7 Strategies of Setting and Implementing Goals

Mental Contrasting and Implementation Intentions

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When Viktor Frankl (1959/1984) reflected on how to master the challenges of life, in his case the horrendous task of living through a concentration camp, he found the following answer:

> It did not really matter what we expected from life, but rather what life expected from us. We needed to stop asking about the meaning of life, and instead to think of ourselves as those who were being questioned by life—daily and hourly. Our answer must consist, not in talk and meditation, but in right action and in right conduct. Life ultimately means taking the responsibility to find the right answer to its problems and to fulfill the tasks which it constantly sets for each individual. (p. 122)

Frankl seems to suggest that taking charge of one's actions is the way to master the challenges of daily life. But how can people take charge of their actions? In the present chapter, we suggest an effective way of taking charge of one's actions: self-regulating one's goal pursuits.

Research on the psychology of goals suggests that successful goal pursuit hinges on solving two sequential tasks: goal setting and goal implementation. The distinction between the setting and the implementing of goals was originally emphasized by Kurt Lewin (1926; Lewin, Dembo, Festinger, & Sears, 1944). This distinction turns out to be very useful for understanding the many new findings produced by the recent upsurge of research on goals (Bargh, Gollwitzer, & Oettingen, 2010; Oettingen & Gollwitzer, 2001), and thus we use it to organize the present chapter. We first discuss research on the self-regulation of setting goals,

and then turn to findings on the self-regulation of implementing set goals. Finally, we propose a self-regulation-enhancing intervention that capitalizes on acquiring and using these goal setting and goal implementation strategies.

SETTING GOALS

If people want to achieve their goals, they need to set goals framed in a way that maximizes their attainment. Framing one's goals in terms of promoting positive outcomes versus preventing negative outcomes (promotion vs. prevention goals; Higgins, 1997) facilitates goal attainment, as does attempting to acquire competence rather than demonstrate the possession of competence (learning vs. performance goals; Dweck, 1999; Dweck & Elliot-Moskwa, Chapter 8, this volume), and anticipating internal rewards rather than external rewards (intrinsic vs. 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 explicated 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 vague standards (e.g., "I will do my best") lead to better performances (Locke & Latham, 1990).

It is also useful to set goals to which one can strongly commit because 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 (Ajzen, 1991; Atkinson, 1957; Bandura, 1997; Gollwitzer, 1990; Klinger, 1975; Locke & Latham, 1990). *Desirability* comprises the summarized beliefs about the pleasantness 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, 1997; 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 guarantee strong goal commitment yet.

Effective Goal Setting: The Self-Regulation Strategy of Mental Contrasting

The model of *fantasy realization* differentiates three modes of self-regulatory thought: mental contrasting, indulging, and dwelling (Oettingen, 2000; Oettingen, Pak, & Schnetter, 2001). It 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., high competition for the qualified programs; evaluation anxiety). The conjoint elaboration of the future and the present reality makes both simultaneously

accessible and links them together in the sense that the reality stands in the way of realizing the desired future. Mental contrasting helps people to make up their mind about whether to commit to the goal of realizing the future by scrutinizing the feasibility of reaching the goal. When feasibility (expectations of success) is high, people commit strongly to attaining the goal; when feasibility is low, they form a weak goal commitment or none at all. 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 strategy ultimately should protect personal resources (time, energy, and money), as people will not show any engagement in the face of unreachable goals, but will engage without restraint in the face of reachable goals.

In line with Newell and Simon's (1972) theory of problem solving, fantasy realization theory envisages people who want to achieve an imagined positive future as facing the problem of wanting something and needing to engage in actions that they can perform to attain the desired outcome (p. 72). Accordingly, the objective problem space (defined as the objective task demands posed by the environment) entails both the desired future and the impediments to getting there. If the subjective problem space (defined as the internal subjective representation of the problem at hand) matches the objective problem space, people will recognize that they need to act on the status quo in order to arrive at the desired future. Therefore, the perceived feasibility (expectations of success) of attaining the desired future should determine people's commitment to attaining the desired future.

However, if the subjective problem space entails only part of the objective problem space (either only the positive future or only the negative status quo), people will fail to recognize that they need to act on the status quo in order to arrive at the desired future. Accordingly, goal commitments stemming from focusing only on a positive future or focusing only on a negative reality (i.e., indulging or dwelling) should fail to be expectancy-dependent. That is, the level of goal commitment reflects the a priori commitment that people hold with respect to the issue at hand, regardless of whether their expectations of success are high or low (Oettingen et al., 2001).

