



## Motivation and Actions, Psychology of

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### Abstract

Traditionally, research on motivation and action has focused on the role of motives and needs, but also on expectations, attributions, and control beliefs. Nowadays, when it comes to answering the question of how motivation relates to action, research includes the concept of goals. But pursuing goals with the right content and structure in the proper situational context does not yet guarantee effective goal attainment. People often have to engage in self-regulatory thought to further their goal pursuits. In this article, we review the history and current research associated with these three broad perspectives on motivation and action.

Traditionally, research on motivation and action has focused on the role of motives and needs, but also on expectations, attributions, and control beliefs. McClelland (1985) distinguished three basic groups of motives: the achievement motive, the power motive, and the affiliation motive. As food is the reward or incentive for hunger, so is improving one's performance on a given task the incentive for the achievement motive. The incentive of the power motive is having impact, control, or influence over another person, a group, or the world at large. Finally, the incentives for the affiliation motive extend to sexual pleasures (sexual motive); being together with people (need for affiliation); and experiencing harmony, concern, and commitment (intimacy motive). All of these motives may entail a hope for success and a fear of failure component. Trying to meet a standard of excellence may not be triggered solely by hope for success, but also by fear of failure, and spending one's spare time affiliating with others may not be determined solely by the anticipated positive feelings of togetherness, but also by fear of rejection.

In principle, all humans are assumed to share these various motives, although with different strengths. Motive strength can be assessed by exploring both the array of situations a person interprets in terms of a given motive (e.g., a person high in need for power interprets all kinds of situations as power related) and the intensity of the anticipated affect associated with having acquired respective incentives. Commonly this is assessed with the Thematic Apperception Test, which contains pictures of scenes loosely related to the motives measured.

Recent research has linked the activation of different motives to different hormonal responses that in turn facilitate motive-specific behaviors. Scoring high on a certain motive implies a recurrent concern for acquiring the respective incentives. For instance, people high on the affiliation motive perform affiliative acts frequently and energetically, readily perceive affiliative cues in the environment, and quickly detect affiliative networks. Also, predictions of the professional success of managers are strikingly accurate, particularly if one considers the motive dispositions in achievement (high), power (high), and affiliation (low) in concert.

However, attempts to predict behaviors from motives commonly fail when engagement in these behaviors is based on conscious reflection. When it comes to choosing between

courses of action or tasks of different difficulty, or to persisting on a given task versus leaving the field, people deliberate on the feasibility and desirability of the alternative courses of action.

One of the first attempts to integrate cognitive aspects of motivation was made by Atkinson (1957) in his risk-taking model. He proposed that the subjective probability of success and the task's perceived incentive value conjointly affect task choice, both variables being influenced by the perceived difficulty of the task. Whereas easy tasks lead to a high subjective probability of success (direct function), they also possess low incentive value (inverse function) because the anticipated affect associated with success (pride) is the lowest for easy tasks. The reverse is assumed for difficult tasks. Atkinson suggested that multiplying probability of success and incentive value will give a good estimate of whether a person will choose to work on a task, especially when the obtained score is weighted by the approach (hope for success) and avoidance (fear of failure) components of the person's achievement motive.

Elaborations of the Atkinson model (e.g., Heckhausen, 1991) added further expectation-related concepts (e.g., the expectation that successful task performance will lead to the anticipated incentives) and differentiated various incentives (e.g., extrinsic side effects, such as when an achievement task has affiliative benefits). Atkinson's model has also been elaborated by attribution theorists (Weiner, 1992) who attempted to understand changes in expectations and incentive value in terms of the attributions made for past performances. Moreover, Weiner discovered that the approach component of the achievement motive (hope for success) is associated with attributing failure to luck or lack of effort and success to ability, whereas the avoidance component is linked to attributing failure to lack of ability and success to luck.

Recognition of the motivational importance of expectations and attributions was the starting point of the cognitive revolution in the psychology of motivation that also introduced the concept of control beliefs. Self-efficacious individuals hold the firm belief that they possess the potential to execute the kinds of behaviors that a given task demands (Bandura, 1997). People acquire this belief by reflecting on their own relevant past behaviors, observing the behaviors of similar others, being evaluated by significant others (e.g., teachers), and observing their own physiological reactions when challenged by a given

task. High self-efficacy beliefs are associated with choosing aspiring goals, exerting strong efforts to attain these goals, and persisting in the face of obstacles and hindrances.

