Psychology of Self-Regulation

Cognitive, Affective, and Motivational Processes

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Making Goal Pursuit Effective
Expectancy-Dependent Goal Setting and Planned Goal Striving

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CONTENTS

Research on self-regulation and self-control has defined its object of interest by emphasizing different phenomena and processes. The many targeted phenomena include overriding unwanted thoughts (e.g., related to distractions, temptations, stereotyping, self-inflation), feelings (e.g., anger, disgust, fear, sadness, prejudice), and behaviors (e.g., aggressive, immoral, risky, health-damaging, underachieving). The various processes that are assumed to promote self-regulation and self-control pertain to fostering the wanted over the unwanted by cognitively inhibiting the unwanted and/or activating the wanted, or to modifying one's current or anticipated emotions so that the wanted can be executed more easily and the unwanted can be more easily halted or prevented. Often it is assumed that effective self-regulation and self-control requires a switch; for instance, a switch from a hot mode of information processing to a cool mode, from a short-term to a long-term time perspective, from an impulsive to a reflective action control, or from habitual bottom-up action control by present stimuli to top-down control by the desired end states specified in a person's goals. It is this latter process of achieving self-regulation and self-control by the pursuit of goals that is focused on in the present chapter. We will argue that goal pursuits are facilitated when an individual applies distinct cognitive procedures or strategies. In other words, we suggest that effectively regulating one's goal pursuits by using certain cognitive strategies is an important route to achieving self-control.

Research on goal pursuit has commonly focused on two separate issues: the setting of appropriate goals and the effective striving for goal attainment (Gollwitzer & Moskowitz, 1996; Oettingen & Gollwitzer, 2001). Research on goal setting observed that mentally contrasting a desired future outcome with obstacles of present reality leads to goal commitments to reach this outcome in line with one's expectations of success (Oettingen, 2000). Given that expectancies of success are high, strong goal commitments emerge as reflected in cognitive, affective, and behavioral indicators. Research on goal striving observed that spelling out goal implementation in advance by simple if-then plans linking an instrumental goal-directed behavior (then-component) to anticipated situational cues (if-component) manages to automate goal striving, thus facilitating getting started on one's goals and shielding them from disruptions (Gollwitzer, 1993, 1999). The goal-setting strategy of mental contrasting (MC) has recently been combined with the goal-striving strategy of making if-then plans (i.e., implementation intentions, II) into a joint strategy (MCII) to be taught in interventions geared at enhancing the self-regulation of goal pursuit. Various intervention studies entailing different samples (e.g., high school students, college students, female professionals) and various types of goals (e.g., academic, lifestyle, health) attest to the effectiveness of the MCII strategy. It can be taught as a metacognitive strategy that is then applied by the trainees to their own individual concerns; effects on goal attainment are both immediate and long lasting, and broader outcome variables such as self-discipline and self-esteem are also positively affected. In the present chapter, we will present the development of research on mental contrasting and forming implementation intentions, and how they were combined into the creation of an intervention strategy to promote goal attainment.

SETTING GOALS

If people want to meet their goals, they need to set goals framed in a way that maximizes goal attainment. Framing one's goals in terms of promoting positive outcomes versus preventing negative outcomes (promotion versus prevention goals; Higgins, 1997) helps goal attainment, as does acquiring competence versus demonstrating the possession of competence (learning versus performance goals; Dweck, 1999), and anticipating internal versus external rewards (intrinsic versus extrinsic goals; Ryan & Deci, 2001). That is, promotion, learning, and intrinsic goals are commonly attained more successfully than prevention, performance, and extrinsic goals. The precision with which the desired future outcome is spelled out also influences success in goal attainment. For example, goals with a proximal versus a distal time frame (Bandura & Schunk, 1981) are more likely to be achieved, and goals with specific rather than I-will-do-my-best standards lead to better performances (Locke & Latham, 1990).

It is also useful to set goals that one can strongly commit to, as such goals (intentions) have a better chance of being attained (Ajzen, 1991; meta-analysis by Webb & Sheeran, 2006). Strong goal commitments are based on the belief that a given goal is both highly desirable and feasible (e.g., Atkinson, 1957; Bandura, 1997; Gollwitzer, 1990; Klinger, 1975). Desirability comprises the summarized beliefs about the importance of expected short-term and long-term consequences of goal attainment (Heckhausen, 1977). Feasibility is defined as expectations that future events and actions will occur (Gollwitzer, 1990). Prominent examples include expectations of whether one can execute a behavior necessary for realizing a specific outcome (i.e., self-efficacy expectations; Bandura, 1977; Maddux, 1999), expectations that a behavior will lead to a specified outcome (i.e., outcome expectations; Bandura, 1977, instrumentality beliefs; Vroom, 1964), and judgments about the general likelihood of a certain outcome (i.e., general expectations; Oettingen & Mayer, 2002). It is important to recognize, however, that perceiving a desirable goal as feasible does not necessarily make for strong goal commitments. Recent research suggests that the way people think about a desired future outcome affects whether feasibility is indeed translated into strong goal commitments facilitating subsequent goal striving and goal attainment.

