Oettingen, G, & Stephens, E. J. (2009). Fantasies and motivationally intelligent goal setting. In G. B. Moskowitz, & H. Grant (Eds.), The psychology of goals (pp. 153-178). New York: Guilford Press.
The self-help industry would have us believe that to "think positive" is the single most effective means of getting what we want. And though empirical research does consistently find that optimistic beliefs foster motivation and successful performance (Bandura, 1997; Heckhausen, 1991; Seligman, 1991; Taylor & Brown, 1988), recent research reveals that alternate forms of positively thinking about the future (e.g., positive fantasies; Oettingen & Mayer, 2002; wishful thinking and other avoidant coping styles; Lengua & Sandler, 1996, Holahan & Moos, 1986) are less beneficial for effortful action, performance, and well-being. Although at first glance it seems contradictory that optimistic beliefs and positive thoughts should lead to such disparate motivational outcomes, whether one mentally indulges in a desired future (i.e., has positive fantasies about a desired future) or actually judges a desired future as within reach (i.e., has positive expectations about a desired future; Oettingen & Mayer, 2002) has very different implications for effortful action and successful performance.

Oettingen and Mayer (2002) distinguish between two ways of thinking about the future: expectations and fantasies. Expectations are judgments of how likely it is that certain events or behaviors will occur in the future (Bandura, 1977; Mischel, 1973; review by Olson, Roese, & Zanna, 1996). Based on experiences in the past, and thus on a person's performance history, expectations specify the probability of whether an event will actually happen or not. These expectancy judgments are conceptual-
ized as self-efficacy expectations (i.e., whether one can perform a certain behavior in its relative context; Bandura, 1997), as outcome expectations (i.e., whether performing the behavior will produce the desired outcome; Bandura, 1997), as general expectations (i.e., whether a certain event will occur; Heckhausen, 1991; Oettingen & Wadden, 1991), or as generalized expectations (i.e., whether the future in general will be positive or negative; Scheier & Carver, 1992). Conversely, free fantasies are future events or behaviors that appear in the mind (Klinger, 1990; Singer, 1966), independent of whether it is likely or unlikely that they will occur. For example, despite perceiving the chances of competing in the Olympics to be low, a competitive swimmer can indulge in positive fantasies about receiving a gold medal at the next Olympic Games.

Moreover, the two ways of thinking about the future have different predictive values with regards to effortful action and performance. As expectations judge the likelihood of future outcomes by applying past facts to future events (Bandura, 1977, 1997; Mischel, 1973), these types of beliefs prove a valid base for strong behavioral investment and indeed are powerful predictors of future behavior (e.g., Bandura, 1978). In contrast, as positive fantasies embellish future events regardless of past performance and probability of future occurrences (Klinger, 1990; Singer, 1966), these types of thoughts fail to serve as a solid basis for acting. Furthermore, by seducing one to indulge in images of a desired and smoothly attained future these types of thoughts should yield little effort to achieve the desired future.

Several studies examining the predictive power of thinking about the future attest to the different motivating functions of expectations versus fantasies (Oettingen & Mayer, 2002). In one example, women who were obese enrolled in a weight reduction program with positive expectations about losing weight (e.g., “It is likely that I will lose weight”) lost on average 26 pounds more than those with negative expectations (e.g., “It is unlikely that I will lose weight”). However, participants with positive fantasies (e.g., those who imagined easily resisting the temptation of a leftover box of doughnuts in the lunch room) lost on average 24 pounds fewer than participants with negative fantasies (e.g., those who imagined having a hard time resisting a leftover box of doughnuts in the lunch room; Oettingen & Wadden, 1991). In another example, participants with high expectations of success about finding a well-suited job after college graduation received more job offers and enjoyed higher salaries over the course of 2 years than those reporting more negative expectations of success. However, participants with positive fantasies about finding a well-suited job after college graduation were less successful in their job search over 2 years, sending out fewer applications, receiving fewer job offers, and ultimately earning less money than those with more negative fantasies (Oettingen & Mayer, 2002, Study 1). Other similar studies focusing on thoughts about enter-
ing a romantic relationship (e.g., starting a relationship with a secretly admired individual; Oettingen & Mayer, 2002, Study 2), achieving academic success (e.g., performing well on a midterm exam; Oettingen & Mayer, 2002, Study 3), and recovering from hip replacement surgery (e.g., increasing range of hip joint motion, walking on stairs, general recovery; Oettingen & Mayer, 2002, Study 4) provide further evidence that positive expectations predict high effort and performance, whereas positive fantasies predict low effort and performance.

If, as shown in the abovementioned studies, fantasies are problematic for effort and action, the question thus becomes what can be done with these thoughts to make them fruitful for effort and action? One possibility would be to question the unrestricted enjoyment of the desired outcome and its smooth attainment, for example, by considering present factors that potentially hinder attainment of the desired outcome (e.g., a wish about one day getting an A in Biochemistry is juxtaposed with a current lack of effective study skills). Because fantasizing alone about desired outcomes conceals the necessity to act, pairing these thoughts with thoughts about the present reality that stands in the way of fantasy realization could reveal an existing discrepancy between the present and desired future, that is, to achieve what one wants, one needs to make changes in the here and now. Moreover, grounding such thoughts in aspects of the present, impeding reality should facilitate the activation of judgments about whether or not one could actually reach the desired outcome. In other words, juxtaposing fantasies about a desired future with aspects of the present reality should prompt individuals to consider their expectations of reaching a desired outcome that in turn prove critical for effort and action.

