seem to differ from nonprocrastinators in their intention to pursue a goal.[10] For example, in studies on academic work and job-seeking intentions, procrastination has been found to be unrelated to the strength of goal intentions.[11] Still, the gap between intentions and goal-directed behavior was found to be greater in procrastinators than in nonprocrastinators.[12] On the other hand, it was observed that in some cases, goal-setting interventions, such as training sessions or tests, managed to decrease procrastination.[13] All things considered, strong goal intentions seem to represent an important factor for successful goal achievement. But given the residual intention-behavior gap, the lack of qualitative and quantitative differences between procrastinators' and nonprocrastinators' intentions, and the unreliable effects of goal-setting interventions on procrastination, there must be a more complete explanation for procrastinating behavior beyond merely weak goal intentions.

Goal-setting theories aim to explain the formation of goal intentions but do not address problems that arise when a person tries to realize a set goal. These problems are the focus of self-regulation theories of goal striving, which are concerned with the processes that mediate the effects of intentions on behavior.[14] In the following section, we will concentrate on four major problems that must be overcome during goal striving:[15] initiation of action on a goal, staying on track (warding off distractions), disengaging from failing courses of action, and avoiding overextension (ego depletion).[16] We will elaborate on how each of these problems can contribute to procrastination.

The most prominent challenge of successful goal striving is *getting started* with goal-directed actions; this issue is implicated in the definition of procrastination,[17] as it is assumed that a procrastinating person is committed to

9. Sheeran, "Intention-Behavior Relations."
10. Steel, "Nature of Procrastination," 79.
11. Lay and Brokenshire, "Conscientiousness."
12. E.g., Steel, Brothen, and Wambach, "Procrastination and Personality."
13. For an overview, see Schouwenburg et al., "Counseling the Procrastinator."
14. E.g., Bandura, *Self-Efficacy*; Carver and Scheier, "Principles of Self-Regulation"; Gollwitzer, "Implementation Intentions"; Kuhl, "Functional-Design Approach."
15. E.g., Gollwitzer and Sheeran, "Implementation Intentions."
16. Baumeister et al., "Ego Depletion."
17. Van Eerde, "Procrastination," 374.

a goal and has the opportunity to act on the goal but avoids the implementation of the intention. The differentiation of two kinds of intention-action discrepancies that has been proposed by research on goals[18] can also be applied to procrastination. A person may intend to act but does not (an *inclined abstainer*), or he or she may intend not to act but does so (a *disinclined actor*). Procrastination in terms of not getting started can refer to not starting to enact a desired goal-directed behavior (e.g., not starting to exercise despite the goal to be physically fit) as well as to the failure to cease an undesired goal-contradictory behavior (e.g., not quitting to smoke despite the goal to stay healthy).

What are reasons for not getting started? Three main explanations have been suggested by research on goal striving:[19] one fails to remember the intention to act, one does not recognize good opportunities to act, or one does not overcome an initial reluctance to act. Forgetting to act on the intended goal represents a common reason for failure to act (e.g., not remembering to regularly take prescription medication). But although this problem qualifies as a problem of getting started with goal striving, it does not qualify as procrastination, as it fails to meet the criterion of purposefully postponing or delaying an action. Similarly, not recognizing a good opportunity to act on the goal meets the criteria of a problem of goal striving but not of procrastination. However, the third reason, that a person has to overcome an initial reluctance, corresponds with findings on the strong relationship between task aversiveness and procrastination.[20] Initial reluctance is thought to result from a trade-off between attractive long-term consequences and less attractive short-term consequences. For example, a person might strongly intend to eat a low-calorie diet in order to stay healthy in the future, but in the moment of decision, he or she chooses to eat fatty French fries, which are more attractive in the short run than a healthy but less tasty low-fat salad.[21] In addition to health goals, such trade-off structures can be found in many areas of day-to-day life, such as environmental goals, consumer goals, safer-sex goals, and academic goals.

The second challenge of successful goal striving is *avoiding unnecessary disruptions*. Most definitions of procrastination refer solely to delaying the start of a goal-directed action.[22] However, deciding to put off an intended course of action (despite sufficient opportunities to act and expecting to be worse off for the delay) when in the midst of trying to realize a goal also fulfills the above-mentioned criteria of procrastination. For example,

18. E.g., Sheeran, "Intention-Behavior Relations."

19. E.g., Gollwitzer, Gawrilow, and Oettingen, "Power of Planning."

20. For reviews, see Van Eerde, "Meta-Analytically Derived Nomological Network"; Steel, "Nature of Procrastination," 75.

21. See Ainslie, "Specious Reward" and *Breakdown of Will*, as well as the chapters by Ainslie (chapter 1) and Ross (chapter 2) in this volume.

22. For an overview, see Steel, "Nature of Procrastination," 66.

a student might start writing an outline of his or her thesis but then become distracted and put off continuing this activity by checking e-mail or surfing the Web. What are the reasons for this kind of procrastination? Research on goal striving suggests that insufficient goal shielding plays an important role in suboptimal regulation of goal-directed responses.[23] Here, goal shielding refers to the protection of valued goals against other competing influences. When goal striving extends over a long time period, the goal has to be shielded from potentially disruptive stimuli, both internal (e.g., feeling anxious, tired, or overburdened) and external (distractions and temptations).