Effective Goal Setting: The Strategy of Mental Contrasting

The model of fantasy realization (Oettingen, 2000; Oettingen, Pak, & Schnetter, 2001) proposes that mentally contrasting a desired future with the reality that impedes its realization will create expectancy-dependent goal commitments. Specifically, in *mental contrasting*, people imagine the attainment of a desired future (e.g., becoming a clinical psychologist, giving a good talk) and then reflect on the present reality that stands in the way of attaining the desired future (e.g., the GRE yet to be taken, evaluation anxiety). Thus, contrasting fantasies about the future with reflections on reality is a problem-solving strategy: the person wants to achieve a desired future and needs to engage in actions to realize it.

In their theory of problem solving, Newell and Simon (1972) distinguish between an objective and a subjective problem space. The objective problem space

is defined by the demands of the task. In the case of realizing a desired future, the objective problem space is composed of the desired future and the impediments to getting there. The subjective problem space is defined by the internal representations of the problem. Mental contrasting matches the subjective problem space with the objective problem space by linking future and reality, and thereby people recognize that they need to take actions to achieve the desired future. As a consequence, expectations of attaining the desired future become activated and determine the person's commitment and subsequent striving to attain the wanted future. When perceived chances of success (expectations of success) are high, people will actively commit to and strive toward reaching the desired future; when expectations of success are low, people will refrain from doing so. In other words, mental contrasting makes a person sensitive to the question of which goals are reachable, and it gets people to go for reachable goals and keep clear of unreachable ones. This ultimately should protect a person's resources (time, energy, and money) as people will not show any engagement in the face of unreachable goals, but engage without restraint in the face of reachable goals.

The model of fantasy realization specifies two other ways of thinking about the future; however, both fail to lead to goal commitment and goal striving guided by the perceived likelihood of attaining the desired future. People may either solely envision the attainment of the wished-for future (i.e., *indulging*) or solely reflect on the negative reality (i.e., *dwelling*). Considered again from a problem-solving perspective (Newell & Simon, 1972), both modes of thinking create a subjective problem space that does not correspond to the objective problem space. As the objective problem space is not subjectively accessible, a discrepancy or tension between future and reality is not perceived and thus it is not signaled that actions would be necessary or instrumental to achieve the desired future. Therefore, expectations of success do not become activated, and goal commitment and goal striving do not reflect the perceived likelihood of reaching the desired future. The level of goal striving is determined by the a priori commitment that the person holds with respect to attaining the desired future. In other words, it is only mental contrasting, but not indulging and dwelling, that succeeds in strengthening goal commitment with subsequent goal striving when expectations of success are high, and in weakening it when expectations of success are low. Indulging and dwelling are thus less effective in protecting a person's resources than mental contrasting; individuals who indulge and dwell show a medium level of engagement even when no engagement (in the case of low expectations of success) or full engagement (in the case of high expectations of success) would be the resource-efficient way to go.

Empirical Evidence

A multitude of studies have tested the effects of mental contrasting, indulging, and dwelling on goal commitment and goal striving (Oettingen, 2000; Oettingen, Hönig, & Gollwitzer, 2000; Oettingen, Mayer, Thorpe, Janetzke, & Lorenz, 2005; Oettingen et al., 2001). For example, in one study, freshmen enrolled in a vocational school for computer programming (Oettingen et al., 2001, Study 4) first indicated their expectations of excelling in mathematics. Then they named aspects

that they associated with excelling in mathematics (e.g., feelings of pride, increasing job prospects) and aspects of reality that may impede such excelling (e.g., being distracted by peers, feeling lazy). Subsequently, three experimental conditions were established to correspond with the three modes of thought. In the mental contrasting condition, participants had to elaborate in writing two positive aspects of the future and two aspects of reality, in alternating order, beginning with a positive aspect of the future. Participants in the indulging condition were asked to elaborate four positive aspects of the future; in the dwelling condition, they instead elaborated four negative aspects of reality. As a dependent variable, participants indicated how energized they felt with respect to excelling in mathematics (e.g., how active, eventful, energetic). Further, 2 weeks after the experiment, participants' teachers reported how much effort each student had invested for the last two weeks and provided each student with a grade for that time period.

As predicted, only the students in the mental contrasting group felt energized, exerted effort, and earned grades based upon their expectations. Those with high expectations of success felt the most energized, invested the most effort, and received the highest course grades, while those with low expectations of success felt the least energized, invested the least effort, and received the lowest course grades. To the contrary, participants in the indulging and dwelling conditions felt moderately energized, exerted moderate effort, and received moderate grades independent of their expectations of success.