As mentioned previously, expectations judge the likelihood of future outcomes by applying past facts to future events (Bandura, 1977, 1997; Mischel, 1973). Theories of motivation contend that beliefs guide action, that is, perceiving a future state or behavior as feasible (i.e., having high expectations) and desirable (i.e., high incentive) motivates individuals to act toward realizing that future (Bandura, 1997; summary by Heckhausen, 1991). However, although expectancy and incentive are the two main determinants of goal-directed behavior, these beliefs do not guarantee action. Certainly we have all had wishes (e.g., meeting a deadline) that were feasible (e.g., 6 months writing period for a 30-page chapter, experience writing successful chapters in the past) and desirable (e.g., happy editors, opportunity to highlight your recent work), yet we nevertheless failed to take the necessary action to realize those wishes. Therefore, for expectations to guide action they need to first become activated, yet how is this accomplished? To illustrate this notion we want to briefly consider some findings from animal psychology.

Edward C. Tolman (1925), a neo-behaviorist working with Mus norvegicus albinus, proposed that animals acquire expectations (i.e., “cog-
nitive-like map"; Tolman, 1948) about the layout of a maze as a function of running through it. Tolman (1948) suggested that rats' expectations of the maze served to determine "what responses, if any, the animal will finally release" (p. 191). However, what he found was that only the rats with the motivation to search (i.e., they had to be hungry) were the ones who utilized their expectations (i.e., activated cognitive maps) to maneuver through the maze to find available food (i.e., incentive). That is, rats only then demonstrated that they had been building a cognitive map "once they were motivated to do so" (i.e., there was food at the end of the maze; Tolman, 1948, p. 193). What Tolman's findings therefore show is that unless expectations become activated, these seeds of behavior remain dormant, and that in rats, to activate expectations, and thus behavior, some type of incentive (e.g., food) is inherently necessary.

Yet are the factors, as described by Tolman, sufficient to activate human expectations and thus influence behavior? Desirability and feasibility, as mentioned before, play a role, but what more is necessary to activate our expectations (i.e., cognitive maps) and thus prompt us to act toward a coveted future? A recent model of fantasy realization (Oettingen, 2000; Oettingen, Pak, & Schnetter, 2001) proposes specific thought processes (e.g., self-regulatory strategy of mental contrasting; Oettingen, 2000) that serve to turn free fantasies about a desired future into binding goals. Specifically, the model assumes that mentally contrasting aspects of the future and reality activates expectations about attaining a desired future that in turn leads to persistent goal striving and effective goal attainment in the case of high expectations. This chapter focuses on this self-regulatory strategy (i.e., mental contrasting of future and reality) that people can use to help them commit to goals of realizing a desired future based on the perceived likelihood (i.e., based on expectations), in addition to two other self-regulatory strategies, indulging in aspects of the future and dwelling on aspects of the present reality, which make people form commitment to goals irrespective of expectations. This chapter begins by examining these strategies in detail, describing their effects and scope, then presents current research showing motivational and cognitive mechanisms of the three self-regulatory strategies. Finally, the last section of the chapter introduces translational research establishing how interventions that teach people how to use these strategies as a metacognitive tool can affect and improve their personal and professional lives.

**Three Strategies of Fantasy Realization**

Fantasy realization theory (Oettingen, 1999, 2000) elucidates three routes to goal setting that result from how people elaborate their fantasies about
desired futures. One route leads to expectancy-based goal commitment, whereas the other two routes lead to goal commitment independent of expectations. This section describes these three self-regulatory strategies of fantasy realization, one in particular that helps people translate their expectations into appropriate goal-directed behavior.

**Mental Contrasting**

The expectancy-based route to goal commitment rests on mentally contrasting fantasies about a desired future with aspects of the present reality. When people use the self-regulatory strategy of mental contrasting (Oettingen, 1999), they first imagine a desired future (e.g., improving in academic or professional performance) and then reflect on the respective negative reality (e.g., having little time or being distracted). The conjoint elaboration of the positive future and the negative reality makes future and reality simultaneously accessible (Kawada, 2004) and activates the relational construct (Higgins & Chaires, 1980) of the negative reality standing in the way of realizing the desired future, thereby emphasizing a necessity to change the present reality to achieve the desired future. This necessity to act should activate relevant expectations of success, which then informs goal commitment. When perceived feasibility is high, people strongly commit to attaining the goal of changing the status quo and realizing the desired future; when perceived feasibility is low, people form weak goal commitment or none at all.

**Indulging and Dwelling**

The second route to goal commitment originates from solely fantasizing about a positive future. Such indulging in thoughts about the positive future seduces a person to mentally enjoy the future in the here and now because there are no reflections on the present reality that would point to the fact that the positive future is not yet realized. Thus, a necessity to act is not induced and expectations of success are not activated and used. Commitment toward fantasy realization solely reflects the individual’s prior determination to attain the desired future. It should be independent of the perceived chances of success (i.e., expectations of success). As a consequence, people will try too hard when underlying expectations of success are low and not try hard enough when underlying expectations of success are high.