### The Concept of Goals

Nowadays, when it comes to answering the question of how motivation relates to action, research relies upon the concept of goals. In our opinion, the concept of goals helps the cognitive explication of a person's readiness to make a certain response and to execute it in an energized manner. Importantly in this regard, Ajzen (1991) suggested that this readiness should be assessed in terms of a person's intention to make the response. Such intentions can be conceived as self-imposed or assigned goals that imply standards that the person intends to meet (with respect to quality and quantity criteria). Doing so allows asking new questions such as, what makes people reach their goals and what makes them fail to do so?

### Determinants of Effective Goal Pursuit

*Goal content* strongly affects the chances of attaining a goal. For instance, Ryan et al. (1996) have argued that goals of autonomy, competence, and social integration favor creativity, cognitive flexibility, deep processing of information, and effective coping with failure. These effects are assumed to be mediated by an intrinsic self-regulation, as the needs of autonomy, competence, and social integration are associated with intrinsic goal striving in line with a person's interests or core values, rather than with extrinsic goal striving in line with environmental pressures or internal sanctions. Intrinsic goal striving is preferred by individuals with positive self-regard, and it can be facilitated from outside by teachers who provide autonomy support (e.g., when law school faculty provide autonomy support, grade point average improves).

In addition to goal content, *structural features of goals* also affect goal pursuit. For example, acting on one's goals is commonly believed to depend on the strength of the goal ('I really want to reach goal x!'). But most tests of this goal strength-behavior relation are only based on correlational studies that preclude causal inferences. A recent meta-analysis by Webb and Sheeran (2006) took a closer look at this assumption by only selecting studies where the strength of the goal was manipulated relative to a control group, and differences in subsequent goal-directed behavior were observed. They found 47 experimental tests of the intention (goal)-behavior relation that actually used an experimental manipulation of the strength of the goal (intention). The meta-analysis showed that a medium-to-large change in strength of intention ( $d = 0.66$ ) led to a small-to-medium change in respective behavior ( $d = 0.36$ ).

But meeting one's goals does not only depend on the strength of the goal; it also depends on what kind of aspiration or standard is specified in the goal (i.e., whether the person wants to achieve a lot or only a little). Locke and Latham (2006) reported that participants are more likely to attain challenging goals that are spelled out in specific terms than moderately specific goals or challenging but vague goals

(i.e., 'do your best'). This effect has a number of prerequisites: frequent performance feedback, strong goal commitment, low goal complexity, and the presence of necessary skills and means to the individual. What does not seem to matter is whether the goal is determined from outside (assigned goals), freely chosen by the individual (self-set goals), or chosen in interaction with others (participative goals). As potential mediators of the goal-specificity effect, Locke and Latham pointed to heightened persistence, attention to the execution of goal-directed behaviors, a greater readiness to plan the goal pursuit, and to feedback and self-monitoring advantages.

Goal attainment is also affected by structural features such as goal orientation (i.e., approach vs avoidance orientation, promotion vs prevention, learning vs performance orientation, and low vs high identity-relation). Framing of the orientation of social goals in terms of *approach versus avoidance* clearly affects their attainment. For instance, striving for the goal of making new friends versus striving for the goal of not being lonely produces quite different outcomes. With respect to the outcome variable of interpersonal satisfaction, framing a goal in terms of avoiding loneliness leads to less favorable results than framing it as making new friends (Elliot et al., 2006). These differences seem to be mediated by differential attention and memory processes, differential interpretation and weighting of available information, and differential evaluation of the progress made toward goal attainment.

Higgins (2006) reported that approach goals benefit more from goal striving that makes use of eagerness-related approach strategies (such as pulling things toward oneself) than from vigilance-related avoidance strategies (such as pushing things away from oneself), whereas the reverse is true for avoidance goals. The assumed reason for this is *value from fit*. Higgins argued that people engage more in goal striving when the strategies used match the goal orientation (i.e., eagerness strategies/positive outcome focus; vigilance strategies/negative outcome focus) than when there is a mismatch (i.e., vigilance strategies/positive outcome focus; eagerness strategies/negative outcome focus). This heightened engagement in turn leads to a higher perceived value.

