

SOCIETY FOR THE SCIENCE OF MOTIVATION  
PRESIDENTIAL ADDRESSThe Goal Concept: A Helpful Tool for Theory Development and  
Testing in Motivation Science

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In the present article, I will try to elucidate how relying on the goal concept facilitates the development and testing of theories in the science of motivation. For this purpose, I will focus on those theories whose development I was closely involved with: the self-completion theory (Wicklund & Gollwitzer, 1982), the mindset theory of action phases (Heckhausen & Gollwitzer, 1987; Gollwitzer, 1990), and the theory of if-then planning (Gollwitzer, 1999, 2014). So the focus is not on discussing the many different goal theories that have been developed and tested in the psychology of motivation by addressing the consequences of setting, striving for, and attaining goals of a different kind, or the various self-regulation strategies that have been suggested to help people commit to, pursue, and attain these goals. Rather, I'll try to demonstrate convincingly that the goal concept is a powerful tool when it comes to creating theories that facilitate the understanding of phenomena that are at the center stage in the science of motivation.

*Keywords:* goals, theories in motivation science, self-completion, action-related mindsets, implementation intentions

In the present article, I will not discuss the different goal theories that have been developed and tested in the psychology of motivation focusing on the various consequences that setting, striving for, and attaining goals of a different kind are characterized by. For instance, whether or not the pursuit of learning versus performance goals allows for more effective processing of negative feedback (Dweck & Leggett, 1988), the setting of specific challenging versus vague do your best goals leads to better goal attainment (Locke & Latham, 2013), pursuing

approach versus avoidance goals is associated with more positive rather than negative affect (Elliot, Gable, & Mapes, 2006), or whether promotion versus prevention goals are associated with eagerness rather than vigilance in goal pursuit (Higgins, 1997). I will also refrain from discussing whether self-regulation strategies can enhance the commitment to one's goals, pursuing these goals, and attaining them (e.g., mental contrasting vs. positively fantasizing about a desired future outcome, Oettingen, 2012; planning out one's goal striving in advance, Gollwitzer, 1993), and whether certain situational contexts (e.g., being in a position of power, in a positive/negative mood) will facilitate or hamper the setting, striving for, and attainment of goals. All of this is discussed extensively in recent handbook chapters by Gollwitzer and Oettingen (2012, in press) as well as Oettingen and Gollwitzer (2018).

What I want to achieve in the present article is different: I want to elucidate how relying on the goal concept helped the development of

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various theories in the science of motivation. For this purpose, I will focus on theories whose development I was closely involved with: the self-completion theory (SCT; Wicklund & Gollwitzer, 1982), the mindset theory of action phases (MAP; Heckhausen & Gollwitzer, 1987; Gollwitzer, 1990), and the theory of if-then planning (Gollwitzer, 1999). Proceeding this way will make it easier for me to elucidate how valuable the goal concept has been for theory development in different domains relevant to motivation psychology: self & identity (SCT) and action control (MAP; the theory of if-then planning).

Sticking to the listed theories also allows me to point out that the goal concept may enrich research on motivation-related phenomena in two different ways: First, by bringing something of value to the table that would not have occurred without it. This is true in particular for SCT where the goal concept allowed for the insight that people may not only present themselves in line with their self-concepts and evaluate themselves in line with their self-esteem; people may also strive for identity goals (e.g., of being a great businessman) and thus present themselves in a way that is not consistent with their self-concepts or does not affirm their self-esteem but compensates for identity-goal related shortcomings. Second, the goal concept may point research on motivational phenomena into new directions in which a particular theory is formed and tested. As will become evident later in the article, this is true in particular for the two theories pertaining to action control: MAP and the theory of if-then planning. Finally, in closing I'll suggest that research on other phenomena studied in the science of motivation might also benefit from turning to the goal concept, enriching their theoretical analysis as well as the respective empirical tests.