The third route to goal commitment is based on merely reflecting on the negative reality. Dwelling on the negative reality produces continual ruminations, as no fantasies about a positive future designate the direction to act. Hence, a necessity to act is not induced, and expectations are not
activated and used. Commitment toward fantasy realization solely reflects the individual’s prior determination to attain the desired future. Similar to indulging, commitment should be independent of the perceived chances of success (i.e., expectations of success).

Numerous studies show that mental contrasting turns free fantasies into binding goals by activating expectations, thus influencing subsequent goal commitment and goal-directed behavior (e.g., Oettingen, 2000; Oettingen et al., 2001). In one study (Oettingen et al., 2001, Study 4), freshmen in a vocational school for computer programming reported their expectations for excelling in math, a critical subject within their school, and then had to either engage in mental contrasting, indulging, or dwelling regarding math achievement. Teacher-rated study efforts and course grades, assessed 2 weeks after the experiment, showed that participants with high expectations in the mental contrasting group invested more effort and attained better grades than all other participants, whereas, in the indulging and dwelling groups, participants showed commitment independent of participants’ perceived chances of success. The same pattern of results occurred in a study with 12-year-old middle school students where the desired future pertained to excelling in learning a foreign language (Oettingen, Höning, & Gollwitzer, 2000, Study 1), in students wishing to solve an interpersonal problem (Oettingen et al., 2001, Studies 1 and 3), and in students being offered the opportunity to get to know an attractive stranger (Oettingen, 2000, Study 1).

Furthermore, two recent studies show that the range of mental contrasting effects extends from desired futures to which people readily commit (e.g., achievement-, interpersonal-, leisure/hobby-related desired futures), up to those that people are hesitant to commit to (e.g., offering and requesting help). After first establishing that people are indeed more hesitant to commit to goals that require help giving and help seeking, it was found that mental contrasting with high expectations helped pediatric nurses commit to goals of improving communication with patients’ relatives, a critical help-giving job demand, as well as helped students commit to goals of asking comparatively unapproachable individuals for their assistance.

It is important to note that the outcomes of mental contrasting do not occur as a result of a change in expectations or incentive value, but rather as a result of the mode of self-regulatory thought, aligning commitment with expectations (Oettingen et al., 2001). Furthermore, it is important to mention here that the effects of mental contrasting are dependent upon the ensuing perception of the present standing in the way of 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).

**Summary**

Thus far, evidence was presented that mental contrasting enables people to commit to their desired futures in line with their expectations of attaining the desired future, and that mental contrasting is effective in promoting commitment to goals that are initially hard to commit to. The cumulative results of these studies attest to the power of mental contrasting as a self-regulatory strategy to turn free fantasies into binding goals by facilitating the activation and transformation of high expectations into strong commitment and low expectations into weak or no commitment. Recent research extends these findings by uncovering the motivational and cognitive processes behind mental contrasting, essentially the mechanisms underlying how mental contrasting effectively translates beliefs into goal commitment and effective goal pursuit.

**Mechanisms of Mental Contrasting**

Previous research examining the thought processes of mental contrasting, indulging, and dwelling focused predominantly on the outcomes of the three self-regulatory strategies (i.e., expectation-dependent versus expectation-independent goal commitment; e.g., Oettingen et al., 2001). Still absent from the overall picture though was how mental contrasting influences expectation-congruent goal commitment and thus fosters effective goal pursuit. The next several studies present the underlying motivational and cognitive processes responsible for these effects and provide neural data substantiating and extending the theoretical principles.

**Energization**

Locke and Latham (2002) identified feelings of energization as paramount to promoting goal-directed behavior. They contended that commitment to realizing a desired future has an “energizing function” (i.e., activity incitement; Brunstein & Gollwitzer, 1996), for example, desired futures that prove more challenging to achieve (e.g., a seasoned marathon runner who sets her sights on beating a personal best time) give rise to greater effort than less challenging desired futures (e.g., a seasoned marathon
runner who sets her sights on finishing an upcoming marathon; Locke 
& Latham). As previously discussed, mental contrasting, unlike indul-
ging or dwelling, activates the perception of the present reality standing 
in the way of the desired future, which consequently prompts a need to 
act and catalyzes expectation activation. When the perceived chances of 
attaining the desired future appear high, feelings of energization should 
propel individuals forward on their quest toward goal attainment, ultima-
tely resulting in strong goal commitment. Thus, whether energization 
serves as a mechanism responsible for the effects of mental contrasting on 
expectation-dependent goal pursuit is the focus of the next two studies 
(Oettingen, Mayer, Sevincer, et al., 2008).

Using an acute stress paradigm (i.e., videotaped public speaking; 
al’Absi et al., 1997), quantity and quality of goal striving were 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 men-
tal contrasting or an indulging condition. As dependent variables particip-
ants indicated their initial feelings of energization with a self-report mea-
ure (e.g., how energized do you feel when you think about giving your talk) and to gauge participants’ evaluations of their own presentations they 
were asked to rate their actual performance. Persistence of goal striving 
was indicated by the length of each participant’s presentation, and qual-
ity of goal striving was assessed via independent raters’ evaluations of the 
quality of the videotape content (Oettingen, Mayer, Sevincer, et al., 2008, 
Study 2).