In sum, only mental contrasting, not one-sided elaborations of either the future or the reality adjusts goal commitments to people's expectations of success. That is, indulging and dwelling are less effective in protecting people's resources than is 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 strategy.

One might argue that the model of fantasy realization resembles cybernetic theories such as the test–operate–test–exit model (TOTE; Miller, Galanter, & Pribram, 1960), the theory of the control of perception (Powers, 1973), or its spin-off, the self-regulatory control-process model (Carver & Scheier, 1990). These feedback loop models share with fantasy realization theory their focus on the control of behavior or perception. However, in contrast to fantasy realization theory, the cybernetic models assume that a discrepancy between feedback (given state) and a set standard (ideal state) is discovered by a comparator and thus leads to attempts to reduce the discovered discrepancy. Fantasy realization theory specifies strategies that differentially influence whether people will use their fantasies about a desired future to build smart (expectancy-dependent) goal commitments. Elaborating the desired future and seeing the reality as a potential obstacle leads to smart (selective) goal commitment. One-sided thinking will lead to uniform, moderate goal commitment. That is, fantasy realiza-

tion theory pertains to vague fantasies about the future and not to a set standard, it refers to anticipating potential obstacles and not to experienced feedback, and it assumes a link between future and obstacle, and not a comparator. In addition, it specifies modes of thought that divert a person from discrepancy reduction despite existing discrepancies. In short, feedback, standard, and comparator—the central variables in the feedback loop models—do not play a role in fantasy realization theory, which specifies the strategies that people can use to create goal commitments that are either based or not based on their expectations of success (see also, Oettingen & Kappes, 2009).

Fantasy realization theory may also be associated with the concept of possible selves (Markus & Nurius, 1986; Oyserman & Markus, 1990)—that is, individuals' ideas of what they might become, what they would like to become, and what they are afraid of becoming. Possible selves are the cognitive components of hopes, expectations, fears, goals, and threats, and they work as incentives for behavior. Fantasy realization theory shares with the concept its focus on thinking about the future. In contrast to the omnibus concept of possible selves, however, fantasy realization theory focuses on the processes that turn vague ideas about future selves either into binding goal commitments based on a person's expectations of success or into half-hearted goal commitments that are oblivious to the person's perceived chances of success.

Empirical Evidence

A multitude of studies have tested the effects of mental contrasting, indulging, and dwelling on goal commitment and goal striving (i.e., goal pursuit; Oettingen, 2000; 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 impediments to excelling (e.g., being distracted, 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 2 weeks and provided each student with a grade for that time period.

As predicted, only in the mental contrasting group did the students feel energized, exert effort, and earn grades in accord with 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 have replicated this pattern of results. For example, experiments pertained to studying abroad (Oettingen et al., 2001,

Study 2) and acquiring a second language (Oettingen et al., 2000, Study 1); to giving and receiving help (Oettingen, Mayer, Stephens, & Brinkmann, in press), getting to know an attractive stranger (Oettingen, 2000, Study 1), finding a balance between work and family life (Oettingen, 2000, Study 2), and improving oneself (Oettingen, Mayer, Thorpe, Janetzke, & Lorenz, 2005, Study 1), to smoking reduction (Oettingen, Mayer, & Thorpe, in press) as well as to various idiosyncratic interpersonal and personal wishes of great importance (Oettingen et al., 2001, Studies 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., feeling energized), 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 who dwelled on negative images of reality showed moderate commitment regardless of their expectations of success.