The third challenge, *disengaging on time* from faulty courses of action, also relates to procrastination. An example would be a person who voluntarily postpones necessary updates to his or her investment portfolio, despite having the opportunity to do so and the expectation of reduced gains or increased losses as a result of the delay. Reasons that have been suggested for not disengaging from failing courses of action include the application of a "don't waste" heuristic[24] (a compulsion to bring an investment to completion) and the motive of self-justification. As the "don't waste" heuristic suggests that no voluntary decision takes place and people may continue to expect positive results in the end, it does not qualify as procrastination. However, the self-justification explanation allows for the possibility that people know that they will most likely be worse off in the long term, yet still voluntarily decide to put off an intended action until a later point, as this allows them to postpone the short-term psychological costs of accepting that their prior resource allocation to the chosen course of action was mistaken.[25] As a consequence, people may end up throwing good money after bad (the *sunk-cost* phenomenon).

A final challenge to successful goal striving is *avoiding overextending oneself*. But how does overextension relate to procrastination? Following the resource model of self-regulation,[26] the capacity to effortfully regulate one's thoughts, feelings, and actions is limited. When this resource is taxed by excessive use, a state of *ego depletion* emerges that impairs subsequent self-regulation. For example, after forcing themselves to eat radishes instead of delicious cookies, participants put less effort into solving unsolvable puzzles (decreased persistence). Because counteracting the reasons for procrastination listed above (i.e., overcoming initial reluctance, goal shielding, and overcoming self-justification motives) requires self-control, ego-depleted people ought to be more likely to procrastinate. After depleting one's self-regulatory resources by acting on a goal (for

23. E.g., Achtziger, Gollwitzer, and Sheeran, "Implementation Intentions"; Shah, Friedman, and Kruglanski, "Forgetting All Else."
24. Arkes and Blumer, "Psychology of Sunk Cost."
25. Brockner, "Escalation of Commitment."
26. Baumeister et al., "Ego Depletion."

example, via thought or emotion suppression), an increased likelihood of procrastination with respect to other goals is to be expected.

In summary, procrastination is not restricted to the postponement of the start of a goal-directed action but can also affect other stages of goal striving, such as the shielding of ongoing goal striving from disruptive internal and external stimuli and the decision to halt a failing course of action. In addition, overextending oneself during goal striving can contribute to procrastination.

ACTION CONTROL BY IMPLEMENTATION INTENTIONS

What can a person do to overcome procrastination? Several strategies have been suggested, including interventions strengthening the expectation of one's ability to enact the necessary goal-directed actions (self-efficacy);[27] changing the value of the task (e.g., piggybacking distant goals onto more immediate goals);[28] and reducing sensitivity to distractions through stimulus control (removing temptation cues in one's environment) or automation (habitualizing action control).[29] In the rest of this chapter, we will propose implementation intentions as an easily applicable planning strategy that can help to overcome procrastination by automating action control.

Implementation intentions support goal intentions. Whereas goal intentions in the format "I intend to achieve outcome X/to perform behavior X" describe desired end states and represent the result of the process of goal setting, implementation intentions additionally spell out in advance when, where, and how these goals should be realized. Implementation intentions have been demonstrated to be especially effective when they are formed in an *if-then* format ("If situation Y arises, then I will perform action Z"). In the *if* component of an implementation intention, a concrete situation is specified that is anticipated as a good opportunity to act. In the *then* component, a proper goal-directed response is included. For example, one could support the goal to finish an essay with the implementation intention "If I turn on my computer, then I will first work 20 minutes on the essay." As a consequence of this predecision, the control over the initiation of the writing behavior is delegated to the specified situation. Starting the computer should automatically activate the linked behavior to work on the essay first without requiring a second conscious decision. The effectiveness of implementation intentions has been demonstrated for all four challenges of goal striving described above (getting

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27. Bandura, *Self-Efficacy.*
28. Ainslie, *Picoeconomics.*
29. Bargh and Barndollar, "Automaticity in Action."

started, staying on track, calling a halt, and not overextending oneself). A meta-analysis including 94 studies and more than 8,000 participants[30] revealed a medium-to-large effect size of implementation intentions on goal achievement over and above the effect of the respective goal intentions alone.[31] Implementation intentions are an easy strategy to apply, and they have remarkable effects on goal attainment and thus offer an effective countermeasure against procrastination.

How Do Implementation Intentions Improve Goal Attainment?

Two processes have been proposed to explain how implementation intentions improve goal achievement. First, through the *if* component, they heighten the activation of the critical situation. Second, they automate the initiation of the action specified in the *then* component in response to the critical situation.