Consistent with previous mental contrasting studies, individuals in 
the mental contrasting group, in contrast to those in the indulging condi-
tion, 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 (i.e., congruous with goal commitment and striving), but 
also predicted objective and subjective presentation quality. Additionally, 
in the mental contrasting condition feelings of energization significantly 
mediated the relationship between expectations of success and subjective 
and objective performance quality. Physiological data substantiate these 
findings by demonstrating the same pattern of results for mental contrast-
ing as measured by cardiovascular responses (Oettingen, Mayer, Sevincer, 
et al., in press, Study 1). Cardiovascular responses, such as systolic blood 
pressure, are shown to be reliable indicators of physiological arousal states 
and effort mobilization (Gendolla & Wright, 2005; Wright & Kirby, 
2001). Indeed in this study, objective measurement of energization via
systolic blood pressure during the thought process of mental contrasting and indulging supported the familiar pattern of results and the notion that energization is a motivational mediator explaining the expectation-commitment link produced as a result of mental contrasting.

These two studies examining energization as a mediator of the effect of mental contrasting versus indulging not only highlight the role of energization in expectation-dependent goal commitment, but also point to one implication of feelings of energization, namely that energization resulting from mental contrasting in one domain could transfer to other potentially unrelated domains. This transfer effect could have implications, for example, when one engages in mental contrasting with regards to an interpersonal concern; energization resulting from this process could transfer to an unrelated task, like studying for an upcoming test, thus potentially influencing subsequent commitment and action toward an important, yet unrelated desired outcome.

**Planning for Upcoming Hindrances**

Failing to prepare and plan for upcoming hindrances on the way toward achieving a desired future compromises one's chances of success (Gollwitzer, 1999). Because mental contrasting influences individuals to view the negative aspects of the present reality as obstacles hindering the attainment of a desired future, mental contrasting individuals with high expectancies should prepare for potential impediments by planning out in advance strategies to help them tackle any future bumps in the road. Explicitly, mental contrasting individuals with high expectancies should spontaneously form if–then plans (i.e., implementation intentions: If situation X, then I will perform Y; see Gollwitzer 1999), shown to be highly effective facilitators of goal striving in a host of domains (meta-analysis by Gollwitzer & Sheeran, 2006). Moreover, because these plans are shown to materialize during the mental contrasting procedure (i.e., Oettingen et al., 2001, Study 1; Oettingen, Mayer, Thorpe, Janetzke, & Lorenz, 2005, Study 2), they should serve as a cognitive mechanism responsible for the effects of mental contrasting versus the other self-regulation strategies on goal commitment. Whether or not this tendency to form plans actually serves as a cognitive mechanism responsible for the different effects of the self-regulatory strategies on commitment serves as the basis for the next study.

For this recent study, participants first indicated an important interpersonal concern (e.g., solving a conflict with a friend, being friendlier to parents) and, thereafter, had to engage in either mental contrasting, indulging, dwelling, or reverse mental contrasting (i.e., participants started first with elaboration of the reality followed by elaboration of the future). Additionally, participants answered questions assessing their commit-
ment to resolving their interpersonal concern (e.g., actively pursuing their desired outcome).

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 implementation intentions [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 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 presumed, plan formation emerged congruent with expectations in the mental contrasting condition and irrespective of expectations in the dwelling and reverse mental contrasting conditions (because negative aspects of the present reality fail to emerge in the indulging condition, determining plan formation in response to these negative aspects was not possible in this group). Specifically, the formation of if–then plans (i.e., implementation intentions; Gollwitzer, 1999) showed the same pattern of results as the goal-pursuit variables (i.e., congruous with goal commitment and striving) and also predicted participants’ goal pursuit to resolve their concerns. Additionally, in the mental contrasting condition, forming implementation intentions fully mediated the relation between expectations of success and objective performance quality. Thus, when people are in the mental contrasting condition and have high expectations of success they begin to consider a course of action toward goal attainment and therefore make plans to overcome anticipated obstacles. Such planning in turn fosters goal attainment.

**Thorough Obstacle Consideration**

A person engaged in mental contrasting resembles a person challenged to problem solve: “He wants something and does not know immediately what series of actions he can perform to get it” (Newell & Simon, 1972, p. 72). According to Newell and Simon (1972) problem solving is effective inasmuch as an individual is capable of internalizing the objective task environment (e.g., the desired future and the negative reality standing in the way of attaining the desired future); mere awareness of one component (e.g., either the desired future or the negative reality) fails to provide a complete picture of the problem-solving task at hand. One result of the process of mental contrasting is promotion of effective problem solving through enabling conceptualization of “what series of actions he can perform [to attain a desired future]” (p. 72). Specifically, through the anticipation of
obstacles that may impede fantasy realization one recognizes the course of action necessary to attain a desired future.