The outcomes of mental contrasting do not occur as a result of changes in expectations (feasibility) or incentive value (desirability), but rather as a result of the mode of self-regulatory thought, aligning commitment with expectations (Oettingen et al., 2001, 2009). Furthermore, the effects of mental contrasting depend on the person perceiving that the present reality is standing in the way of realizing the future. When engaging in mental contrasting, individuals first elaborate a desired future and establish it as their reference point, and then 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 contrasting), by first elaborating the negative reality and then elaborating the desired future, conceals seeing present reality as an obstacle to fantasy realization and thus fails to elicit goal commitment congruent with expectations of success (Oettingen et al., 2001, Study 3). The studies presented next explore the underlying motivational and cognitive processes responsible for the reported effects of mental contrasting 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 desired future is linked to an energizing function, also referred to as *activity incitement* (Brunstein & Gollwitzer, 1996). For example, desired futures that prove more challenging to achieve (e.g., high school students practicing the Scholastic Aptitude Test [SAT], setting their sights on beating their personal score) give rise to greater effort than less challenging desired futures (e.g., high school students practicing the SAT, setting their sights on achieving their usual score; Locke & Latham, 2002). Energization was hypothesized and found to mediate the effects of mental contrasting on fostering selective goal pursuit (i.e., goal setting and goal striving) as measured by persistence as well as subjective and objective quality of performance (Oettingen et al., 2009). Specifically, economics students 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. Participants were randomly assigned to either a mental contrasting or an indulging condition. As dependent variables, the students indicated their initial feelings of energization (e.g., "How energized do you feel when you think about giving your talk?"), and they were asked to rate their actual performance. Persistence of goal pursuit was indicated by the length of each participant's presentation, and quality of goal pursuit was assessed via independent raters' evaluations of the quality of the videotape content (Oettingen et al., 2009, 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 pursuit as measured by subjective self-evaluations of performance and objective ratings of the videotaped presentations. Moreover, feelings of energization not only showed the same pattern of results as the goal pursuit variables but they also mediated the relation between expectations of success and both objective and subjective presentation quality in the mental contrasting condition. Physiological data, as measured by systolic blood pressure, showed the same pattern of results (Oettingen et al., 2009, 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 to the attainment of a desired future, high-expectancy mental-contrasting individuals may readily prepare for potential impediments by planning in advance how to tackle them. 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 emerge during mental contrasting (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 and Stephens (2009) had students mentally contrast, indulge, dwell, or reverse contrast 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 the mental contrasting, dwelling, and 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]"). 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). As in the previously described studies on the mediating variable of energization, *if ... then ...* plans showed the same pattern of results as the dependent variables, and in the mental contrasting condition *if ... then ...* plans mediated the relation between expectations and goal commitment. Thus, when people engage in mental contrasting 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, facilitates goal commitment and goal striving.

Neural Correlates

Mental contrasting (as opposed to indulging) is a cognitively demanding task that requires individuals to look into the future, past, and present to form goal commitments (i.e., intentions) in line with their expectations. Therefore, mental contrasting should be associated with greater activity in brain regions linked to working memory processes. Because mental contrasting effects are based on mentally placing the present negative reality in the way of the desired future, it also should lead to greater activity in brain areas associated with episodic memory. Elaborations in mental contrasting 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. Further, mental contrasting should be linked to heightened activity in brain regions that are related to vividly imagining events. Because 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 that measures 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, as compared to indulging and resting, mental contrasting went along with 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 the negative reality, and thus evokes more vivid images than does indulging which did not differ from resting. Future studies should investigate the mental activities in dwelling and reverse contrasting. We expect that these two self-regulatory strategies will differ from mental contrasting and show similar patterns to indulging and resting.

Going beyond prior research, these findings suggest that certain conditions must be met in order for mental contrasting to be most effective. For example, because mental contrasting taxes working memory, people should not be able to perform it effectively when cognitive resources are blocked by dual-task activities (e.g., being occupied by demanding cognitive tasks, coping with interpersonal stressors, extreme fatigue, or physical frailty and pain). Moreover, because mental contrasting is based on the effective retrieval of relevant

obstacles experienced in the past, it should be particularly effective for people who have carefully encoded past experiences with obstacles and thus can easily and accurately retrieve them 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 future as desirable (positive attitude or high incentive value) and feasible (e.g., high expectation of success) are only the 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 the negative present 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

Kurt Lewin's distinction between goal setting and goal striving reminds us that goal attainment may not be 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. But what are these difficulties or problems? At least four problems stand out: getting started with goal pursuit, staying on track, calling a halt to futile goal striving, and not overextending oneself. For all of these problems, the self-regulation strategy of forming implementation intentions has been shown to be beneficial.

Implementation Intentions: Planning Goal Implementation in Advance

To form an implementation intention (i.e., make an *if ... then ...* plan; Gollwitzer, 1993, 1999), one needs to identify a future goal-relevant situational cue and a related planned response to that cue. Whereas goal intentions merely specify desired end states ("I want to achieve goal X!"), implementation intentions in the format "If situation Y arises, then I will initiate behavior Z!" additionally specify when, where, and how a person intends to pursue a goal. Implementation intentions thus delegate control over the initiation of the intended goal-directed behavior to a specified opportunity by creating a strong link between a situational cue and a goal-directed response. For example, a person who has the goal to eat more healthily can form the implementation intention "When I'm at my favorite restaurant and the waiter asks me for my order, then I'll request a vegetarian meal!" Implementation intentions have been found to help people close the gap between initial goal setting and actually meeting their goals. Indeed, a recent meta-analysis involving over 8,000 participants in 94 independent studies revealed