The Specified Situation.   Heightened activation of the mental representation of the critical situation helps people to retrieve the specified situation from memory (superior recall) and to detect it even when concealed (perceptual readiness). Similarly, implementation intentions prepare people to attend to critical cues.[32] In fact, the effects of implementation intentions on attention are so strong that they even disrupt focal attention.[33] In two studies, the disruption of focal attention through implementation intentions has been tested by presenting stimuli that were part of an implementation intention for an unrelated task as task-irrelevant distractors. In the first study, participants either formed specific implementation intentions in an *if-then* format or just formed goal intentions. The intentions were directed at the goal of performing well in a subsequent categorization task. Next, participants worked on an ostensibly unrelated task in which they had to make word-versus-nonword decisions while neutral as well as critical stimuli (intention situations) were presented as task-irrelevant distractors. Participants' response times to the word-versus-nonword decisions served to measure the disruption of focal attention, such that slower responses indicated more attention disruption by the task-irrelevant distractors. The results revealed that the presence of critical stimuli as distractors slowed down participants' responses compared with the presence of neutral distractor stimuli—but only when participants had formed implementation intentions, not when they had formed goal intentions. In the second study, these findings were replicated using a

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30. Gollwitzer and Sheeran, "Implementation Intentions."
31. Webb and Sheeran, "Does Changing Behavioral Intentions."
32. Aarts, Dijksterhuis, and Midden, "To Plan."
33. Wieber and Sassenberg, "I Can't."

task with vowel-versus-consonant classifications. Moreover, in this study, implementation intentions not only focused attention on critical cues during the unrelated classification task, but they also still improved the detection of the critical cues in the subsequent relevant task. Together, these findings imply that critical cues will not escape a person's attention, given that the relevant goal is activated and that the cues have been included in an implementation intention.

The Goal-Directed Behavior.   As a second process, implementation intentions automate the initiation of the action specified in the *then* component as soon as the critical situation presents itself. To call a behavior automatic, it has to have at least one of several relevant features.[34] It has been demonstrated that implementation intentions lead to an immediate response to critical stimuli[35] and to a response without conscious intent,[36] both characteristic of automatic behaviors. Furthermore, they enable people to efficiently respond to critical stimuli. To test the efficiency of action initiation through implementation intentions, paradigms were used that required working on two tasks simultaneously (dual-task paradigms). As a person's resources to process information simultaneously are limited, greater efficiency in one subtask in a dual-task paradigm allows the performance of the second subtask to remain constant even as performance of the first improves. In a dual-task study by Brandstätter et al.,[37] participants worked on a primary task in which they had to keep a mouse-directed square on top of a moving circle. The secondary task consisted of a *go/no go* task that required a key press in response to numbers but not to letters appearing at random time intervals in the midst of the moving circle. Prior to working on the dual task, participants either formed an implementation intention to respond as quickly as possible to the number 3 or simply familiarized themselves with the number 3 by writing it down several times. Results indicated that participants who formed an implementation intention responded faster to the critical number 3 than those who only familiarized themselves with this number, and that this was done without impairing the performance in the tracking task. Apparently, implementation intentions forge a strong mental link between the critical cue specified in the *if* component and the response specified in the *then* component so that action initiation in the presence of the critical cue becomes automated. It is this automation of the initiation of goal-directed action that should make forming implementation intentions beneficial to overcoming procrastination.

34. E.g., Bargh, "Conditional Automaticity."
35. Gollwitzer and Brandstätter, "Implementation Intentions."
36. Bayer et al., "Responding to Subliminal Cues."
37. Brandstätter, Lengfelder, and Gollwitzer, "Implementation Intentions," studies 3 and 4.

Moderators of Implementation-Intention Effects

In addition to the research on processes underlying implementation-intention effects, several studies have investigated the potential limits of the effectiveness of implementation intentions in terms of commitment to their respective goal intentions, commitment to the implementation intention, self-efficacy, and overlap with the personality factors of socially prescribed perfectionism and conscientiousness.

Commitment to the Goal Intention. In accordance with the theory of intentional action control,[38] empirical research indicates that people need to be strongly committed to their goal intentions in order for implementation-intention effects to occur.[39] In addition, the activation of the goal intention must be ensured. For example, in a study by Sheeran, Webb, and Gollwitzer,[40] speed-directed implementation intentions in an *if-then* format improved participants' response times and thereby their performance only when the goal to respond quickly was activated. Implementation intentions thus produce a kind of goal-dependent automaticity.[41] But while goal-dependent automaticity typically originates from the frequent and consistent pairing of situations and behaviors (see also *proceduralization*),[42] the goal-dependent automaticity of implementation intentions is established by just one conscious act of will. Functionally, the goal-dependent automaticity produced by implementation intentions helps prevent rigid action initiation, as it prevents executing implementation intentions in situations in which the goal is not in place. As procrastinators do strongly intend to pursue their goals,[43] the requirement of a sufficient commitment of the respective goal intention for implementation-intention effects to occur should always be fulfilled.