The essence of mental contrasting thus rests on calling to mind obstacles that impede the realization of a desired future. People who approach the problem of fantasy realization via mental contrasting should invest effort and time in generating obstacles. This hypothesis is in line with the finding that trying to arrive at a correct or comprehensive understanding of a given problem leads to expending more effort in retrieving and considering relevant information (Kruglanski & Freund, 1983; Chaiken, 1987; Sanbomatsu & Fazio, 1990; reviews by Kruglanski, 1996, and by Pittman, 1998). Thinking thoroughly about an issue involves retrieving less readily accessible but critical information from memory (Sanbomatsu & Fazio, 1990), as well as considering a greater number of pieces of information (Kruglanski; 1996). However, although individuals attend to obstacles during dwelling, this strategy should not lead to invested effort and time in generating obstacles because dwelling fails to provide a complete picture of the problem-solving task at hand. Thus after dwelling, the negative aspects of the present reality should not be scrutinized as critical pieces of information necessary for problem solving.

In this study college undergraduates first engaged in either mental contrasting, indulging, or dwelling pertaining to a leisure activity (e.g., finding more time for a hobby; Grant, Oettingen, Gollwitzer, & Schneider, 2008, Study 1). Thereafter, participants named their most important concerns in three other domains (e.g., achievement, interpersonal, and health) and listed obstacles related to those concerns. The dependent measure was the amount of time participants took to generate, in writing, the obstacles related to the other three concerns.

As predicted, individuals in the mental contrasting condition took more time than individuals in the indulging and dwelling conditions to generate obstacles standing in the way of the desired future. Moreover, thorough obstacle consideration held true across domains (e.g., academic, interpersonal, health), congruous with the transfer assumption of the Smith and Branscombe (1987) model of procedural strengthening and transfer (Gollwitzer, 1990), as participants who engaged in mental contrasting with respect to one domain (e.g., leisure activity) transferred the cognitive procedures to other subsequent domains (e.g., achievement, interpersonal and health). More specifically, those who engaged in mental contrasting focused on obstacles in one domain and thus carefully considered hindrances in another domain. Ostensibly, mental contrasting, as compared to indulging and dwelling, engages people in careful consideration of obstacles and additionally readies them to critically consider hindrances in regard to other concerns in their lives. That individuals in the dwelling condition did not expend more effort and time generating obstacles further
illustrates that mental contrasting alone engrosses people in the aspects obstructing attainment of a desired future.

The research presented thus far concerning the mechanisms of mental contrasting used a combination of self-report measures, content analysis, and behavioral and physiological indicators to determine the resulting strength of commitment to strive toward a goal. However the following study elucidates the postulated cognitive components and processes of mental contrasting and indulging by looking at brain activity in relevant regions.

**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 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.

Continuous magnetoencephalography (MEG), a brain-imaging technique measuring magnetic fields produced by electrical activity in the brain (Achtziger, Fehr, Oettingen, Gollwitzer, & Rockstroh, in press), was used to test the assumptions that mental contrasting and indulging appear as two different mental processes as illustrated by dissimilar patterns of brain activity in areas associated with working memory, episodic memory, intention maintenance, action preparation, and vivid visualization. Specifically, mental contrasting was predicted to show stronger activity in all regions of interest in comparison to indulging and resting.

First, university participants were pretested to identify those who could vividly and intensely represent the future and reality related to
their concern, that is, those who were most able to self-induce both self-regulation strategies and who had high expectations for success of fully realizing their named concerns. Next, using a within-subject design, participants inside of the MEG machine relaxed during a 5-minute rest period, then mentally (as opposed to the standard written elaboration) engaged in either mental contrasting then indulging, or indulging then mental contrasting.

The dependent measures were the amount of activity in the brain regions of interest (i.e., pattern of dipoles per second) based on the mode of self-regulatory thought (i.e., mental contrasting vs. indulging versus resting). The results of the study verified the initial hypotheses. First, mental contrasting and indulging were identified as two distinct mental activities, and second, areas of greater brain activity in mental contrasting as compared to indulging and resting were observed, supportive of proposed cognitive components and processes ascribed to mental contrasting as per fantasy realization theory.

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 for 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. Apparently, indulging relies less on episodic memory processes, that is, indulging in a positive future does not entail the mental exploration of past experiences, rather it should entail loose associations between the not-yet-experienced desired positive future (Oettingen, 2000; Oettingen et al., 2001). Furthermore, whereas mental contrasting forces a person to take a more critical look at the desired future and negative reality, thus evoking vivid images, indulging seemingly to a lesser extent evokes such images. This finding implies that mere daydreaming about a positive future is possible without having to closely attend to the images.

Mental contrasting appears to fulfill its task of turning high expectations into strong intentions by engaging working memory, episodic memory, and vivid imagery. Indulging, on the contrary, does not differ from resting, suggesting that indulging indeed involves no more than passively experiencing the desired future in the mind’s eye. Going beyond prior research on the effects of mental contrasting on the attainment of personal goals, the present findings suggest that certain preliminaries have to be fulfilled such 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 cogni-
tive 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 this MEG study is the cognitive complexity of mental contrasting to promote expectation congruent goal commitment and goal pursuit.