a medium-to-large effect size ($d = 0.65$; Cohen, 1992) of implementation intentions on goal achievement, on top of the effects of mere goal intentions (Gollwitzer & Sheeran, 2006). As goal intentions by themselves already have a facilitating effect on behavior enactment (Webb & Sheeran, 2006), the size of the implementation intention 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 (specified in the *if* part of the plan) and the intended behavior (specified in the *then* part of the plan). Because forming an implementation intention implies the selection of a critical future situation, the mental representation of this situation becomes highly activated and hence more accessible (Gollwitzer, 1999). This heightened accessibility of the *if* part of the plan has been observed in several studies (e.g., Aarts, Dijksterhuis, & Midden, 1999; Parks-Stamm, Gollwitzer, & Oettingen, 2007; Webb & Sheeran, 2007, 2008). This accessibility persists over time until the plan is enacted or the respective goal is achieved or dismissed. The heightened activation of the critical situation helps people to easily recall the specified situation, and it leads to swift allocation of attention when the situation arises.

Implementation intentions also forge a strong association between the specified opportunity and the specified response (Webb & Sheeran, 2007, 2008). The upshot of these strong links is that, once the critical cue is encountered, the initiation of the goal-directed response specified in the *then* component of the implementation intention exhibits features of automaticity, including immediacy, efficiency, and redundancy of conscious intent. When people have formed an implementation intention, they can act in situ without having to deliberate on when and how they should act. 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 in the critical moment (Bayer, Achtziger, Gollwitzer, & Moskowitz, 2009; Sheeran, Webb, & Gollwitzer, 2005, Study 2) is consistent with this idea.

These component processes of implementation intentions (enhanced cue accessibility, automation of responding) mean that *if ... then ...* planning enables people to see and seize good opportunities to move toward their goals. Fashioning an *if ... then ...* plan *strategically automates* goal striving (Gollwitzer & Schaal, 1998); people intentionally make *if ... then ...* plans that delegate control of goal-directed behavior to preselected situational cues with the explicit purpose of reaching their goals. That is, automatic action initiation achieved by implementation intentions originates from a conscious act of will rather than practice (i.e., exerting the critical behavior in the critical situation repeatedly and consistently).

Implementation Intentions and Overcoming Problems of Goal Implementation

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 four central problems of goal implementation named above. 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 when people are commonly busy with other things (i.e., during the subsequent 2 days, which are family holidays in Europe). Still, research participants who had furnished their goal intention with an implementation intention that specified when, where, and how they 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, Hönig, and Gollwitzer (2000, Study 3) observed that implementation intentions helped students to act on their task goals (i.e., performing math homework) on time (e.g., at 10 A.M. in the morning of every Wednesday over the next 4 weeks).

Other studies have examined the ability of implementation intentions to foster a willingness to strive toward goals involving behaviors that are somewhat unpleasant to perform. For instance, goals to perform regular breast examinations (Orbell, Hodgkins, & Sheeran, 1997) or cervical cancer screenings (Sheeran & Orbell, 2000), to resume functional activity after joint replacement surgery (Orbell & Sheeran, 2000), to eat a low-fat diet (Armitage, 2004), to recycle (Holland, Aarts, & Langendam, 2006), and to engage in physical exercise (Milne, Orbell, & Sheeran, 2002) were all more readily acted upon when people had developed implementation intentions—even though there was an initial reluctance to execute these behaviors. Moreover, implementation intentions were associated with goal attainment in domains where it is easy to forget to act (e.g., regular intake of vitamin pills; Sheeran & Orbell, 1999; the signing of worksheets by the elderly; Chasteen, Park, & Schwarz, 2001).

Many goals cannot be accomplished by simple, discrete, one-shot actions but require that people continue to strive for the goal over an extended period of time. Such *staying on track* may become very difficult when certain internal stimuli (e.g., being anxious, tired, overburdened) or external stimuli (e.g., temptations, distractions) interfere with and potentially derail ongoing goal striving. Implementation intentions can suppress the negative influence of interferences from outside the person (Gollwitzer & Schaal, 1998). For instance, if a person wants to avoid being unfriendly to a friend who is known to make outrageous requests, he or she can form suppression-oriented implementation intentions, such as: "If my friend approaches me with an outrageous request, then I will not respond in an unfriendly manner!" The *then* component of suppression-oriented implementation intentions does not have to be worded in terms of not showing the critical behavior; it may alternatively specify an antagonistic behavior (" ... , then I will respond in a friendly manner!") or focus on ignoring the critical cue (" ... , then I'll ignore her request!").