Commitment to the Implementation Intention. Additionally, the commitment to enacting the implementation intention needs to be strong. For example, in a study by Achtziger, Bayer, and Gollwitzer,[44] telling participants that they had the type of personality that benefits from staying flexible (low plan commitment) led to weaker implementation-intention effects in comparison to participants told that they had the type of personality that benefits from sticking to plans (high plan commitment). The necessity of commitment to the *if-then* plan also supports the effectiveness of implementation intentions, by ensuring that incidental or superficial

38. E.g., Gollwitzer and Schaal, "Metacognition in Action."
39. E.g., Verplanken and Faes, "Good Intentions."
40. Sheeran, Webb, and Gollwitzer, "Interplay," study 2.
41. Bargh, "Conditional Automaticity"; Gollwitzer and Schaal, "Metacognition in Action."
42. Anderson, *Architecture of Cognition.*
43. E.g., Steel, "Nature of Procrastination," 79.
44. Achtziger, Bayer, and Gollwitzer, "Committting Oneself," study 2.

if-then plans do not impair flexibility for goal attainment.[45] Although procrastinators might differ in regard to their planning behavior, it seems plausible that once they form an implementation intention, they commit themselves as strongly to the formed plan as nonprocrastinators do. Indirect support for this notion is provided by research that demonstrates the effectiveness of implementation intentions in procrastinators.[46] Therefore, the precondition of a strong commitment to the implementation intention should not represent a limitation for implementation-intention effects in procrastinators.

Self-Efficacy.   A person must be confident that he or she has the ability to perform the actions instrumental to producing the desired outcomes (i.e., he or she must have a high level of *self-efficacy*)[47] in order for implementation-intention effects to occur. In an experimental study, we tested the moderation of implementation-intention effects by self-efficacy.[48] Participants' self-efficacy with respect to taking an abstract reasoning test (Raven matrices) was manipulated before they worked on a set of task trials. To establish low self-efficacy, participants worked on difficult training task trials that mostly led to experiences of failure; to establish high self-efficacy, participants worked on easy training trials that mostly led to mastery experiences. While all participants learned that double-checking their results for each trial was an effective strategy to improve their performance, only in the implementation-intention condition did they formulate this strategy into an *if-then* plan ("If I find an initial solution, then I will double-check it"). A positive effect of implementation intentions was only found in the high-self-efficacy condition; implementation-intention participants in the high-self-efficacy condition took significantly more time to work on the difficult matrices and indeed solved more of them correctly than participants with high self-efficacy who did not include the double-checking strategy in an implementation intention. For participants with low self-efficacy, implementation intentions neither increased time spent on the difficult matrices nor improved their performance. Low self-efficacy thus limits the effectiveness of implementation intentions. The formation of implementation intentions, on the other hand, cannot be expected to increase self-efficacy.[49] As low self-efficacy is also a strong predictor of procrastination,[50] it is especially important to ensure that people set realistic goals (not too easy or too hard), so that high self-efficacy to perform the necessary goal-directed actions is probable. Otherwise, forming implementation intentions will not help with overcoming procrastination.

45. E.g., Gollwitzer et al., "Flexible Tenacity."
46. E.g., Owens, Bowman, and Dill, "Overcoming Procrastination."
47. Bandura, *Self-Efficacy.*
48. Wieber, Odenthal, and Gollwitzer, "Self-Efficacy Feelings."
49. Webb and Sheeran, "Mechanisms."
50. Steel, "Nature of Procrastination," 77.

Personal Attributes. Personal attributes have been examined as moderators of implementation-intention effects in two lines of research. *Socially prescribed perfectionism* moderated the effectiveness of implementation intentions,[51] resulting in worse goal achievement among socially prescribed perfectionists. As with self-oriented perfectionism, socially prescribed perfectionism entails setting high personal standards and evaluating oneself stringently. But whereas the standards for self-oriented perfectionists are set by the individuals themselves, socially prescribed perfectionists try to conform to standards and expectations that are prescribed by others. A high level of socially prescribed perfectionism is related to depression, anxiety disorders, and obsessive-compulsive symptoms.[52]

In one study, participants who scored high on the socially prescribed perfectionism subscale of the Multidimensional Perfectionist Scale (MPS) rated their progress on their New Year's resolutions (three personal goals) after two and four weeks lower when they had formed implementation intentions than when they had received control instructions. In a similar second study, participants with high scores on socially prescribed perfectionism who formed implementation intentions not only rated their goal progress lower but also were less satisfied with their personal goal progress and thought that others were less satisfied with their progress (as compared with participants who formed implementation intentions but scored low on this subscale of perfectionism). However, for participants with self-oriented perfectionism, forming implementation intentions actually improved goal progress. A similar result has been found in the meta-analysis on procrastination by Steel[53] that revealed a (weak) relationship between socially prescribed perfectionism and procrastination ($r = 0.18$) but no such relationship for self-oriented perfectionism or for perfectionism in general ($r = -0.03$). Socially prescribed perfectionism not only represents a risk factor for procrastination but also moderates the effectiveness of implementation intentions, such that a high level of this subtype of perfectionism impedes their effectiveness. It seems important, therefore, to find out why socially prescribed perfectionists do not benefit from implementation intentions so that these problems can be circumvented.

A second line of research examined *conscientiousness*.[54] In an experimental study using undergraduate students, attendance in class was determined to be a function of conscientiousness, openness to experience, goal intentions, and implementation intentions. Results replicated previous findings that a lack of conscientiousness (low or moderate scores on the conscientiousness subsets of self-control, distractibility, organization, and achievement motivation) generally put people at risk for procrastination,

51. Powers, Koestner, and Topciu, "Implementation Intentions."
52. E.g., Powers, Zuroff, and Topciu, "Covert and Overt Expressions."
53. Steel, "Nature of Procrastination," 76.
54. Webb, Christian, and Armitage, "Helping Students."

whereas a high level of conscientiousness represented a protection factor.[55] While class attendance of highly conscientious students was not changed by forming implementation intentions as it already was at a high level (ceiling effect), low and moderately conscientious students significantly benefited from planning when, where, and how they would attend class (increasing their previously low class attendance rates).