**Summary**

As described, mental contrasting influences goal commitment via motivational (i.e., energization) and cognitive (i.e., thorough obstacle elaboration and planning) mechanisms and affects these processes in line with activity in corresponding brain regions. Although an understanding of the mechanisms underscoring the beneficial effects of mental contrasting is necessary and important for furthering goal theory, it is equally important to develop an understanding for if and how people can use these techniques on their own to enhance the quality of their everyday lives. Thus, the next section focuses on the metacognitive utility of mental contrasting as well as the combined strategy of mental contrasting and implementation intentions (i.e., MCII) as a first attempt to demonstrate the translation of years of laboratory research into practical applications to improve various aspects of people's lives.

**Mental Contrasting: A Useful Strategy in Daily Life**

The question of applicability of laboratory findings to everyday life is an increasing focus in the psychological community (National Advisory Mental Health Council, 2000). Translational research, as it is commonly called, is concerned with the translation of scientific discoveries into practical applications to benefit overall health and well-being. Regarding research looking at the outcomes and mechanisms of mental contrasting in areas of academic achievement, interpersonal concerns, professional development, and health, to name just a few, it is still largely unknown if and how people can apply the self-regulatory strategy in their everyday lives, essentially as a metacognitive tool. Therefore, whether or not these strategies can be used by individuals as metacognitive strategies to benefit their everyday lives, how these strategies affect job effectiveness and self-discipline, and if these strategies can influence critical health-related outcomes becomes the focus of the next section of the chapter.
Mental Contrasting on the Job

Ample evidence exists showing the positive outcomes related to achieving one's goals (e.g., positive emotional experience; Brunstein, 1993; life satisfaction; see Cantor & Blanton, 1996; Emmons, 1996, for review). However, many researchers also point out that striving for goals that cannot be brought to completion leads to a host of negative outcomes including negative affect (Higgins, 1987; Higgins, Roney, Crowe, & Hymes, 1994), anxiety (Pomerantz, Saxon, & Oishi, 2000), mental and physical problems (Emmons, 1996), and diminished well-being (Brunstein, 1993; Brunstein, Schultheiss, & Maier, 1999). In the same vein, researchers find that those who disengage from unattainable goals (e.g., bearing children after confirmed infertility) experience heightened well-being (Klinger, 1975, 1977; Wrosch, Scheier, Carver, & Schulz, 2003).

Given that mental contrasting allows individuals to commit to goal striving in accordance with perceived feasibility, it offers itself as a strategy to promote fruitful goal striving and also as a strategy to curtail futile goal striving. Thus, applying mental contrasting flexibly and independently in everyday life should help people discriminate between concerns that they are able to resolve and concerns that they should postpone or relinquish altogether. To the contrary, applying indulging in everyday life should make people invest in their everyday concerns irrespective of whether or not they will be able to resolve them. Such lack of discriminative competence should put them at risk for poor decision making and ineffective time management. Thus, the aims of a recent study were twofold: First, to examine if teaching people the self-regulatory strategies of mental contrasting or indulging enables them to apply these strategies in a metacognitive way toward their own problems, and second, how using the strategies affects job-related tasks.

For this intervention study, hospital personnel managers were trained in either mental contrasting or indulging regarding their own, everyday problems, and it was expected that those trained to use mental contrasting, in contrast to those trained to use indulging, should better discriminate between fruitful and futile concerns, resulting in better time management and more effective work-related behaviors. Hospital personnel managers were the target of this intervention because these individuals, whose daily obligations include managing employees, attending meetings, delegating responsibility, and presenting information, seemed particularly apt to benefit from a self-regulatory strategy effective at increasing fruitful and curtailing futile goal pursuit.

Indeed, in comparison to the managers assigned to the indulging condition, personnel managers in the mental contrasting condition reported better time management, less effortful decision making, increased project
completion, and increased project relinquishment 2 weeks after receiving the initial training in one of the two strategies. The finding that mental contrasting can be used by individuals on a daily basis as a self-regulatory strategy to deal with a variety of personal and professional problems is all the more impressive because this strategy entails precise sequential execution of relatively complex cognitive processes. When chances of success were high, hospital managers in the mental contrasting condition should have actively pursued and completed ongoing projects, and when chances of success were low, hospital managers in the mental contrasting condition should have relinquished projects they perceived as less likely to have a good outcome (i.e., lower chance of success). Thus, in accordance with findings suggesting the beneficial effects of relinquishing infeasible goals (e.g., Wrosch et al., 2003; Klinger, 1975, 1977) these individuals should have forestalled psychological distress associated with the pursuit of unattainable goals, preserved their subjective well-being, and perhaps even benefited their health in doing so.

**Mental Contrasting and Implementation Intentions: A Complementary Coupling**

Mental contrasting helps people form strong goal commitments to desired futures they perceive are feasible to attain. However, even if people form strong goal commitment, they are not always successful at translating their strong goal commitment into effective goal-directed behavior. For instance, people may simply forget to act, they might be unaware of suitable situations for actions, or they may be distracted if and when a suitable situation presents itself. Implementation intentions (Gollwitzer, 1999), on the other hand, specify the when, where, and how of goal striving by guiding goal attainment (e.g., eating healthy) through the use of a cue (“If I have the urge to eat potato chips”), triggering an instrumental goal-directed behavior (“then I will eat a piece of fruit”). Therefore the coupling of these two self-regulatory strategies is indeed complementary: Mental contrasting when expectations of success are high fosters energization, individuals’ readiness to plan, and the formation of strong goal commitments, whereas implementation intentions provide an effective strategy to turn plans and strong goal commitments into effective goal-directed behavior and goal attainment (Gollwitzer & Sheeran, 2006).