### **Self-Completion Theory: Explicating Goal Compensation at the Identity Level**

Traditionally, the psychology of the self or identity (Suls & Greenwald, 1983; Suls, 1993) primarily focuses on the following question: How does a person conceive of his or her self? Within this approach, the term of self or identity refers to a cognitive structure that incorporates all of the ways in which a person might answer the question, "Who am I?" As William James

had anticipated (James, 1890/1950), people's answers were found to relate to physical attributes ("I am tall"), social roles ("I am a father"), traits ("I am a conscientious person"), to skills and aptitudes ("I am an IT freak"), or to values and interests ("I love to read"). Research in this tradition refers to the self in terms of the *self-concept*, and it has observed that people commonly are keen to verify their self-concepts (e.g., by choosing interaction partners that agree with their self-related beliefs; Swann, 1983). But why then do we often see people presenting themselves more positively than it is justified? Knowing that imposters are not the most liked people around (as the term implies, imposters do thrust themselves offensively upon others), one wonders: Why do self-aggrandizing self-presentations exist?

In the late 1970s, Robert Wicklund and I asked ourselves this very question. Given that audiences commonly are annoyed by braggers, what drives presenting oneself positively when things are actually not looking good? When we stumbled into Kurt Lewin's (1926) work and that of his students (Lissner, 1933; Mahler, 1933; Ovsiankina, 1928; Zeigarnik, 1927) on compensatory efforts in individuals who fail to perform an assigned goal (e.g., children who were given the task of building a house of wooden blocks), we adopted a goal perspective on the imposter phenomenon. We asked ourselves: Couldn't it be that the individuals who loudly claim to possess a certain identity (such as being a great father) do not think of this identity in terms of a self-concept but rather in terms of the aspired-to identity goal (of wanting to be a great father). According to this perspective, public claims to be a great father might be nothing more than a compensatory response to the experience of falling short with respect to an aspired-to identity (e.g., finding out that a friend spends way more time with his children than oneself does).

Accordingly, we developed self-completion theory to better understand how people strive for *self-defining goals* or *identity goals*. Such goals specify the possession of a wanted identity as a desired end state. Self-completion theory (Wicklund & Gollwitzer, 1982; Gollwitzer & Kirchhof, 1998) proposes that people who strive for certain identity goals can undertake a variety of activities to claim identity-goal progress, because many different actions indicate the

possession of the respective identities. For a scientist, for example, such self-symbolizing activities might include engaging in professional duties (e.g., giving lectures, conducting research, publishing the obtained findings), making positive self-descriptions (e.g., “I discovered the essence of a certain psychological principle!”), exerting identity-relevant social influence (e.g., advising students), or acquiring respective skills, tools, and material symbols (e.g., programming skills, having fast computers, a large office). Failing to perform an identity-relevant activity or noticing that one lacks a certain identity symbol is assumed to produce a state of incompleteness; to restore completeness, people can engage in self-symbolizing efforts (i.e., compensatory efforts). Such self-symbolizing can emphasize the possession of alternative symbols or setting out to acquire new identity symbols (e.g., describing oneself as having the required personality attributes, Gollwitzer & Wicklund, 1985; displaying relevant status symbols, Harmon-Jones, Schmeichel, & Harmon-Jones, 2009; engaging in identity-relevant activities, Brunstein & Gollwitzer, 1996).

More recently, individuals with the identity goal of successful businessmen or lawyer have been found to engage in self-symbolizing efforts even when the offered routes to self-symbolizing required engaging in antisocial, corrupt actions that conflicted with their general values (Marquardt, Gantman, Gollwitzer, & Oettingen, 2016). More specifically, Marquardt et al. observed that in the face of bogus negative feedback on their aptitude for the aspired-to identity, participants with the identity goal of becoming a successful businessman or lawyer compensated by endorsing immoral but effective solutions to business problems or admitting to previous immoral but successful actions shown by lawyers, respectively. Also, when high school seniors who pursued a STEM profession received negative feedback on possessing relevant cognitive abilities and thus felt incomplete, they self-ascribed personality traits associated with professional success in the STEM fields even when these traits were clearly linked to a heightened readiness to engage in immoral behavior.