Framing goals in terms of *learning versus performance* has been found to matter as well (Dweck, 1996). Learning goals lead to better achievement than performance goals because they allow for a more effective coping with negative feedback. For people with performance goals, negative feedback signals failure and lack of ability and thus causes them to give up prematurely. People with learning goals, on the other hand, view negative feedback as setbacks and as valuable cues on how to focus on new strategies, ultimately furthering goal attainment. Recent research on the framing of achievement goals in terms of learning versus performance has also investigated its influence on interactions in social achievement situations (Poortvliet et al., 2007). People with learning goals are oriented reciprocally. They give information openly, and they process received information with a focus on those pieces of information that fit well and add value to their own chosen task strategy. On the other hand, people with performance goals are oriented exploitatively. They provide information to others reluctantly, and they process received information with a suspicious attitude that leads them to focus on detecting and disregarding

low-quality information that might hurt their own task performance.

Finally, it matters whether a person frames a given task goal in terms of its *identity-relatedness*. For instance, the task of solving a certain arithmetic problem can be approached with the goal of solving it effectively or the goal of becoming a great mathematician. The latter goal has been referred to as a self-defining goal or *identity goal*, as it specifies an identity as a desired end state. Self-completion theory (Wicklund and Gollwitzer, 1982) proposes that people who are committed to identity goals can undertake a variety of activities to claim identity-goal attainment, because many different behaviors indicate the possession of such identities. For a scientist, for example, such self-symbolizing activities might include engaging in professional duties (e.g., giving lectures); making positive self-descriptions (e.g., 'I discovered a new principle!'); exerting identity-relevant social influence (e.g., advising students); or acquiring respective skills, tools, and material symbols (e.g., programming skills, fast computers, large office). Failing to perform an identity-relevant activity or lacking an identity symbol produces a state of incompleteness; to restore completeness, people engage in self-symbolizing efforts by emphasizing the possession of alternative symbols or setting out to acquire new identity symbols (e.g., engaging in identity-relevant activities, describing oneself as having the required personality attributes, showing off relevant status symbols). Importantly, affirming one's general self-integrity or bolstering one's self-esteem are not sufficient to offset incompleteness regarding an identity goal; rather, one must acquire specific identity symbols (Gollwitzer et al., 2013).

Attaining one's goals, however, does not only depend on the content of the goals and their structural features. It also depends on the *context* in which the person strives for her goals. Research has differentiated various critical context variables that relate to the person's affective state, the array of competing action tendencies, and the power position of the goal striver. For instance, Tice et al. (2001) focused on negative *affect* and observed that feeling emotionally distraught (e.g., having been asked to imagine that one has caused a traffic accident that killed a child) makes it difficult to follow through with goals of not eating unhealthy food or delaying gratification to attain better long-term rewards.

Recently, researchers have also focused on the contextual variable of being in a position of *power* versus being powerless. For instance, Guinote (2008) reported that people in power procrastinate less in pursuing their goals, they persist longer in the face of difficulties, they show more willingness to try out different strategies to attain the goal, and they more readily seize good opportunities to make goal-directed responses. In addition, they more readily recognize whether a given situation can be used to serve their goals and then allow suitable situations to guide their behavior. All of this appears to be facilitated by a change in executive functioning. Powerful individuals are better than powerless ones at updating goal-relevant information (i.e., new information is monitored for goal relevance, and relevant information replaces old, irrelevant information in working memory). They are also better at inhibiting responses that may interfere with the present goal, and at switching between the main goal and respective subgoals.

## The Self-Regulation of Goal Pursuit

But pursuing goals with the right content and structure in the proper situational context does not yet guarantee effective goal attainment. People often have to engage in self-regulatory thought to further their goal pursuits. For instance, picking a goal that appears desirable and feasible does not yet guarantee that one effectively strives for this goal. A person may adopt the goal to play the piano because she loves to make music and feels capable of doing so, yet actually attempting to realize this goal takes a further effort, and there are certain self-regulatory strategies that facilitate making this effort.