A variety of studies pertaining to different life domains replicated this pattern of results. For example, experiments pertained to studying abroad (Oettingen et al., 2001, Study 2), acquiring a second language (Oettingen et al., 2000, Study 1), getting to know an attractive stranger (Oettingen, 2000, Study 1), finding a balance between work and family life (Oettingen, 2000, Study 2), improving oneself (Oettingen et al., 2005, Study 1), and idiosyncratic interpersonal wishes of great importance (Oettingen et al., 2001, Study 1 and 3). Further, goal commitment and goal striving were assessed by cognitive (e.g., making plans), affective (e.g., feeling responsible for the wished-for ending), motivational (e.g., feelings of energization), and behavioral indicators (e.g., invested effort and achievements). Indicators were measured via self-report or observations and either directly after the experiment or weeks later. In all of these studies the same pattern of results appeared: Given high expectations of success, participants in the mental contrasting group showed the strongest goal commitment and goal striving; given low expectations, people showed the least goal commitment and goal striving. Participants who indulged in positive images about the future or dwelled on negative images of reality showed moderate commitment without considering their expectations of success.

It is important to note that the outcomes of mental contrasting not occur as a result of changes in expectations (feasibility) or incentive valence (desirability), but rather as a result of the mode of self-regulatory thought, aligning commitment with expectations (Oettingen et al., 2001; Oettingen, Mayer, Sevincer, et al., in press, Study 1). Furthermore, it is important to mention that the effects of mental contrasting depend on the person perceiving the present reality as standing in

the way of realizing the future. When engaging in mental contrasting, individuals first elaborate a desired future, establishing the positive future as their reference point, and only thereafter elaborate aspects of the present reality, thereby perceiving the negative aspects as obstacles standing in the way of attaining the future. Reversing this order (i.e., reverse mental contrasting), by first elaborating the negative reality followed by elaboration of the desired future, thwarts construal of the present standing in the way of the future and thus fails to elicit goal commitment congruent with expectations of success (Oettingen et al., 2001, Study 3). The studies presented next explored the underlying motivational and cognitive processes responsible for these effects and provide neurological data substantiating and extending the theoretical principles.

Mechanisms of Mental Contrasting

Energization   Locke and Latham (2002) identify feelings of energization as critical to promoting goal-directed behavior. They contend that commitment to realizing a challenging future is linked to an "energizing function" (i.e., activity incitement, Brunstein & Gollwitzer, 1996). For example, desired futures that prove more challenging to achieve (e.g., a high school student practicing for the SAT, setting her sights on beating her personal score) give rise to greater effort than less challenging desired futures (e.g., a high school student practicing for the SAT, setting her sights on achieving her usual score; Locke & Latham, 2002). Thus, energization was hypothesized and found to be a mediator responsible for the effects of mental contrasting on fostering discriminative goal pursuit (Oettingen, Mayer, Sevincer, et al., in press, Studies 1 and 2). Specifically, using an acute stress paradigm (i.e., videotaped public speaking. 1997), goal commitment as evinced by the quantity and quality of goal striving was observed in the laboratory. Economics students participating in this study were informed that they were to deliver a speech in front of a video camera to help with the development of a measure of professional skills for a human resource department. Participants were randomly assigned to either a mental contrasting or an indulging condition. As dependent variables, participants indicated their initial feelings of energization with a self-report measure (e.g., how energized do you feel when you think about giving your talk), and to gauge participants' subjective performance they were asked to rate their actual performance. Persistence of goal striving was indicated by the length of each participant's presentation and quality of goal striving was assessed via independent raters' evaluations of the quality of the videotape content (Oettingen, Mayer, Sevincer, et al., in press, Study 2).

Consistent with previous mental contrasting studies, individuals in the mental contrasting group, but not those in the indulging condition, evidenced a strong link between perceived expectations of success and goal striving as measured by subjective self-evaluations of performance and objective ratings of the videotaped presentations. Additionally, in the mental contrasting condition, feelings of energization fully and significantly explained the relationship between expectations

of success and both subjective and objective performance quality. Physiological data as measured by systolic blood pressure showed the same pattern of results (Oettingen, Mayer, Sevincer, et al., in press, Study 1). Cardiovascular responses, such as systolic blood pressure, are considered reliable indicators of physiological arousal states and effort mobilization (Gendolla & Wright, 2005; Wright & Kirby, 2001).

Planning for Upcoming Hindrances   Failing to prepare and plan for hindrances one could encounter on the way toward achieving a desired future compromises one's chances of success (Gollwitzer, 1990). Since mental contrasting leads individuals to view the negative aspects of the present reality as obstacles hindering the attainment of a desired future, high-expectancy mental-contrasting individuals should prepare for potential impediments by planning in advance how to tackle any future obstacles. Specifically, high-expectancy mental-contrasting individuals should spontaneously form if-then plans shown to be highly effective facilitators of goal striving in a host of domains (meta-analysis by Gollwitzer & Sheeran, 2006). Moreover, because these plans have been observed to emerge right after the mental contrasting procedure (Oettingen et al., 2001, Study 1; Oettingen et al., 2005, Study 2), they qualify as a cognitive mechanism responsible for the effects of mental contrasting on goal attainment. To test this assumption, Oettingen, Mayer, and Brinkmann (2009) had students engage in mental contrasting, indulging, dwelling, or reverse mental contrasting regarding an interpersonal concern. Thereafter, participants answered questions assessing their commitment to resolving their goals (e.g., putting effort into achieving their goals).