Importantly, our goal perspective on self-symbolizing also allowed us to recognize that self-symbolizing should not be equated with efforts to affirm one’s *general self-integrity* or

bolstering one’s *self-esteem*. These latter two strategies are not sufficient to offset incompleteness regarding an identity goal, as this requires one to acquire specific identity symbols and not just a positive evaluation of the self in general (e.g., Ledgerwood, Liviatan, & Carnevale, 2007; Gollwitzer, Marquardt, Scherer, & Fujita, 2013). Also, in line with the research on goal striving conducted by Lewin and his students, we hypothesized and found that our research participants experienced a higher level of completeness when a social audience noticed their efforts to compensate for an experienced incompleteness. In other words, self-symbolizing that is noticed by others and thus has become a social fact is more powerful in restoring experienced incompleteness (Gollwitzer, 1986). In addition, we found that incomplete individuals are more concerned with finding an audience for their identity striving than are completed individuals (Brunstein & Gollwitzer, 1996). However, incomplete individuals see others only in terms of the potential to notice their compensatory efforts; thus, they lack social sensitivity in the sense of empathetically interacting with their audience (Gollwitzer & Wicklund, 1985).

Most interestingly, when people make public their intention to acquire a certain self-definitional indicator (e.g., when a person who wants to become a great student publicly utters the behavioral intention of enrolling in an inspiring but challenging course) this already produces an enhanced sense of completion (Gollwitzer, Sheeran, Michalski, & Seifert, 2009). However, this enhanced sense of completeness was found to have negative consequence for actually acting on one’s intentions. Apparently, when others take notice of a stated identity-relevant behavioral intention, the superordinate goal of claiming the identity feels like being reached already, and thus actually performing the intended behavior becomes less necessary. This finding is in line with results of prior self-completion studies; public, positive self-descriptions claiming the possession of an identity symbol produced the same sense of self-definitional completeness as actually obtaining this indicator of identity goal completeness (Brunstein & Gollwitzer, 1996; Gollwitzer, Wicklund, & Hilton, 1982).

Finally, self-completion research so far has primarily focused on the state of incompleteness and its downstream consequences (i.e.,

compensation by self-symbolizing). More recently, the focus has changed toward the state of completion and its downstream consequences of resorting to inaction, which is a problem when one's identity goal demands sustained action (e.g., when one's identity goal is being a "green person"). For instance, Longoni, Gollwitzer, and Oettingen (2014) analyzed whether validating the purchase of green products hampers subsequent green behaviors in people with the identity goal of being green. They found that positive feedback on purchasing green products led to less subsequent recycling compared to negative feedback, with participants who did not receive any feedback lying in between. Moreover, participants who did receive positive feedback evinced a decreased cognitive accessibility of goal-related constructs in a lexical-decision task compared to participants who had received negative feedback, suggesting that feedback validating one's green purchasing choices is associated with heightened goal completeness. Similarly, participants who had received positive feedback recalled a green patch as less green compared to negative feedback participants, suggesting that the urge to attain the identity goal of being green was weakened by positive as compared to negative feedback.

To conclude, self-completion theory offers an additional perspective—a goal perspective—to the psychology of self and identity, which has so far favored a self-concept perspective (Who am I?) and a self-evaluation perspective (Do I have high self-esteem?). The additional perspective suggested by self-completion theory helped to explore how people can strive for their identity goals by finding out (a) what kind of indicators can best symbolize goal completeness, (b) that creating social realities for one's self-symbolizing efforts improves its impact on goal completeness, and (c) that engaging in self-symbolizing is an impulsive activity that limits reflective thought which is commonly required when people opt to take the perspectives of others.

Most importantly, SCT by taking a goal perspective has brought back the notion of compensation for failing and falling short. As self-symbolizing is a compensatory act, it is comforting to know that people who experience an incompleteness with respect to an aspired-to identity goal can always point to alternative indicators of goal completeness that are still in

their possession, and thus easily reinstall a sense of completeness. This allows them to "stay in the field" (as Lewin referred to persistent goal pursuit) which is highly important when it comes to identity goals, as these goals cannot be attained by one single act and can never be attained fully. Think for instance of the identity goal of being a great father, scientist, or piano player. There is no exhaustive attainment of such goals; rather, pursuing such goals is a life-long endeavor. This requires that people can easily stay in the field in the face of incompleteness experiences, and self-completion theory points to an effective way of doing this: Incomplete individuals only have to engage in self-symbolizing that points to those indicators that are still available, thus reestablishing completeness on the spot. Theorizing on self and identity that does not use the concept of "identity goal" does not provide such an optimistic outlook. When people fall short, it is assumed that they have to adjust the respective self-concept accordingly thus showing consistency (Swann, 1983); and if the failure is so bad that it even affects their self-esteem they need to engage in efforts that affirm their self-esteem in general (Steele, 1988). Without applying the goal concept to the theorizing on self and identity as is done in SCT, the option of compensating on the spot would have never been explicated and tested as a viable way to cope with identity-related shortcomings.