In summary, the ability to resist procrastination and the effectiveness of implementation intentions are expected to be strongest when a person is highly committed to the goal (strong goal intentions), believes in his or her ability to enact the action required to produce the desired outcomes (high self-efficacy), and does not have the tendency to evaluate his or her behavior according to high standards set by others (socially prescribed perfectionism). A lack of strong goal intentions, low self-efficacy, and high levels of socially prescribed perfectionism not only are directly associated with procrastination but also limit the effectiveness of implementation intentions. In contrast, while low levels of conscientiousness are also positively associated with procrastination, it is those individuals with low and moderate levels of conscientiousness who especially benefit from implementation intentions to counter procrastination.

EVIDENCE THAT IMPLEMENTATION INTENTIONS HELP OVERCOME PROCRASTINATION

As the problems of forgetting one's intentions and not recognizing an opportunity to act on one's goals do not qualify as procrastination issues, we will not discuss research on the effectiveness of implementation intentions in overcoming these problems.[56] Not all studies analyzing goal striving ask participants for their reasons for having delayed action. Therefore, we cannot be entirely sure in these studies whether participants actually procrastinated or, rather, simply pursued other goals that were more important at the time. However, this criticism does not apply to laboratory experiments in which the time to get started on a focal experimental task is assessed. Moreover, participants' goal intentions as well as their goal progress dependent on the implementation-intention manipulation were measured in all reported studies. Although some of these studies used a quasi-experimental approach (classifying groups based on preexisting differences), most studies applied experimental designs (randomly assigning participants to conditions) that allow for causal inferences from the experimental factors to differences in the dependent variables. Two kinds of implementation intentions were used in the presented studies: implementation intentions in an *if-then* format and implementations in

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55. Steel, "Nature of Procrastination," 78.
56. E.g., Achtziger, Bayer, and Gollwitzer, "Committing Oneself."

alternative formats. Although implementation intentions specifying when, where, and how one intends to act on a goal in an *if-then* format are more effective than implementation intentions without the *if-then* format, both types of implementation intentions successfully enhance goal attainment.[57]

Procrastination generally occurs as the consequence of a complex interaction of diverse causes. In some cases, it may be driven primarily by situational characteristics or task characteristics. In other cases, personal characteristics might be the predominant factor. In the following sections, we will review studies in accordance to their main focus: as situation-related, task-related, or individual-related delay.

Getting Started

As an example of strong situational influences on the postponement of intended actions, a person would be more likely to procrastinate on a goal at times when other important goals or social norms are competing for his or her attention. For instance, in one study, German participants voluntarily committed themselves to the goal of writing an essay on how they spent their Christmas Eve by December 26 (also a holiday in Germany).[58] To test whether implementation intentions improved participants' goal achievement, half of the sample additionally supported the goal intention with an implementation intention: when, where, and how they intended to write the essay. German Christmas holidays are a time in which any kind of work-related activity is normatively banned in favor of socializing and spending time with family and friends. Thus, participants had to overcome a situational influence (social norms) to pursue their goal. Results revealed that participants who formed implementation intentions were three times more likely to actually write the report (i.e., to procrastinate less) than mere goal-intention participants. They wrote the reports 2.3 days after Christmas, compared with 7.7 days in the control condition, and sent them in 4.9 days after Christmas, compared with 12.6 days in the control condition. Moreover, 71 percent of the participants in the implementation-intention condition sent in their essays, as opposed to 32 percent of those in the control condition. Implementation intentions successfully reduced participants' procrastination even in a situation in which social norms endangered their goal.

Similarly, a person would be expected to be more likely to procrastinate at times when substantial changes are taking place in his or her environment. For example, in a study by Brandstätter et al.,[59] the effect of implementation intentions on getting started in difficult situations was

57. Chapman, Armitage, and Norman, "Comparing Implementation Intention Interventions."

58. Gollwitzer and Brandstätter, "Implementation Intentions," study 2.

59. Brandstätter et al., "Goals Need Implementation Intentions."

tested in the area of continuing education after the German reunification. Participants were chosen who indicated their interest in continuing education. The interview questions were "What are your plans for the near future with regard to your professional career?" and "Have you ever thought of continuing your education?" To assess whether participants formed an implementation intention, they were asked if they had already committed themselves to when, where, and how they would start to act on the goal to continue their education. Interviews conducted two years later indicated that participants who had formed an implementation intention were more successful in participating in vocational retrainings than those who did not specify when and where they would start to act. Thus, even in times of dramatic change (the first years after reunification), implementation intentions helped the participants to not procrastinate on their goal to continue their education.