To assess the mediating variable for this study, two independent raters content-analyzed participants' elaborations of the negative aspects of the reality in either the mental contrasting, dwelling, or reverse contrasting conditions to assess the number of if-then plans (e.g., "If I come home feeling overworked, then I will still spend at least half an hour with [my partner]") formed as a result of experimental condition. A significant benefit of this content-analysis method is its ability to capture participants' plan formation during the process of mental contrasting versus noncontrasting thought (i.e., dwelling and reverse contrasting). If-then plans mediated the interaction between expectation and self-regulatory thought, and in the mental contrasting condition, forming if-then plans fully explained the relation between expectations and subjective success in goal achievement. Thus, when people are in the mental contrasting condition and have high expectations of success, they consider a course of action toward goal attainment and make plans to overcome anticipated obstacles. Such planning in turn helps to form strong goal commitments with respective intensive goal striving.

Neural Correlates   Mental contrasting, as opposed to indulging, presents itself as a cognitively demanding task, one requiring individuals to look into the future,

past, and present, helping them to form goal commitment (i.e., intentions) in line with their expectations. As such, mental contrasting should be associated with greater activity in brain regions linked to working memory processes as mental contrasting effects are based on mentally placing the present negative reality in the way of the desired future. However, mental contrasting should also lead to greater activity in brain areas associated with episodic memory because it demands the elaboration of obstacles. Such elaborations should recruit memories of relevant obstacles that were experienced in the past as well as relevant memories about past successes and failures in trying to overcome them. Mental contrasting should also be linked to heightened activity in brain regions that are related to vividly imagining events. As the mental contrasting procedure demands switching back and forth from positive images about a desired future to images of impeding obstacles, images of both the desired future and obstacles should become particularly vivid and crystallized. Finally, mental contrasting should lead to greater activity in brain regions that are related to holding intentions and action preparation because mental contrasting leads to the formation of strong goal commitment, given that relevant expectations of success are high.

Indeed, a study using continuous magnetoencephalography (MEG), a brain imaging technique measuring magnetic fields produced by electrical activity in the brain (Achtziger, Fehr, Oettingen, Gollwitzer, & Rockstroh, 2009), showed that mental contrasting and indulging are two distinct mental activities. Specifically, mental contrasting heightened activity in brain regions responsible for working memory and intention formation, suggesting that mental contrasting directs attention toward critical information, such as positioning the present, negative reality in the way of the desired future. Moreover, mental contrasting heightened activity in regions responsible for episodic memory and vivid mental imagery suggesting that mental contrasting is rooted in the retrieval of past personal events, as well as the processing of complex stimuli, such as reexperiencing past incidents. In contrast, indulging relies less on episodic memory processes. Indulging in a positive future primarily entails loose associations between aspects of the not-yet-experienced desired positive future rather than the mental exploration of past experiences (Oettingen, 2000; Oettingen et al., 2001). Furthermore, mental contrasting requires a critical look at both the desired future and negative reality, and thus evokes more vivid images than indulging.

Going beyond prior research, the present findings suggest that certain preliminaries have to be fulfilled so that mental contrasting can evidence its beneficial effects. For example, as mental contrasting taxes working memory, people should not be able to effectively perform mental contrasting whenever cognitive resources are blocked by dual-task activities (e.g., being occupied by demanding cognitive tasks, coping with interpersonal stressors, extreme tiredness, or physical frailty and pain). Moreover, as mental contrasting is based on the effective retrieval of relevant obstacles experienced in the past, mental contrasting should be particularly effective for people who have carefully encoded past experiences with obstacles and thus can easily and accurately be retrieved from memory. Vividly depicted in the present MEG study is the cognitive complexity of mental contrasting.

Summary

Findings supporting the model of fantasy realization show that perceiving the envisioned future as desirable (positive attitude or high incentive value) and feasible (e.g., high efficacy expectations) are just prerequisites for the emergence of strong goal commitments. To create strong goal commitments, people need to translate these positive attitudes and high expectations into binding goals, a process that is facilitated by mentally contrasting the positive future with negative reality. Such mental contrasting has been found to produce expectancy-dependent goal commitments in widely different life domains (e.g., interpersonal, achievement, and health). It is based on the motivational process of energization and the cognitive process of if-then planning when translating expectations into goal commitment and subsequent striving, and it has been linked to brain activity typical of purposeful problem solving based on one's past experiences and performance history.