Suppression-oriented implementation intentions can also be used to shield ongoing goal striving from disruptive inner states. Achtziger, Gollwitzer, and Sheeran (2008) report two field experiments concerned with dieting (Study 1) and athletic goals (Study 2), in which goals were shielded by suppression implementation intentions geared toward controlling potentially interfering inner states (i.e., cravings for junk food in Study 1, and disruptive thoughts, feelings, and physiological states in Study 2).

An alternative way of using implementation intentions to protect ongoing goal striving from derailment is to form *if ... then ...* plans geared toward stabilizing the ongoing goal pursuit at hand (Bayer, Gollwitzer, & Achtziger, 2010). Using again the example of a person who is approached by her friend with an outrageous request, let us assume that he or she is also tired or irritated and thus particularly likely to respond in an unfriendly manner. If he or she has stipulated in advance in an implementation intention how he or she will converse with the friend, the interaction may come off as planned, and being tired or irritated should fail to affect the person's behavior toward her friend.

In a negotiation study Trötschel and Gollwitzer (2007) explored whether spelling out one's goal striving via implementation intentions makes goal striving less vulnerable not only to internal interferences but also to external ones. They found that loss-framed negotiation settings failed to produce the typical negative effects on fair and cooperative negotiation outcomes (i.e., when the commodities to be shared are framed in terms of losses rather than gains, negotiators typically behave more competitively and produce inferior joint profits). In Trötschel and Gollwitzer's studies, negotiators who had furnished the goal intention to be cooperative (i.e., "I want to cooperate with my counterpart!") with *if ... then ...* plans that spelled out in advance how they wanted to achieve this goal (i.e., "If I receive a proposal, then I'll make a cooperative counterproposal!") no longer evidenced negative effects of loss framing. Negotiators in the loss-framed negotiation setting who had clear cooperative goal intentions now achieved the same high performance in joint profits as was observed with negotiators in the gain-frame control group.

The self-regulatory problem of *calling a halt* to a futile goal striving (i.e., disengaging from a chosen but noninstrumental means or from a chosen goal that has become unfeasible or undesirable) can also be ameliorated by forming implementation intentions. People often fail to readily disengage from chosen means and goals that turn out to be faulty because of a strong self-justification motive (i.e., we tend to adhere to the irrational belief that decisions we have made deliberately must be good; Brockner, 1992). Such escalation effects (e.g., sticking with a chosen means or goal even if negative feedback on goal progress mounts) are reduced effectively, however, by the use of implementation intentions. These *if ... then ...* plans only have to specify receiving negative feedback as the critical cue in the *if* component and switching to available alternative means or goals as the appropriate response in the *then* component (Henderson, Gollwitzer, & Oettingen, 2007).

Finally, the assumption that implementation intentions subject behavior to the direct control of situational cues (Gollwitzer, 1993) implies that the person does not have to exert deliberate effort. As a consequence, the self should not become depleted (Muraven & Baumeister, 2000; see also Doerr & Baumeister, Chapter 5, this volume) when task performance is regulated by implementation intentions, and thus for individuals using implementation intentions, *not overextending* themselves should become easier. Indeed, even using different ego-depletion paradigms, research participants who used implementation intentions to self-regulate in one task did not show reduced self-regulatory capacity in a subsequent task. 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.

Using Implementation Intentions to Support Therapeutic Goals

Bayer and Gollwitzer (2007) combatted dysfunctional beliefs in difficult academic tasks (e.g., taking the Raven intelligence test). Even when people start taking a test with high self-efficacy beliefs, encountering a difficult test item may lead to weakened self-efficacy for subsequent test items. To counter such *lowered self-efficacy*, Bayer and Gollwitzer (2007) asked participants to bolster their goal intentions to perform well ("I will correctly solve as many test items as possible!") with implementation intentions specifying a self-efficacy strengthening response ("And if I start a new test item, then I'll tell myself: I can solve it!").

Participants in the implementation intention condition performed better than those in the mere goal intention to perform well condition; they also performed better than participants in a further condition where a self-efficacy strengthening goal intention had to be formed ("I will tell myself: I can do these test items!").