**Effects on Self-Discipline**

Self-discipline (i.e., self-control) has been defined as the ability to consciously and effortfully quell strong responses in the service of a higher goal (Duckworth & Seligman, 2006). Empirical evidence indicates that people high
on trait measures of self-discipline have better outcomes in various aspects of life (e.g., academic performance, impulse control, psychological adjustment, interpersonal relationships; Tangney, Baumeister, & Boone, 2004). On the other hand, the bulk of social and personal problems (e.g., debt, violence, academic failure, addictions, procrastination, self-handicapping) seem to stem from deficiencies in self-discipline (Baumeister, Heatherton, & Tice, 1994). Thus, strategies, such as mental contrasting and implementation intentions, which help people develop a sense of self-discipline (Oettingen, 1999; Gollwitzer, 1999), seem all the more necessary as this skill has far-reaching implications for overall well-being.

To examine the influence of the Mental Contrasting Implementation Intention (MCII) intervention on self-discipline, undergraduate participants were either assigned to a MCII intervention group or to a control group (Oettingen, Barry, Guttenberg, & Gollwitzer, 2008). 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 the obstacle (e.g., 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 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 the stereo is on when I come home at eight o’clock tonight, then I will immediately ask my roommate to turn the stereo off”), and 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 ear plugs”). Students practiced using the MCII procedure so they could perform the strategy on their own for various everyday concerns over the course of one week.

As dependent measures, participants rated self-discipline at two time points: one week after the intervention in comparison to a respective baseline measure. The results showed that the MCII intervention directly enhanced MCII participants’ reports of self-discipline, in comparison to control group participants’ self-discipline, 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 infeasible goals) and second by helping them to effectively achieve a goal. Thus, this powerful-yet-simple combination of strategies should have helped people recognize and realize their potential and feel a sense of self-discipline in the everyday lives.
Effects on Health Behavior

A common, yet troubling finding with regards to health behavior change is that though initial success is quite prevalent, long-term maintenance of the changed behavior is generally quite rare (Polivy & Herman, 2002). Extended behavior modification is however necessary if one is to reap the benefits of protective health behaviors (e.g., for regular exercise: Department of Health, 2004), yet roughly one-half of the individuals who begin a self-monitored exercise program abandon them within 6 months (Dishman, 1982, 1991). Therefore, it seems crucial to develop interventions to facilitate long-term behavior change.

One promising approach is to target goal commitment and goal implementation: People who fully commit to their goals for behavior change and plan goal implementation should be more successful, in the short and the long run. The next study we report was therefore conducted to determine whether participants who receive relevant information and learn the MCII technique would exercise more, immediately after the intervention and in the long run, than participants in an intervention-only control group (Stadler, Oettingen, & Gollwitzer, in press).

Middle-aged women were recruited to take part in this study focusing on healthy lifestyles. To begin, participants were randomly assigned to either an information control group or a MCII intervention group. In the information control group, women learned about the benefits of a healthy diet and exercise. In the MCII group, participants received the same information, additionally learning the MCII technique. First, participants learned the mental contrasting strategy 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 learned the MCII technique with regards to short- and long-term health concerns.

As dependent measures participants maintained daily behavioral diaries to keep track of the amount of time they exercised every day. Specifically, participants recorded daily how much they had exercised in 15-minute intervals. 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. 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 par-
participants in the information control group. Thus, using the MCII technique was effective for initial success and long-term maintenance of improving exercise behavior. Moreover, as moderate amounts of physical exercise are shown to strengthen cardiovascular and respiratory systems, decrease risk for heart disease and Type 2 diabetes, help with weight control, improve stress and pain management, reduce risks of certain types of cancers, and improve quality of sleep (Mayo Foundation for Medical Education and Research, 2007), the MCII intervention should have far-reaching consequences for overall health.

Effects on Improving Mobility in Patients with Chronic Back Pain

A great challenge facing many physical therapists who work with patients with chronic back pain is motivating patients to exercise. One obstacle standing in the way of successful rehabilitation is that people who suffer pain 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, 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 as the maintenance of long-term behavior very often fails to persist over time (Marcus et al., 2000), strategies that translate fantasies about improved mobility into firm goal commitment with subsequent goal-directed action should be highly desirable for clinical applications as a means of increasing patients’ physical activity and thus enhancing treatment and overall well-being.

In this study, the MCII intervention was adapted for a clinical sample of patients with chronic back pain (Schramm, Oettingen, Dahme, & Klinger, 2008). It was predicted that patients implementing the MCII technique in conjunction with the standard treatment offered to patients suffering from chronic back pain, in contrast to those only receiving the standard treatment, should evidence increased physical mobility. To test this assumption, participants with chronic back pain (i.e., existence of chronic pain of spine lasting longer than 6 months) were recruited from an outpatient 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 outpatient back pain program and MCII intervention). The standard outpatient back pain program offered by the rehabilitation center entailed 3 to 4 weeks of treatment including individual informative seminars (e.g., relaxation techniques, handling stress), medical
care and psychological consultation, physical therapy, and exercise. The experimental condition involved next to the standard back pain program, two one-half hour sessions: In the first session participants engaged in mental contrasting about realizing fantasies related to improved mobility (e.g., playing with a grandchild, becoming fit in everyday life), and during the second session participants identified behaviors in response to the obstacles generated in the first session to serve as the focus of an implementation intention (e.g., “If I see my baby granddaughter at our next family picnic, then I will carefully bend down to play with her”; “If I pass the door to the stairwell in my office building, then I will take the stairs up to my office”).