IMPLEMENTING SET GOALS

Goal attainment is not secured solely by forming strong goal commitments and framing the goals at hand in an appropriate manner. There is the second issue of implementing a chosen goal (i.e., goal striving), and one wonders what people can do to enhance their chances of being successful at this phase of goal pursuit. The answer seems to be the following: People need to prepare themselves so that their chances of overcoming the major difficulties of goal implementation are kept high. The type of preparation that has found much theoretical and empirical attention in recent years is the making of if-then plans (i.e., the forming of implementation intentions).

The Distinction Between Goal Intentions and Implementation Intentions

To form an implementation intention (Gollwitzer, 1993, 1999), one needs to identify a future goal-relevant situational cue (i.e., the *if-component*) and a related planned response to that cue (i.e., the *then-component*). Whereas a goal intention specifies the desired event in the form of "I intend to perform Behavior X or to reach Outcome X" (e.g., to exercise regularly or to get an A in Introductory Psychology), an implementation intention specifies both an anticipated goal-relevant situation and a proper goal-directed response. Thus, an implementation intention that serves the goal intention to "get an A in Introductory Psychology" would follow the form "**if** Situation Y arises (e.g., if my roommates ask me to go out tonight), **then** I will perform Behavior Z (e.g., then I will say that I will be joining them next week when my exam is over)."

Implementation intention provides benefits over and above goal intentions. A meta-analysis by Gollwitzer and Sheeran (2006) involving over 8,000 participants in 94 independent studies reported an effect size of $d = .65$. This medium-to-large effect size (Cohen, 1992) represents the additional facilitation of goal achievement by implementation intentions compared to goal intentions alone. As goal intentions

by themselves already have a facilitating effect on behavior enactment (Webb & Sheeran, 2006), the size of this effect is remarkable.

How do implementation intention effects come about? The mental links created by implementation intentions facilitate goal attainment on the basis of psychological processes that relate to both the anticipated situation (the if part of the plan) and the intended behavior (the then part of the plan). Because forming an implementation intention implies the selection of a critical future situation, the mental representation of this situation becomes highly activated, and hence more accessible (Gollwitzer, 1999). This heightened accessibility of the if part of the plan was observed in several studies (e.g., Parks-Stamm, Gollwitzer, & Oettingen, 2007; Webb & Sheeran, 2007, 2008) and means that people are in a good position to identify and take notice of the critical situation when they subsequently encounter it (e.g., Webb & Sheeran, 2004). For instance, participants who formed implementation intentions to collect a coupon were faster to recognize words related to the location of the coupon (e.g., corridor, red door) compared to participants who only formed the goal intention to collect the coupon. Implementation-intention participants also were more likely to collect the coupon subsequently (Aarts, Dijksterhuis, & Midden, 1999).

Studies also indicate that implementation intentions forge a strong association between the specified opportunity and the specified response (Webb & Sheeran, 2007, 2008). The upshot of these strong links is that the initiation of the goal-directed response specified in the if-then plan becomes automated, that is, exhibits features of automaticity including immediacy, efficiency, and redundancy of conscious intent. The idea is that people do not have to deliberate anymore about when and how they should act when they have formed an implementation intention—unlike people who have formed mere goal intentions. Evidence that if-then planners act quickly (Gollwitzer & Brandstätter, 1997, Experiment 3), deal effectively with cognitive demands (Brandstätter, Lengfelder, & Gollwitzer, 2001), and do not need to consciously intend to act at the critical moment (Sheeran, Webb, & Gollwitzer, 2005, Study 2) is consistent with this idea.

These component processes of implementation intentions (enhanced cue accessibility, automatization of responding) mean that if-then planning enables people to see and seize good opportunities to move toward their goals. *Strategically* forming if-then plans *automates* goal striving (Gollwitzer & Schaal, 1998) because people delegate control of goal-directed behaviors to preselected situational cues with the explicit purpose of reaching their goals, that is, automatic action initiation originates in a conscious act of will (if-then planning).

Implementation Intentions and Solving Problems of Goal Striving

Given these special features of action control by implementation intentions, one wonders whether people benefit from forming implementation intentions when they are confronted with the most challenging problems of goal implementation: getting started, staying on track, calling a halt, and not overextending oneself.

Getting Started   Numerous studies suggest that problems of *getting started* on one's goals can be solved effectively by forming implementation intentions. For

instance, Gollwitzer and Brandstätter (1997, Study 2) analyzed a goal intention (i.e., writing a report about how the participants spent Christmas Eve) that had to be performed at a time (i.e., during the subsequent two Christmas holidays) where people are commonly busy with other things. Still, research participants who had furnished their goal intention with an implementation intention that specified when, where, and how one wanted to get started on this project were about three times as likely to actually write the report than mere goal intention participants. Similarly, Oettingen et al. (2000, Study 3) observed that implementation intentions helped people to act on their task goals (i.e., taking a concentration test) on time (e.g., at 10 a.m. in the morning of every Wednesday over the next four weeks).