Whereas situational factors might have played a primary role in triggering procrastination in the above cases, task-related factors (such as the negative evaluation of actions required to pursue a goal, also called task aversiveness) seem to be mainly responsible for procrastination in other instances.[60] A person might value being physically fit but still put off starting regular physical exercise because he or she simply does not like exercising. Do implementation intentions help people get started even on aversive tasks? Indeed, numerous studies demonstrate the beneficial effects of implementation intentions on getting started even when an initial reluctance to act has to be overcome.[61] One study on doing weekly math homework (over a period of one month) examined the question of whether implementation intentions specifying the when and how of the intended behavior differed in their effects from implementation intentions using an *if-then* format.[62] In this study, participants were provided with computer disks containing a series of tedious arithmetic tasks. Half of the participants formed *if-then* plans specifying when and how they were planning to act on the goal: "If it is Wednesday at 8:30, then I will perform as many arithmetic tasks as possible." The other half formed implementation intentions detailing when and how by stating: "I will perform as many arithmetic tasks as possible each Wednesday at 8:30." To measure procrastination, the time participants started to work on the arithmetic tasks each week was recorded, and the mean deviation from the intended starting time was computed. When participants formed *if-then* plans, they deviated 1.5 hours from their intended starting time; in contrast, when the implementation intentions were not in an *if-then* format, they procrastinated an average of 8.0 hours. Implementation intentions in an *if-then* format thus helped participants reduce their procrastination behavior on assigned learning goals (performing arithmetic tasks within a certain time

60. Steel, "Nature of Procrastination," 75.
61. Gollwitzer and Sheeran, "Implementation Intentions."
62. Oettingen, Hönig, and Gollwitzer, "Effective Self-Regulation," study 3.

frame) above and beyond implementation intentions that specify the when and how of the intended behavior not using the *if-then* format.

Other examples of the effectiveness of implementation intentions in helping people to overcome initial reluctance and get started with aversive tasks include health goals, such as starting regular physical exercise, conducting breast self-examinations as a cancer-prevention strategy, resuming functional activity after joint-replacement surgery, and eating healthily. Implementation intentions also helped people with their environmental goals, such as using public transport and purchasing organic food, and their professional goals, such as promoting workplace health and safety.[63] In essence, implementation intentions have been shown to be an efficient self-regulatory strategy to overcome procrastination in many parts of life.

Staying on Track

A strong predictor of procrastination is insufficient self-control.[64] An important function of self-control is to ward off potential distractions and temptations during goal striving. We assume that insufficient shielding of one's goals also contributes to procrastination (see above). A classic test for a person's ability to shield an ongoing task from distractions is the resistance-to-temptation paradigm.[65] In this paradigm, participants work on a tedious task while tempting distractions are presented. Four studies have investigated the effects of implementation intentions on resistance to temptation. In the first three studies, participants worked on a strenuous Concentration Achievement Test, in which arithmetic problems had to be solved while clips of award-winning commercials were simultaneously shown.[66] Before the task began, various intention conditions were realized. Participants either worked directly on the task (control condition), formed a goal intention to not let themselves get distracted (goal-intention condition), or supported this goal intention either with an implementation intention to work harder in the face of distractions (task-facilitative *if-then* plan) or with an implementation intention to simply ignore the distraction (temptation-inhibiting *if-then* plan). Task-facilitative implementation intentions only improved goal achievement when participants' motivation to perform well on the task and to ignore the distractions was low. However, participants who formed temptation-inhibiting implementation intentions outperformed the other groups in all three studies, independent of participants' motivation to perform well on the task and to ignore the distractions.

63. Gollwitzer and Sheeran, "Implementation Intentions."
64. Steel, "Nature of Procrastination," 78.
65. E.g., Patterson and Mischel, "Effects of Temptation-Inhibiting."
66. Gollwitzer and Schaal, "Metacognition in Action."

In the fourth study, the effectiveness of *if-then* implementation intentions at shielding goal striving from temptations was tested in six-year-old children.[67] When children start attending school, it is crucial that they learn to not be easily distracted. To improve goal striving, the strategy to ignore distractions seems to be quite effective.[68] To test whether even very young children can automate their action control with *if-then* implementation intentions, children either formed an *if-then* implementation intention ("If I see a distraction, then I will ignore it") or a control intention ("I will ignore distractions") before attempting to ignore funny cartoon pictures or movie clips while working on a repetitive animal or vehicle categorization task. Reaction times in the categorization task were faster for children who formed *if-then* implementation intentions, indicating that such intentions helped even six-year-old children to not procrastinate during goal striving.

Disengaging from Bad Means and Goals

Procrastination can also endanger successful self-regulation after the phase of getting started or staying on track, when the planned course of action is failing and a person needs to disengage but instead stays committed to the goal. The goal may have become a personal rule, which, in turn, may have motivated misperceptions that encourage continuation of a failing course of action, as people may fear that exceptions will undermine their ability to exert self-control when similar situations arise in the future.[69]

But implementation intentions not only may be used to prevent getting derailed from striving smoothly and effectively toward a goal; they can also be used to solve the problem of calling a halt to a faulty goal striving. People often fail to readily relinquish chosen means and goals that turn out to be faulty because of a strong self-justification motive ("I chose this goal or means, so it must be good"). Such escalation phenomena (also referred to as "throwing good money after bad") can be controlled, however, by the use of implementation intentions that specify when and how to consider a switch to a different means or a different goal. For instance, Henderson, Gollwitzer, and Oettingen asked participants who had chosen a certain strategy for a given task goal to form an implementation intention that specified a simple action response ("If I receive disappointing feedback, then I'll switch my strategy") or merely set the goal to always use the best strategy available.[70] They observed that this implementation intention facilitated disengagement as a response to experienced failure. Interestingly, there was a third condition in which participants specified a complex reflection response in their implementation intention ("If I