Recent research also has explored whether adding implementation intentions to emotion regulation goals make these goals more effective (Schweiger Gallo, Keil, McCulloch, Rockstroh, & Gollwitzer, 2009). In one study, the control of fear in people with spider phobias was analyzed. Based on Gross's (2002) distinction between response-focused versus antecedent-focused emotion regulation strategies, implementation intention participants were asked to furnish their goal to not get frightened when spider pictures were presented with either a response-focused implementation intention ("If a see a spider, then I will stay calm and relaxed") or an antecedent-focused implementation intention ("If I see a spider, then I'll ignore it"). As compared to mere goal intention participants, implementation intention participants showed weaker fear responses to the presented spider pictures no matter whether they had formed a response-focused or an antecedent-focused implementation intention. Actually, participants using implementation intentions managed to control their fear to the low level that was observed with control participants who had no fear of spiders at all. In a final study using dense-array electroencephalography, the effectiveness of *ignore* implementation intentions for the control of fear in participants with spider phobias was replicated, and the obtained electrocortical correlates revealed that those participants who bolstered their goal intention with an *ignore* implementation intention showed significantly reduced early activity in the visual cortex in response to spider slides, as reflected in a smaller P1 (assessed at 120 milliseconds [ms] after the spider pictures were presented). This finding suggests that implementation intentions indeed lead to strategic automation of the specified goal-directed response (in the present case, an *ignore* response) when the critical cue (in the present case, a spider picture) is encountered, as conscious effortful action initiation is known to take longer than 120 ms (i.e., at least 300 ms).

Finally, implementation intentions have also been found to be effective in helping people overcome bad habits (e.g., unhealthy eating habits; Verplanken & Faes, 1999). This comes as no surprise, as Cohen, Bayer, Jaudas, and Gollwitzer (2008, Study 2) observed that implementation intentions can control even the Simon effect (Lu & Proctor, 1995), which is based on the following ingrained response: Stimuli presented on the left side of a person are commonly dealt with by using the left arm, whereas stimuli presented on the right side are responded to by the right arm. In the Simon task, classification responses that are incongruent (i.e., the critical stimulus and the critical response are located at different sides to the person's position) commonly take longer response times than classification responses that are congruent (i.e., the stimulus and the response are on the same side). Cohen et al. (2008) found that the effect of spatial location on classification responses for cues that had been specified in the *if* part of implementation intentions was abolished.

Moderators of Implementation Intention Effects

There are various moderators of the effects of implementation intentions on goal attainment pertaining to characteristics of the superordinate goal (e.g., intrinsic interest, Koestner, Lekes, Powers, & Chicoine, 2002; strength of commitment and activation state, Sheeran et al., 2005), the implementation intention itself (e.g., commitment to the *if ... then ...*

plan; Gollwitzer, 1999), and characteristics of the individual. Implementation intentions have been found to be also useful for individuals with poor self-regulatory abilities, such as people with schizophrenia, substance abuse disorders (Brandstätter et al., 2001, Studies 1 & 2), and frontal lobe damage (Lengfelder & Gollwitzer, 2001). Benefits are also found for children with attention-deficit/hyperactivity disorder (ADHD) who are known to have difficulties with tasks that require response inhibition (e.g., go/no-go tasks). For example, the response inhibition performance in the presence of stop signals can be improved in children with ADHD by having form them implementation intentions (Gawrilow & Gollwitzer, 2008). This improved response inhibition is reflected in electrocortical data as well (Paul et al., 2007). Typically, the P300 component (i.e., an event related potential, ERP, recorded at a latency of 300 milliseconds) evoked by no-go stimuli has greater amplitude than the P300 evoked by go stimuli. This difference is less pronounced in children with ADHD. Paul et al. (2007) found that *if ... then ...* plans improved response inhibition and increased the P300 difference (no-go/go) in children with ADHD.

Summary

Implementation intentions help people to cope more effectively with the major problems of goal striving: getting started, staying on track, calling a halt, and not overextending oneself. In a conscious act of will ("If situation X arises, then I will show behavior Y!"), people link an anticipated critical internal or external cue to a goal-directed response. The latter then becomes automatically triggered in the presence of the critical cue. Implementation intentions can be used to facilitate the attainment of all kinds of difficult goals, including therapeutic goals such as changing expectations (self-efficacy) and overcoming fears or bad habits. They also seem to work for those groups of people who are known to have difficulties with action control (e.g., children with ADHD).