Other studies have examined the ability of implementation intentions to foster goal striving that is unpleasant to perform. For instance, the goal to perform regular breast examinations (Orbell, Hodgkins, & Sheeran, 1997) or cervical cancer screenings (Sheeran & Orbell, 2000), resume functional activity after joint replacement surgery (Orbell & Sheeran, 2000), eat a low-fat diet (Armitage, 2004), recycle (Holland, Aarts, & Langendam, 2006), and engage in physical exercise (Milne, Orbell, & Sheeran, 2002), were all more readily acted upon when people had furnished these goals with implementation intentions. Moreover, implementation intentions were found to help attainment of goal intentions where it is easy to forget to act (e.g., regular intake of vitamin pills, Sheeran & Orbell, 1999; the signing of work sheets with the elderly, Chasteen, Park, & Schwarz, 2001).

Staying on Track   Many goals cannot be accomplished by simple discrete one-shot actions but require that people keep striving for the goal over an extended period of time. Such staying on track may get very difficult when certain internal (e.g., being anxious, tired, overburdened) or external stimuli (e.g., temptations, distractions) are not conducive to goal realization but instead generate interferences that could potentially derail the ongoing goal striving. Implementation intentions can facilitate the shielding of such goal striving from interferences that stem from outside the person by suppressing them (Gollwitzer & Schaal, 1998). For instance, if a person wants to avoid being unfriendly to a friend who is known to make outrageous requests, she can protect herself from showing the unwanted unfriendly response by forming suppression-oriented implementation intentions. Such suppression-oriented implementation intentions may take various forms: "And if my friend approaches me with an outrageous request, then I will not respond in an unfriendly manner (or then I will respond in a friendly manner, or then I'll ignore it)!"

But suppression-oriented implementation intentions can also be used to shield ongoing goal strivings from disruptive inner states. Achtziger, Gollwitzer, and Sheeran (2008, Study 1) report a field experiment concerned with dieting in which goal shielding was supported by suppression implementation intentions geared at controlling potentially interfering inner states (i.e., cravings for junk food). An alternative way of using implementation intentions to protect ongoing goal striving from getting derailed by adverse inner states (e.g., inappropriate moods, ego depletion, irritation) is forming implementation intentions geared at stabilizing the ongoing goal striving (Bayer & Gollwitzer, 2009). Using again the example of a person who is approached by her friend with an outrageous request, let's assume

that this person is also tired or irritated and thus particularly likely to respond in an unfriendly manner. If this person has stipulated in advance in an implementation intention what she will converse about with her friend, the critical interaction may simply run off as planned, and being tired or irritated should fail to hurt the interaction with her friend.

Calling a Halt · Implementation intentions can also help to solve the self-regulatory problem of calling a halt to faulty goal striving. People often fail to readily disengage from chosen means and goals that turn out to be faulty because of a strong self-justification motive (Brockner, 1992). Such escalation phenomena (also referred to as "throwing good money after bad") can be controlled effectively, however, by the use of implementation intentions that specify exactly when and how to consider a switch to a different means or a different goal. For instance, Henderson, Gollwitzer, and Oettingen (2007) asked participants who had chosen a certain strategy for a given task goal to either form an implementation intention that specified a complex reflection response ("If I receive disappointing feedback, then I'll think about how things have been going with my strategy!") or a more 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. Henderson et al. observed that action implementation intentions facilitated disengagement as a response to experienced failure no matter whether there were signs that things were picking up or that they would continue to stay bleak. Reflection implementation intention participants, on the other hand, integrated information about recent improvement in forming their disengagement decision (i.e., they were less willing to disengage when things were picking up). This study 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 reflection implementation intentions (as compared to action implementation intentions) even allows for flexible disengagement in the sense that recent positive feedback is respected in one's decision to switch (or not) to a different goal striving strategy.

Not Overextending Oneself   The assumption that implementation intentions subject behavior to the direct control of situational cues (Gollwitzer, 1993) implies that the self is not involved when behavior is controlled via implementation intentions. As a consequence, the self should not become depleted (Muraven & Baumeister, 2000) when task performance is regulated by implementation intentions, and thus for individuals using implementation intentions, not overextending themselves should become easier. Indeed, using different ego-depletion paradigms, research participants who had used implementation intentions to self-regulate in a first task did not show reduced self-regulatory capacity in a subsequent task. Whether the initial self-regulation task was controlling emotions while watching a humorous movie (Gollwitzer & Bayer, 2000), or performing a Stroop task (Webb & Sheeran, 2003, Study 1), implementation intentions successfully preserved self-regulatory resources as demonstrated by greater persistence on subsequent difficult tasks (i.e., solving difficult anagrams).

Summary

Forming implementation intentions has been shown to help people solve the major problems of goal striving: getting started, staying on track, calling a halt, and not overextending oneself. Recent research has shown that implementation intentions unveil these beneficial effects even when goal striving is limited by conditions that seem quite resistant to change by self-regulatory efforts. For instance, it was observed that implementation intentions facilitated achieving high scores on math and intelligence tests (Bayer & Gollwitzer, 2007), even though such performances are known to be limited by a person's respective capabilities. Or it was observed that implementation intentions helped people succeed in sports competitions (Achtziger et al., 2008, Study 2) and negotiations over limited resources (Trötschel & Gollwitzer, 2007), even though in such competitive situations a person's goal striving is limited by the opponents' behavior.