### Instigating Determined Goal Pursuits

The *theory of fantasy realization* specifies three respective self-regulation strategies (Oettingen, 2012): mental contrasting, indulging, and dwelling. In mental contrasting, people first imagine the fulfillment of a wish or fantasy (e.g., giving a good presentation at a conference) and then reflect on the present reality that stands in the way of attaining the desired future (e.g., evaluation anxiety). Mental contrasting is a problem-solving strategy that allows people to recognize that they have not yet fulfilled their wish and that they need to take action in order to achieve the desired future. As a consequence, expectations of attaining the desired future become activated and determine a person's striving to attain the desired future. When perceived expectations of success are high, people will engage in strong goal striving; when expectations of success are low, people will refrain from doing so, and thus they will venture on alternative wishes and desired futures. In this way, mental contrasting helps people discriminate between feasible and unfeasible goals.

The theory of fantasy realization specifies two further routes to goal pursuit. People may engage either in indulging (envisioning only the attainment of the wished-for future) or in dwelling (reflecting only on the present negative reality). Neither of these mental strategies produces any discrepancy between future and reality, and thus the individual fails to recognize that actions (making responses) are necessary to achieve the desired future. Therefore, expectations of success do not become activated, and goal pursuit does not reflect the perceived likelihood of reaching the desired future. Individuals who indulge and dwell show a medium level of striving, even though the resource-efficient strategy to follow would be no engagement in the case of low expectations of success, and full engagement in the case of high expectations of success.

Various experiments support these claims. In one study (Oettingen et al., 2001: Study 4), first-year students enrolled in a vocational school for computer programming indicated their expectations of excelling in mathematics. Next, they named positive aspects that they associated with excelling in mathematics (e.g., feelings of pride, increasing job prospects) and negative aspects of reality, that is, potential personal obstacles (e.g., being distracted by peers or feeling lazy). In the mental-contrasting condition, participants had to elaborate in writing two aspects of the desired future and two aspects of the present reality, in alternating order beginning with the

aspect of the desired future. Participants in the indulging condition were asked to elaborate four aspects of the desired future only; in the dwelling condition they instead elaborated four aspects of the present reality only. As a dependent variable, participants indicated how energized they felt with respect to excelling in math (e.g., how active, eventful, energetic). Two weeks after the experiment, the participants' teachers reported how much effort each student had invested over the interim and provided each student with a grade for that time period. As predicted, only in the mental-contrasting condition did the students feel energized, exerted effort, and earned grades based upon their expectations of success. Those with high expectations of success felt the most energized, invested the most effort, and received the highest course grades; 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 both the indulging and dwelling conditions felt moderately energized, exerted moderate effort, and received average grades independent of their expectations of success.

A variety of studies pertaining to different life domains replicated this pattern of results, for example, experiments on studying abroad, acquiring a second language, getting to know an attractive stranger, finding a balance between work and family life, self-improvement, coping with stress, and fulfilling idiosyncratic interpersonal wishes of great importance. Furthermore, intensity of goal pursuit was assessed by cognitive (e.g., making plans), affective (e.g., feelings of frustration), motivational (e.g., feelings of energization), and behavioral (e.g., amount of invested effort) indicators. These indicators were measured via self-report or observations, either directly after the experiment or weeks later.

Recent research suggests that mental contrasting also promotes the choice of suitable means for effective goal striving. [Oettingen et al. \(2010\)](#) examined the mental-contrasting effects on seeking and giving help as means to an end. For college students, mental contrasting about attaining academic help (more than indulging and dwelling) led to expectancy-dependent seeking of help (Study 1), while for critical care nurses mental contrasting about helping patients' relatives led to expectancy-dependent giving of help (Study 2). Mental contrasting also enables people to master negative feedback. A series of three studies ([A. Kappes et al., 2012](#)) showed that when expectations of success were high, mental contrasting promoted the processing of relevant negative feedback (which in turn led to effective planning), protected participants' self-view of competence against negative feedback, and led to optimistic as well as effort-related (rather than ability-related) attributions in response to negative feedback.