AN INTERVENTION TO ENHANCE A PERSON'S SELF-REGULATORY SKILLS: COMBINING MENTAL CONTRASTING WITH IMPLEMENTATION INTENTIONS

A variety of theories view enhanced self-regulation as an important goal of psychotherapy, although different theories have different terms for the concept. Psychodynamic approaches refer to enhanced self-regulation as character development, Adlerians call it lifestyle modification, behaviorists talk of acquiring an adaptive social repertoire, and psychologists adhering to the humanist tradition talk of a fully functioning person (see Karoly & Anderson, 2000). When Viktor Frankl (1959/1984) explicates that "life ultimately means taking the responsibility to find the right answer to its problems and to fulfill the tasks which it constantly sets for each individual," he seems to agree that effective self-regulation is a desirable therapeutic outcome.

How can psychotherapies help people achieve effective self-regulation? 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 mental contrasting and forming implementation intentions in order to become more effective self-regulators in their goal setting and goal striving. This intervention—called MCII, for *mental contrasting and implementation*

intentions—was tested in a first study that used MCII integrated into a standard therapy for patients with chronic back pain. In a second study middle-age women were taught MCII as a metacognitive strategy to be applied in everyday life to enhance health-promoting behavior (i.e., exercising regularly). Finally, in a third study MCII was taught, again as a metacognitive strategy, this time to help students cope with the stresses of college life. To assess the implications of the MCII intervention for personality development, broader variables such as changes in self-discipline and self-esteem were the dependent variables.

In all of these studies, the MCII combination enhanced goal pursuit. For implementation intentions to be effective, strong goal commitments must be in place (Sheeran et al., 2005, Study 1), and mental contrasting creates such strong commitments. Additionally, mental contrasting guarantees the identification of obstacles to goal attainment. These 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, 2009). Accordingly, an intervention such as MCII, which explicitly suggests forming *if ... then ...* plans after mental contrasting can capitalize on these effects.

MCII as a Strategy to Reach a Specific Therapeutic Goal

A first study testing these ideas focused on improving mobility in a clinical sample of patients with chronic back pain. A great challenge facing many physical therapists who work with such patients is motivating them to exercise. One obstacle to successful rehabilitation is that pain sufferers anticipate pain in any activity-related situation and thus tend to avoid activity altogether. A second obstacle is patients' beliefs that passive treatments (e.g., surgery, massage) are the most effective or only avenue for pain control. Patients who hope that such "passive" treatments will eliminate their pain are less likely to learn how they themselves can effectively self-manage and overcome their pain (Vlaeyen & Linton, 2000), a difficult, yet necessary, step for successful rehabilitation. Because long-term behavior change in the form of physical activity is necessary for these patients to recover and improve their quality of life, and because long-term behavior often fails to be maintained over time (Marcus et al., 2000), a supplementary MCII intervention should be useful.

Christiansen, Oettingen, Dahme, and Klinger (in press) recruited outpatients with chronic back pain from a rehabilitation center in Germany. Participants were randomly assigned to either a control group (i.e., standard outpatient back pain program) or an intervention group (i.e., standard program plus MCII intervention). The standard program entailed 3–4 weeks of treatment, including elements of cognitive-behavior therapy, individualized information seminars (e.g., relaxation techniques, handling stress), medical care and psychological consultation, physical therapy, and exercise. The MCII intervention consisted of two half-hour sessions. In the first session, participants mentally contrasted positive aspects of improved exercise (e.g., feeling fitter, joining the family walk on Sunday) with obstacles standing in the way of improved exercise (e.g., fear that the pain will worsen, feeling shy to ask family members to slow down). During the second session, participants formed *if ... then ...* plans after identifying behaviors in response to the obstacles generated in the first session (e.g., "If I get anxious that my pain will increase, then I will assure myself that I can only benefit from exercise"; "If I feel shy to talk to my family on Sunday during the walk, I will ask my children to

walk ahead and wait for me in the coffee place"). Dependent variables were physical strength and appropriate lifting behavior (i.e., "handling load" of the functional capacity evaluation [FCE]; Gouttebarge, Wind, Kuijer, & Frings-Dresen, 2004; and a bicycle ergometer test) and pain severity. The measures were taken at preintervention, 10 days postintervention, and 3 months postintervention.

The standard treatment + MCII intervention improved physical mobility in patients with chronic back pain more than the standard treatment only as observed 10 days and 3 months after the intervention, and as assessed by subjective and objective measures. These effects were independent of participants' reported pain, which did not significantly differ between conditions during and after treatment. The MCII intervention proved to be time- and cost-effective in that it consisted of only two sessions for a total of 1 hour. Other short-term psychological interventions for patients with chronic back pain take at least 4–6 hours (e.g., Linton & Nordin, 2006; for review, see the findings of the "Cochrane Back Group": Ostelo et al., 2006).