Finally, implementation intentions were found to help people's goal striving even in cases where effective goal striving is threatened by competing habitual responses; this seems to be true no matter whether these automatic competing responses are behavioral (e.g., Cohen, Bayer, Jaudas, & Gollwitzer, 2008; Holland et al., 2006), cognitive (e.g., Gollwitzer & Schaal, 1998), or affective (e.g., Schweiger Gallo, Keil, McCulloch, Rockstroh, & Gollwitzer, 2009). The latter findings suggest that forming implementation intentions turns top-down control by goals into bottom-up control by the situational cues specified in the if-component of an implementation intention (Gilbert, Gollwitzer, Cohen, Oettingen, & Burgess, in press), and they explain why special samples that are known to suffer from ineffective control of their thoughts, feelings, and actions (e.g., heroine addicts during withdrawal and schizophrenic patients, Brandstätter, Lengfelder, & Gollwitzer, 2001, Studies 1 and 2; frontal lobe patients, Lengfelder & Gollwitzer, 2001; children with ADHD, Gawrilow & Gollwitzer, 2008; Paul et al., 2007) also benefit from forming implementation intentions.

AN INTERVENTION TO FACILITATE EFFECTIVE GOAL PURSUIT: COMBINING MENTAL CONTRASTING AND IMPLEMENTATION INTENTIONS (MCII)

In recent research we explored whether it is possible to construct an intervention that teaches people to use on their own an integrated combination of the two experimentally developed strategies of mental contrasting and forming implementation intentions, so that people can become effective self-regulators of their goal setting and goal striving. In the first study, middle-aged women were taught MCII as a metacognitive strategy to be applied in everyday life to enhance health-promoting behavior (i.e., exercising regularly). Moreover, in a second study, MCII was again taught as a metacognitive strategy, this time to help students cope with the stresses of college life. To assess its implications for personality development, broader variables such as changes in self-discipline and self-esteem were the dependent variables.

In both studies, the combination of MC and II benefited effective goal pursuit. To unfold their beneficial effects, implementation intentions require that strong goal

commitments are in place (Sheeran et al., 2005, Study 1), and mental contrasting creates such strong commitments. Additionally, mental contrasting guarantees the identification of obstacles that hinder goal striving. These same obstacles may then be addressed with if-then plans by specifying critical situations in the if-component that are linked to instrumental goal-directed responses in the then-component. Moreover, mental contrasting increases a person's readiness to make if-then plans (Oettingen et al., 2001; Oettingen, et al., 2005). Accordingly, the MC part of the MCII intervention prepares people motivationally and cognitively to form implementation intentions so they should find it easy to perform the II part of the intervention.

Effects on Health Behavior in Middle-Aged Professional Women

Middle-aged women were recruited to take part in a study focusing on healthy lifestyles (Stadler, Oettingen, & Gollwitzer, 2009). Participants were randomly assigned to either an information-only control group or a MCII intervention group. In the information-only control group, women learned about the benefits of regular exercise. In the MCII group, participants received the same information and additionally learned the MCII technique. First, participants learned the mental contrasting strategy by the help of an interventionist with respect to the goal of exercising regularly (e.g., going for a run three times week), and thereafter were instructed to form three implementation intentions regarding an obstacle standing in the way of exercising (e.g., feeling too tired in the evening to go for a run) in the form of if-then statements: one to overcome the obstacle generated by mental contrasting (e.g., if I feel exhausted when I get home from work tonight, then I will put on my running shoes and go for a jog in the neighborhood), one to prevent this obstacle (e.g., if I hear the clock chime five o'clock, then I will pack my things and leave the office to go for a run), and one identifying a good opportunity to act (e.g., if the sun is shining, then I will go for a 30-minute jog in the park). Participants were then told to apply this MCII procedure to the wish of exercising more by themselves whenever possible in the weeks to come. Participants were free to choose whatever form of exercising they felt compelled to engage in, and they were encouraged to detect those obstacles that were personally most relevant.

As dependent measures, participants maintained daily behavioral diaries to keep track of the amount of time they exercised every day. Overall, the MCII technique enhanced exercise more than the information intervention immediately after the intervention; this effect remained stable for 4, 8, and 16 weeks after the intervention. The results for exercise behavior indicated that participants in the MCII group exercised nearly twice as much, that is, one hour more per week than participants in the information-only control group. Thus, using the MCII technique was effective for both initial success and long-term maintenance of improving exercise behavior.