The mediating processes of mental contrasting pertain to both cognitive and motivational processes (summary by [Oettingen, 2012](#)). As for cognitive processes, mental contrasting modulates the strength of the associative link between future and reality and between reality and instrumental means. When expectations of successfully reaching a desired future are high, mental contrasting strengthens the association between the desired future and the reality; when expectations are low, mental contrasting weakens future-reality associations. Importantly, the future-reality associations in turn mediate mental-contrasting effects on self-reported (e.g., feelings of

responsibility) and other-rated intensity of goal pursuit (e.g., raters scored quality of performance on giving a talk and solving a creativity test). But mental contrasting not only links future and reality, it also connects present reality to relevant instrumental means (i.e., means instrumental to overcome or circumvent the present reality to attain the desired future). Again, the strength of the reality-behavior associations mediated intensity of goal pursuit (e.g., performance of taking the stairs instead of the elevator to achieve the goal of getting physically fit). Mediating processes of mental contrasting pertain also to motivational processes. Mental contrasting of a desired future with present reality leads to energization in terms of increased systolic blood pressure as well as self-report of feeling energized.

A recent experiment used continuous magnetoencephalography, a brain imaging technique measuring magnetic fields produced by electrical activity in the brain ([Achtziger et al., 2009](#)) to test whether mental contrasting qualifies as a sophisticated problem-solving technique. Mental contrasting was compared to indulging in a positive future or simply resting. As compared to resting, mental contrasting produced heightened brain activity in areas associated with working memory, episodic memory, intention maintenance, action preparation, and vivid visualization. That is, mental contrasting demands vividly imagining a desired future, anticipating hindrances to realizing this future, and making plans on how to overcome these barriers. The brain activity associated with indulging, on the other hand, did not differ from resting.

This latter finding raises doubts that solely engaging in highly positive fantasies about a desired future can strengthen a person's goal pursuits. Indeed, research on engaging in positive versus negative fantasies about the future supports this suspicion. Early on, [Oettingen and Wadden \(1991\)](#) observed that obese women who spontaneously indulged in positive fantasies about their weight loss were less successful in achieving a lower body mass index (after 4 months and 2 years) than obese women who spontaneously produced fantasies that were more negative. Moreover, [Oettingen and Mayer \(2002\)](#) observed that people who indulge in positive fantasies (valence and frequency) show comparatively weaker academic achievements (i.e., achieving a good grade in a psychology class), professional achievements (i.e., finding a job after graduation), interpersonal relations (i.e., finding a romantic partner), and health (i.e., recovering from hip surgery). More recently, [H.B. Kappes and Oettingen \(2011\)](#) investigated the effects of experimentally induced positive fantasies on energization, hypothesizing that low energy is a mechanism by which positive fantasies translate into poor achievement. Indeed, induced positive fantasies resulted in less energy (as measured by physiological and behavioral indicators) than fantasies that questioned the desired future, negative fantasies, or neutral fantasies. Additionally, energy measured right after the induction of the positive fantasies mediated accomplishment in everyday life a week later. Finally, positive fantasies yielded a larger decrease in energy when they pertained to a more rather than less pressing need (e.g., need achievement) further suggesting that it is the positivity of fantasies that quells energization. Altogether the results indicate that one reason positive fantasies predict poor

achievement is because they sap energy required to pursue the desired future.

### Dealing with Hindrances on the Way to Goal Attainment

One very powerful self-regulation strategy of overcoming hindrances to goal attainment is planning out one's goal striving in advance. Gollwitzer (1999) proposed a distinction between goal intentions and implementation intentions. Goal intentions (goals) have the structure of 'I intend to reach Z!' whereby Z may relate to a certain outcome or behavior to which the individual feels committed. Implementation intentions (plans) have the structure of 'If situation X is encountered, then I will perform the goal-directed response Y!' Both goal and implementation intentions are set in an act of will: The former specifies the intention to meet a goal or standard; the latter refers to the intention to perform a plan. For instance, a possible implementation intention for the goal intention to eat healthy food could link a suitable situational context (e.g., one's order is taken at a restaurant) to an appropriate behavior (e.g., asking for a low-fat meal). Whereas goal intentions merely specify desired end states ('I want to achieve goal X!'), the if-component of an implementation intention specifies when and where one wants to act on this goal, and the then-component of the plan specifies how this will be done. Implementation intentions thus delegate control over the initiation of goal-directed behavior to a specified opportunity by creating a strong link between a situational cue and a goal-directed response.