The dependent variables for this study were physical strength, appropriate lifting behavior, and pain severity, once after 10 days and 3 months postintervention, and in comparison to respective preintervention baseline measures. To assess physical strength, participants completed one self-report measure to gauge their functional limitations in activities of daily living, and two objective measures, namely a lifting test (i.e., “handling load” of the Functional Capacity Evaluation, FCE; Gouttate, Gouttate, Wind, Kuijer, & Frings-Dresen, 2004) and a bicycle ergometer test. To assess severity of pain participants completed a self-report rating scale.

The findings of this test of a MCII-based intervention to change behavior in a clinical population as part of a therapy program indicate that this intervention, in conjunction with the standard treatment, improved physical mobility in patients with chronic back pain more so than the standard treatment only. The MCII intervention group increased physical mobility at about 2 weeks and 3 months as assessed by subjective and objective measures. These effects were independent of participants’ experienced pain, which did not significantly differ between conditions during and after treatment. Furthermore the MCII intervention proved to be a time- and cost-effective behavior-change technique. Altogether, the intervention consisted of two sessions for a total of one hour. Other short-term psychological interventions take at least 4 to 6 hours (e.g., Linton & Nordin, 2006). Studies including problem-solving approaches contain multiple sessions (e.g., 19 half-day sessions over the course of 8 weeks in the study from van den Hout et al., 2003). The present findings suggest that MCII is a powerful, time- and cost-effective self-regulatory tool that in no more than an hour’s time can help promote physical activity in a population known to have difficulties with rehabilitation.

**Summary**

Mental contrasting, also in conjunction with implementation intentions, can effectively be used as a metacognitive strategy to influence outcomes
ranging from better time management, task effectiveness and reports of self-discipline, to improved health behavior and objective physical mobility in people suffering from back pain. Furthermore, as the results include samples from the United States and Germany, from young adults to middle-aged individuals, and include diverse domains ranging from professional and academic realms to improved health behavior, it seems evident that mental contrasting can be ubiquitously applied as a metacognitive strategy to help people manage and improve their everyday lives. These studies underscore the discriminative capabilities awarded to individuals who engage in mental contrasting (i.e., between fruitful and futile goals) as well as the beneficial personal outcomes associated with using mental contrasting as a metacognitive strategy. Using mental contrasting in their everyday lives should have helped participants in all of the studies either translate their potential and high expectations into strong commitment and action toward realizing a desired future, or to effectively disengage when chances of attaining the desired future appeared low.

**Conclusion**

As an old maxim advises, one needs serenity to accept the things one cannot change, courage to change the things one can, and the wisdom to know the difference. The self-regulatory strategy of mental contrasting, as shown throughout this chapter, bestows upon individuals just this, namely the capability to distinguish between the personally feasible and infeasible, the strength to change that which stands in the way of achieving the desirable, and the composure to let go of the things that are desirable, yet infeasible. Expressed in this proverb and garnered from the thought process of mental contrasting is the skill to simultaneously perceive one's strengths and weaknesses and to use this perception as a starting point for either translating desired (controllable) futures into binding goals or as an opportunity to creatively reengage in more promising prospects, a combination of skills which we newly refer to as **motivational intelligence**. Individuals who are motivationally intelligent are thus those individuals who engage in the self-regulatory strategies of fantasy realization in a motivationally adaptive manner. That is, those who engage in mental contrasting to create strong goal commitments when expectations of success are high, those who engage in mental contrasting to relinquish unachievable or unfavorable futures when expectations of success are low, those who engage in indulging to “stay in the game” when either goal relinquishment is not an option or when expectations are unclear, and finally those who cease indulging and engage in mental contrasting once expectations of success have been sufficiently strengthened. In essence this chapter underlines strategies that
people can use to develop their wisdom to "know the difference," in other words, to develop their motivational intelligence.

The aims of this chapter were many. First, to show how mental contrasting as a self-regulatory thought process turns free fantasies about desired futures into binding goals by activating expectations, enabling people to commit to their desired futures in line with their perceived likelihood of attaining the desired future. Second, to reveal several motivational and cognitive mechanisms underlying the effects of mental contrasting, and to additionally illustrate the cognitive complexity of mental contrasting via neural correlates of this demanding self-regulatory thought process. Finally, to introduce translational research addressing the real-world benefits resulting from applying mental contrasting, also together with implementation intentions, showing how these strategies transcend the laboratory and positively affect the quality of everyday life. What this chapter reveals is that making fantasies come true is not merely the stuff of daydreams or fairy tales. To make our fantasies come true, a person needs the appropriate thought processes to activate expectations and commitment, in other words, making our dreams come true takes motivational intelligence.

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