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67. Wieber et al., "Implementation Intentions Improve Resistance."
68. For an overview, see Metcalfe and Mischel, "A Hot/Cool-System Analysis."
69. Ainslie, *Picoeconomics*.
70. Henderson, Gollwitzer, and Oettingen, "Implementation Intentions."

receive disappointing feedback, then I will think about how things have been going with my strategy so far"). In contrast to participants who had specified the simple implementation intention ("then I'll switch my strategy"), those with the more reflective implementation intentions integrated information about recent improvement in forming their relinquishment decision (they were less willing to relinquish their strategy when things were improving). This finding shows that implementation intentions can be used to curb the escalation of behavioral commitment commonly observed when people experience failure with a chosen strategy of goal striving. Using more reflective implementation intentions even allows for flexible relinquishment of a goal-striving strategy in the sense that recent turns to the better are respected in the decision to switch (or not) to a different goal-striving strategy.

Preventing Ego-Depletion Effects

According to the resource model of self-regulation,[71] when self-regulatory resources are depleted, performance on subsequent tasks that tax these resources should be impaired. Two studies have tested whether the automatic nature of the effects of implementation intentions enables people to effectively self-regulate despite depleted self-regulatory resources. In the first study, participants' self-regulatory resources were depleted by having them control their emotions during a humorous movie (the ego-depletion condition) or not (the control condition).[72] Subsequently, they either supported the goal intention to solve as many anagrams as possible with the implementation intention "If I solve an anagram, then I will immediately start to work on the next" or did not, before working on an anagram task. In a replication of the classic ego-depletion effect, participants whose self-regulatory resources were depleted solved fewer anagrams than the two other groups. But, more important, participants who formed implementation intentions solved as many anagrams as participants whose self-regulatory resources were not depleted. Implementation intentions thus enabled participants to successfully strive for their goals even when their self-regulatory resources were depleted.

In the second experimental study, participants either were ego-depleted (from counting down in sevens from 1,000 while standing on the weaker leg) or not (counting to 1,000 in fives while standing normally).[73] Next, they formed the goal intention to read the ink color of words presented in one of four different colors (Stroop task) as quickly as possible; they either supported this goal intention with the implementation intention "As soon as I see the word, then I will ignore its meaning [e.g., by concentrating on

71. Baumeister et al., "Ego Depletion."
72. Gollwitzer, Bayer, and McCulloch, "Control of the Unwanted."
73. Webb and Sheeran, "Can Implementation Intentions Help."

the second letter only] and name the ink color it is printed in" or formed no implementation intention. Forming implementation intentions improved the Stroop task performance of participants who had been ego-depleted in the initial task up to the level of the nondepleted control group. Both of these studies support the hypothesis that implementation intentions counteract ego-depletion effects.

Curbing Bad Habits

As noted above, implementation intentions have been demonstrated to have features of automaticity. Automatic processes are required for successful self-regulation in at least two situations: when no self-regulatory capacities remain for resource-demanding self-regulation (in other words, ego depletion) and to keep other unwanted automatic processes in check. The previously discussed research demonstrates that implementation intentions lead to effective action control even when self-regulatory resources are depleted. The effectiveness of implementation intentions to curb the influence of unwanted automatic responses (bad habits) on the ongoing intended goal striving has also been examined. For example, in a study on recycling behavior, the effectiveness of implementation intentions in replacing well-established habits with new recycling habits was tested.[74] The recycling behavior of 109 employees of a telecommunications company was observed by measuring the actual amount of paper and the number of plastic cups in their personal wastebaskets before and after an implementation intention manipulation. Over a period of two months, implementation intentions helped participants to overcome their old recycling habits and to recycle as much as a condition in which an eye-catching facility was used to promote paper-recycling behavior and significantly more than control conditions. In addition to situations in which automatic behavioral responses limit goal striving, automatic cognitive responses such as stereotyping and inappropriate automatic emotional responses can also be successfully regulated with implementation intentions. Moreover, implementation intentions were found to improve goal attainment even when intellectual capabilities or competitive opponents limited goal striving.[75]

Attenuating Chronic Problems of Self-Control

To this point, we have reviewed research in which procrastination was conceptualized as a state procrastination (namely, as a function of the situation or the task or the individual during the pursuit of one goal). But research has also taken into account the stability of individual procrastination

74. Holland, Aarts, and Langendam, "Breaking and Creating Habits."
75. For an overview, see Gollwitzer, Gawrilow, and Oettingen, "Power of Planning."

behavior, as some people may procrastinate not only occasionally but also chronically. Trait procrastination is characterized by the relatively stable tendency over time to postpone actions that are necessary to reach a goal.[76]