Evidence that forming if-then plans enhances rates of goal attainment has been obtained in many studies on a whole array of different goals (e.g., academic, health, interpersonal). A recent meta-analysis (Gollwitzer and Sheeran, 2006) involving over 8000 participants in 94 independent studies revealed a medium-to-large effect size ( $d = 0.65$ ; Cohen, 1992) of implementation intentions on goal attainment on top of the effects of mere goals. This size of the implementation intention effect is noteworthy, given that goals by themselves already have a facilitating effect on relevant behavior enactment (Webb and Sheeran, 2006).

Research on the underlying mechanisms of implementation intention effects (summary by Gollwitzer and Oettingen, 2011) found that implementation intentions facilitate goal attainment on the basis of psychological mechanisms that relate to the anticipated situation (specified in the if-part of the plan), the intended behavior (specified in the then-part of the plan), and the mental link forged between the if-part and 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. This heightened accessibility of the if-part of the plan has been observed in several studies testing this hypothesis by using different experimental paradigms: for example, lexical decision tasks, the dichotic-listening paradigm, and cued recall. Moreover, forming implementation intentions not only heightens the activation (and thus the accessibility) of the mental presentation of the situational cues specified in the if-component, it also forges a strong associative link between the mental representation of the specified opportunity and the mental representation of the specified

response. These associative links are quite stable over time. Moreover, mediation analyses suggest that cue accessibility and the strength of the cue-response link together mediate the impact of implementation intention formation on goal attainment.

Gollwitzer (1999) suggested that the upshot of the strong associative (critical situation – goal-directed response) links created by forming implementation intentions 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, uncontrollability, and redundancy of conscious intent. Consistent with this idea, there is plenty of evidence now that if-then planners do act quickly, deal effectively with cognitive demands (i.e., speed-up effects are still evident under high cognitive load), show uncontrolled attention to the specified cues, and do not need to consciously intend to act in the critical moment (i.e., implementation intention effects are observed even when the critical cue is presented subliminally).

The postulated and observed component processes underlying implementation intention effects (enhanced cue accessibility, strong cue-response links, automation of responding) mean that if-then planning allows people to see and seize good opportunities to move toward their goals. Fashioning an if-then plan thus strategically automates goal striving; 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. This delegation hypothesis was tested in a functional magnetic resonance imaging study reported by Gilbert et al. (2009). In this study, participants had to perform a prospective memory task on the basis of either goal or implementation intention instructions. Acting on the basis of goal intentions was associated with brain activity in the lateral rostral prefrontal cortex, whereas acting on the basis of implementation intentions was associated with brain activity in the medial rostral prefrontal cortex. Brain activity in the latter area is known to be associated with bottom-up (stimulus) control of action, whereas brain activity in the former area is known to be related to top-down (goal) control of action. Support for the delegation hypothesis also comes from studies using critical samples (see Gollwitzer and Oettingen, 2011) – that is, individuals with poor self-regulatory abilities such as people with schizophrenia, people with substance abuse disorders, people with frontal lobe damage, and children with attention-deficit/hyperactivity disorder (ADHD).

Research on the facilitating effects of forming implementation intentions on goal attainment has targeted all of the four major problems that are known to doom effective goal striving: getting started, staying on track, failing to call a halt to futile goal striving, and overextending oneself. Given that forming implementation intentions automates goal striving, people who form implementation intentions should actually have it easier when they are confronted with these four central problems of goal implementation. Indeed, numerous studies suggest that problems of getting started on one's goals can be solved effectively by forming implementation intentions. But many goals cannot be accomplished by a simple discrete one-shot action as they require that people keep striving 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 ongoing goal pursuit. Implementation intentions have been found to prevent the negative influence of interferences from inside (e.g., mood) and outside the person (e.g., disruptions by attractive video shows). 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. And finally, when task performance is regulated by implementation intentions, using different ego-depletion paradigms, research participants who used implementation intentions to self-regulate in one task do not show reduced self-regulatory capacity in a subsequent task.