MCII as a Metacognitive Strategy for Everyday Life

In recent years 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 be particularly important for effective goal pursuit. For example, teaching people that intelligence is malleable should lead them to take on learning goals (rather than performance goals) that, in turn, foster effort in the face of setbacks (Dweck & Elliot-Moskwa, Chapter 8, this volume). In addition, teaching people to mentally contrast desirable and feasible future outcomes with respective realities should help people form binding goal commitments. Finally, teaching people to make *if … then …* plans (implementation intentions) should automate the initiation of goal-directed responses and thus ·facilitate the attainment of these goals. To date, however, most interventions 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; see also, Christiansen et al., in press, described above). In such interventions, participants are asked to engage in goal-directed thoughts, feelings, and actions that are targeted specifically at attaining a given predefined desired outcome; they are not encouraged to use these same strategies to set and strive for their goals in general.

However, in everyday life, people commonly wish to attain a multitude of different outcomes varying in domains. Therefore, people should benefit from metacognitive knowledge about strategies that are content free and that involve prioritizing and planning goal pursuit in advance. Indeed, a recent study shows that mental contrasting can be successfully taught and used as a metacognitive strategy (Oettingen, Mayer, & Brinkmann, 2010). German personnel managers who were taught to mentally contrast self-identified unsettling but controllable everyday concerns reported better time management, more ease of decision making, and more effective project completion, as compared to a control group (control participants were merely asked to think positively about their everyday concerns). The next two studies tested whether MCII could also be taught as a metacognitive strategy.

Effects on Health Behavior in Middle-Age Professional Women

Middle-age 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. Participants learned the mental contrasting strategy with respect to the goal of exercising regularly (e.g., going for a run three times week), and then 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 concern of more exercise whenever possible in the weeks to come. Participants were free to choose whatever form of exercise they wanted to engage in, and they were encouraged to identify obstacles that were personally most relevant.

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, and this effect remained stable for 4, 8, and 16 weeks after the intervention. Participants in the MCII group exercised nearly twice as much—that is, 1 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 its key components: 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 using implementation intentions to pursue goals should provide frequent success. Both of these outcomes should raise self-esteem.

Undergraduate participants were assigned either to a MCII intervention group or to a control group (Oettingen, Barry, Guttenberg, & Gollwitzer, 2010). In the MCII 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 potential obstacle in vivid detail, then created three *if ... then ...* statements focusing on overcoming the obstacle (e.g., "If my roommate starts to get noisy again tonight, then I will talk to her about her behavior"), preventing the obstacle (e.g., "If see my roommate at lunch, then I will ask her to turn the music down this evening"), and 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 using the MCII procedure with the help of the experimenter so that they could perform the strategy on their own regarding a multitude of everyday concerns over the course of 1 week.

Participants rated self-discipline and self-esteem at two time points: immediately before the intervention, and once again 1 week after the intervention. The MCII intervention directly enhanced MCII participants' reports of self-discipline and their self-esteem, in comparison to control-group participants (who failed to show any improvements) over a mere 1-week period. The 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 helping them commit to more feasible goals and helping them to effectively achieve these 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 and self-esteem in their everyday lives.

Summary

The combination of mental contrasting and forming implementation intentions can be used to help people meet specific behavioral goals (e.g., mobility goals in patients with back pain) or, when taught as a meta-cognitive strategy, to meet goals in general (e.g., exercising more regularly or coping with college life). It even influenced outcomes related to personality development, such as self-discipline and self-esteem. Furthermore, as the intervention studies include samples from the United States and Germany, from young adults to middle-age individuals, and from diverse domains ranging from professional and academic realms to improved health behavior, it seems evident that mental contrasting with implementation intentions (MCII) can be ubiquitously applied to help people manage the challenges of life.

CONCLUSION

Beginning with Viktor Frankl's observation that meaning in life may originate from action more than talk and meditation, we have reviewed research on the self-regulation of goal pursuit. It seems important that people selectively 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 self-regulatory strategies: mental contrasting for goal setting and forming implementation intentions for goal striving. Importantly, a mental contrasting with implementation intentions (MCII) intervention can be used to teach people the combined use of these two strategies to meet short-term as well as long term goals. The effectiveness of the MCII intervention suggests that people can take charge of their everyday life and personal development by effective self-regulation of their goal pursuits.

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