To test the relationship between behavioral intentions and behavioral enactment (the intention-behavior gap) in trait procrastinators and whether implementation intentions would help chronic procrastinators to attend a scheduled experiment at their university, an experiment was conducted with the help of 152 college students.[77] In a separate first session, participants filled in a questionnaire on their procrastination behavior, to identify self-reported high- or low-level trait procrastinators. Students then received handouts during class about the opportunity to earn extra credit from a study with 10 possible appointment times. Half of the handouts contained instructions to support the goal intention to attend the session with an implementation intention. ("You are more likely to keep your appointment if you commit yourself to arriving at the assigned room at one of the times listed above. Select now the time at which you plan to come for the second experiment, write it at the bottom of the second page, and return that page to your instructor.") As a measurement of procrastination, participants' actual attendance at the additional study session was measured. Participants whose self-reports indicated high trait procrastination kept the scheduled appointment less often than those whose self-reports revealed low trait procrastination. In addition to these differences, low as well as high trait procrastinators benefited equally from forming implementation intentions: implementation intentions increased the attendance rates from 8.3 to 51.4 percent in high trait procrastinators and from 27.5 to 71.8 percent in low trait procrastinators. Thus, even people with a chronic tendency to procrastinate benefited from forming implementation intentions as much as low procrastinators did (with 40 percent enhancement).

Implementation intentions have also been found to help other critical samples known to have problems with action control. For example, opiate addicts in withdrawal are known to have problems getting started on their goals.[78] During opiate withdrawal, people often do not realize their goals, as they are preoccupied with suppressing the automatic and conscious processes that favor the intake of the drugs. It was predicted, however, that even people in withdrawal would benefit from forming implementation intentions. To test this hypothesis, former heroin users at a German hospital were approached during a workshop on how to find and apply for jobs. Patients were asked to voluntarily participate in a study on how young adults master the task of composing a curriculum vitae. At 10:00 A.M.,

76. Schouwenburg, "Procrastination in Academic Settings."
77. Owens, Bowman, and Dill, "Overcoming Procrastination."
78. Brandstätter, Lengfelder, and Gollwitzer, "Implementation Intentions."

patients were shown a model CV and then were asked to form the goal to create their own CVs before 5:00 P.M. on the same day. Half of the participants supported this goal with irrelevant implementation intentions: when, where, and how they wanted to have lunch. The other half supported it with goal-directed implementation intentions: when, where, and how they wanted to write their CV. Whereas irrelevant implementation intentions did not help participants under withdrawal to realize this goal (none of the 10 participants in this condition handed in a CV at 5:00 P.M.), goal-directed implementation intentions did (eight of the participants in this condition handed in a CV at 5:00 P.M.). When using relevant implementation intentions, people procrastinate less, even when suffering from conditions of high cognitive load (in this study, being occupied by controlling the urge to use drugs).

In line with these findings, people suffering from schizophrenia and patients with frontal-lobe injuries were found to perform well on difficult executive-function tasks (e.g., *go/no go* tasks) when using implementation intentions.[79] In addition, children with attention-deficit/hyperactivity disorder (ADHD) benefited from forming implementation intentions in executive-function tasks (e.g., Stroop task) as well as in more real-life self-control tasks (e.g., delay-of-gratification paradigm).[80]

CONCLUSION

Procrastination, understood as the voluntary delay of an intended course of action despite having the opportunity to act and expecting to be worse off for the delay, is a widespread phenomenon. Whereas previous research discussed procrastination mainly in relation to the failure to get started, we extend this notion to all stages of goal striving. People might not get started to act on an intended goal, might not continue pursuing a goal, might not disengage from goal intentions that became unattainable, or might procrastinate after overextending themselves (in the case of ego depletion). To fight procrastination, implementation intentions are suggested as an easily applicable self-regulatory strategy. Implementation intentions refer to specific plans in which people specify when, where, and how they intend to pursue a goal, preferably in the form of an *if-then* plan. Research shows that implementation intentions help people overcome procrastination with respect to various problems of goal striving, improve goal attainment in situations where goal striving is handicapped (e.g., by bad habits, lack of skills, or competitors), and even improve results in populations known to have chronic problems of action control.

79. Brandstätter, Lengfelder, and Gollwitzer, "Implementation Intentions, study 2; Lengfelder and Gollwitzer, "Reflective and Reflexive Action Control."

80. Gollwitzer, Gawrilow, and Oettingen, "Power of Planning."

An important precondition for implementation-intention effects to occur is that strong goal intentions are in place. Future research should therefore develop implementation-intention interventions that are backed up by interventions geared at creating strong goal intentions. For example, protection-motivation interventions[81] or the goal-setting strategy of mental contrasting could precede the formation of implementation intentions as a reinforcement strategy. In a longitudinal study on exercising,[82] participants not only formed self-set implementation intentions—determining when, where, and how they planned to overcome an obstacle; deciding how to prevent an obstacle from occurring; and specifying a good opportunity to act—but also first elaborated positive outcomes of regular exercising and contrasted them with possible obstacles (engaged in mental contrasting). An increase in exercising was observed as an immediate consequence of this intervention; more impressively, this increase held up over the extensive time period of two years. This line of research is most promising, and we hope it continues to highlight the efficacy of implementation intentions, especially as they relate to procrastination.

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81. Milne, Orbell, and Sheeran, "Combining Motivational and Volitional Interventions."
82. Stadler, Oettingen, and Gollwitzer, "Effects of a Self-Regulation Intervention."

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