Increasing Self-Discipline and Self-Esteem in College Students

Given that MCII as a metacognitive strategy improves self-regulation of a variety of goals, we have examined its effects on broader variables of personality development: self-discipline and self-esteem. In line with the conceptualization of

self-discipline (self-control) by Tangney, Baumeister, and Boone (2004), we identified the following key components of self-discipline: time management, project completion, and a feeling of being on top of things. In addition, as MCII should foster strong goal commitment and successful goal completion in a variety of areas, we hypothesized that our MCII intervention might even affect people's self-esteem. As highlighted by William James (1890), self-esteem rises and falls as a function of aspirations and successes. The effect of mental contrasting—a better match between the subjective likelihood of attaining one's goals and commitment to them—should bring commitments in line with objective competence, and utilizing implementation intentions to pursue goals effectively should provide frequent success. Both of these outcomes should act to raise self-esteem.

Undergraduate participants were either assigned to a MCII intervention group or to a control group (Oettingen, Barry, Guttenberg, & Gollwitzer, 2009). In the intervention group, participants first learned how to use the mental contrasting strategy, then learned how to form implementation intentions by identifying the behavior necessary to overcome or circumvent an obstacle (e.g., a noisy roommate as an obstacle to studying effectively for an upcoming test) generated during mental contrasting. To do so, participants imagined a desired outcome and a present obstacle in vivid detail. Then they created three if-then statements. One focused on overcoming the obstacle (e.g., if my roommate starts to get noisy again tonight, then I will talk to her about her behavior), another on preventing the obstacle (e.g., when I come home at eight o'clock tonight, then I will leave a note for my roommate to keep the music low.), and a third on planning to approach the desired outcome (e.g., if I pass a drugstore on the way home, then I will buy myself a pair of earplugs). Students practiced the MCII procedure with the help of an interventionist so they could perform the strategy on their own regarding a multitude of everyday concerns over the course of one week.

As dependent measures, participants rated self-discipline and self-esteem at two time points: immediately before the intervention and again one week after the intervention. The results showed that the MCII intervention directly enhanced MCII participants' reports of self-discipline and their self-esteem, in comparison to control group participants, over a mere one-week period. These effects of the MCII intervention were not moderated by any other measured variables (e.g., sex, age, school year, depression, perceived stress, life satisfaction, troublesome events, college life satisfaction, self-efficacy). Presumably, MCII empowered individuals with self-regulatory skills, first by helping them sensibly commit to goals (i.e., to feasible but not to unfeasible goals) and second by helping them to effectively achieve goals. Thus, this powerful yet simple combination of strategies helped the college students to recognize and realize their potential and feel a sense of self-discipline in their everyday lives.

Summary

Psychologists have begun to analyze metacognitive knowledge in such areas as decision making and memory (e.g., Bless & Forgas, 2000; Koriat & Goldsmith, 1996; Metcalfe & Shimamura, 1994; Nelson & Narens, 1994). For example, children (especially those with little metacognitive knowledge) improve their memory performance

if told about clustering and rehearsal techniques (Schneider, Borkowski, Kurtz, & Kerwin, 1986). The use of metacognitive knowledge should also improve goal attainment. To date, however, most interventions only tell people to strive for an a priori defined goal (e.g., weight control, Stice, Shaw, & Marti, 2006; alcohol control, Lock, 2004; forgiveness, Harris et. al., 2006). In such interventions, participants are not encouraged to learn strategies to be applied to a multitude of different potential goals. Rather, they are asked to engage in certain goal-directed thoughts, feelings, and actions targeted specifically at attaining a given predefined desired outcome.

In everyday life, however, people commonly wish to attain a multitude of different outcomes varying in domains (e.g., academic, interpersonal, health), specificity (Locke & Latham, 1990), temporal distance (Trope & Fishbach, 2000), and framing (Dweck & Leggett, 1988; Higgins, 1997), among others. Therefore, people should benefit from metacognitive knowledge about strategies that are content free, and that relate to prioritizing and planning out all kinds of goal pursuit in advance. The two studies presented in this section tested whether MCII can be taught as a metacognitive strategy, and both studies revealed that the combination of mental contrasting and forming implementation intentions can indeed be taught as a metacognitive strategy to meet one's goals in general (e.g., exercising more or coping with college life). Moreover, the second study showed that such metacognitive knowledge can even benefit outcomes related to personality development such as self-discipline and self-esteem. Furthermore, as these studies include samples from the United States and Germany, from young adults to middle-aged individuals, and include diverse domains (academic versus health), it seems evident that mental contrasting and implementation intentions can be ubiquitously applied to help people manage the challenges of their everyday lives.

CONCLUSIONS

If one agrees that self-regulation and self-control can be achieved by effective goal pursuit, it is important to analyze strategies that allow people to discriminately set goals that are desirable and feasible, and then strive for them in an effective manner. For both of these tasks of goal pursuit there exist effective strategies: mental contrasting for goal setting and forming implementation intentions for goal striving. A mental contrasting with implementation intentions (MCII) intervention can be used to teach people the metacognitive knowledge needed to apply these strategies conjointly. The effectiveness of the MCII intervention suggests that people can indeed take charge of everyday life by regulating their goal pursuits.

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