A new line of research on implementation intentions has been stimulated by Aristotle's concept of *akrasia* (lack of willpower). It is argued that any willful strategy of goal striving (such as if-then planning) has to prove itself under conditions where people commonly fail to demonstrate willpower. Three such conditions have been analyzed so far: (1) situations in which a person's knowledge and skills constrain performance such as taking academic tests, (2) situations in which an opponent's behavior limits one's performance such as negotiation settings, and (3) situations in which the wanted behavior (e.g., not snacking, not littering) runs into conflict with the respective impulsive antagonistic responses. For all of these situations, forming implementation intentions qualifies as an effective self-regulation strategy (see [Gollwitzer and Oettingen, 2011](#)).

The litmus test for any strategy to improve willpower is enhanced performance in a *delay of gratification* task. Children with deficits in inhibitory control (i.e., children with ADHD) are known to have particularly pronounced problems with delaying gratifications. Accordingly, [Gawrilow et al. \(2011\)](#) investigated whether delay of gratification can be facilitated by forming implementation intentions even in children with ADHD. Only when the goal intention to delay gratification was furnished with an implementation intention a heightened ability to delay gratification was observed.

### Current Goal Research: Interventions

Knowledge about effective self-regulation strategies of goal pursuit allows one to construct interventions that teach people how to effectively pursue their goals. One such intervention (see [Oettingen, 2012](#)) combines mental contrasting with forming implementation intentions into a metacognitive strategy called mental contrasting with implementation intentions (MCII). In a recent intervention study with middle-aged women ([Stadler et al., 2009](#)), participants were taught the cognitive principles and individual steps of the MCII self-regulation strategy. This intervention allowed participants to apply MCII to their idiosyncratic everyday wishes and concerns on improving their lifestyle. Specifically, participants were taught to apply MCII by themselves to the wish of exercising more whenever possible. Participants were free to choose whatever form of exercising they wished to apply MCII to, and they were encouraged to anticipate exactly those obstacles that

were personally most relevant and to link them to exactly those goal-directed responses that personally appeared to be most instrumental. As dependent measures, participants maintained daily behavioral diaries to keep track of the amount of time they exercised everyday. Overall, teaching the MCII technique enhanced exercise more than the information-only control intervention; this effect showed up immediately after the intervention and it stayed stable throughout the entire period of the study (16 weeks after the intervention). More specifically, participants in the MCII group exercised nearly twice as much: an average of 1 h more per week than participants in the information-only control group.

The MCII intervention was also used to promote healthy eating in middle-aged women (i.e., eating more fruits and vegetables), and it produced the desired behavior change effects; these persisted even over the extensive time period of 2 years ([Stadler et al., 2010](#)). In another study, [Adriaanse et al. \(2010\)](#) targeted the negative eating habit of unhealthy snacking in college students. MCII worked for both students with weak and strong such habits and, notably, it was more effective than mental contrasting or formulating implementation intentions alone. Moreover, MCII was observed to benefit chronic back pain patients in increasing their health behaviors ([Christiansen et al., 2010](#)). Over a period of both 3 weeks and 3 months patients increased their physical mobility as compared to a standard treatment control group. Physical mobility was measured by objective (i.e., bicycle ergometer test and number of lifts achieved in 2 min) and subjective indicators (reported physical functioning). Finally, MCII has shown beneficial effects outside the health area. For example, it benefited study efforts in adolescents preparing for standardized tests ([Duckworth et al., 2011](#)). Together, these findings suggest that MCII is a cost- and time-effective self-regulation technique when it comes to the effective self-regulation of goal pursuit.

### Summary

Research on goals has started to conceptualize the individual as the master of her own fate. People only need to apply empirically tested self-regulation strategies (e.g., mental contrasting and forming implementation intentions) to effectively attain their goals. These strategies allow realizing idiosyncratic wishes according to what is desirable and feasible. When applied in metacognitive form, these strategies can liberate people from being bound to erroneous engagement and from being plagued by action control deficits (e.g., impulsivity).

*See also:* Academic Engagement; Affect-Regulation Motivation; Avoidance and Approach Motivation: A Brief History; Control Behavior: Psychological Perspectives; Coping across the Lifespan; Decision Making: Nonrational Theories; Grit; Health Self-Regulation, Motivational and Volitional Aspects of; Interest, Psychology of; Motivation in Australian Aboriginal Populations; Passion and Motivation; Personal Projects; Self-Determination Theory; Self-Regulation in Adulthood; Successful Aging in Western Societies: The 'Selection, Optimization, and Compensation' Model.

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