### Action Phases and Mindsets

In the 1980s, when Heinz Heckhausen and I set out to analyze how people control their actions (see Heckhausen, Gollwitzer, & Weinert, 1987), we quickly realized that research on action control is facilitated when it is broken down into different phases. But what kinds of phases does one want to differentiate, and how can one assure that these phases are actually distinct? For both questions the goal concept turned out to be a great tool to find convincing answers.

### The Rubicon Model of Action Phases

For Kurt Lewin (e.g., Lewin, Dembo, Festinger, & Sears, 1944), there was never any doubt that motivational phenomena can only be properly understood and analyzed from an ac-

tion perspective. In support of this claim, Lewin argued that processes of goal setting and goal striving are governed by distinct psychological principles. This insight however went unheeded for several decades, probably for the simple reason that goal setting research based on the expectancy-value paradigm proved very successful (Festinger, 1942; Atkinson, 1957), and thus captured the full attention of motivation psychologists. It was not until the reemergence of the psychology of goals (starting with Klinger's current concerns, 1977) that the processes and potential strategies of goal striving began to receive more attention (review by Oettingen & Gollwitzer, 2001). This new action perspective on human behavior also meant extending the scope of analysis beyond the question of how reliable responding to certain stimuli can best be established, the central question of the behaviorists.

The Rubicon model of action phases understands the course of action to be a temporal, horizontal path starting with a person's wishes and ending with the evaluation of the action outcomes achieved (Gollwitzer, 1990; Heckhausen & Gollwitzer, 1987). It was designed to raise and help answer the following four questions: How do people select their goals? How do they plan the execution of the respective goal striving? How do they enact these plans? And how do they evaluate their accomplishments? According to the Rubicon model, a course of action involves at the outset a phase of deliberating the desirability and feasibility of one's wishes in order to arrive at a binding decision regarding which of them one wants to pursue (predecision phase), a phase of planning concrete strategies for achieving the goal selected at the end of the predecision phase (the preaction phase), a phase of enacting these strategies (action phase), and finally a phase of evaluating the achieved action outcomes (postaction phase).

The four phases are separated by distinct boundaries. The first boundary (also referred to as crossing the Rubicon) is located between the predecision phase and the preaction phase and stands for turning a wish into a binding goal. The second boundary sits between the preaction phase and the action phase, and it stands for moving from planning on how to act on one's goal to actually starting to act. Finally, the third boundary is placed between the action phase and the postaction phase and it stands for one's

acting coming to an end and starting with the evaluation of the achieved outcomes. The first and the last of the four phases are also referred to as motivation phases as they are linked to phenomena that have been addressed in traditional motivation psychology: making choices on the basis of perceived feasibility and desirability has been analyzed by expectancy-value theories (Atkinson, 1957) and evaluating achieved outcomes has been the focus of attention in attribution theories (Weiner, 1986). The second and the third phase are sometimes referred to as volition phases as they are linked to phenomena that have been analyzed in the early days of will psychology (Lewin, 1926; Ach, 1935).

The Rubicon model of action phases has benefitted much from research using the goal concept as it helped to delineate different phases of the control of action. It is important to note however that it goes beyond the distinction between goal setting and goal striving. Although the model keeps these two problems of goal pursuit separate, it encompasses both within a single theoretical model, thus encouraging researchers to analyze their features and the respective underlying processes in relation to each other.

The Rubicon model has led to a number of misconceptions that I want to clarify in the following: First, the model does not imply that every single initiation of action is directly preceded by deliberation of the desirability and feasibility of the underlying goal and the forming of a goal commitment. Many initiations of action are simply resumptions of activities that were started some time before; forming the underlying goal anew is therefore unnecessary. The same is true for action initiations postponed because of a lack of opportunities to act. Second, the model does not imply that forming a goal commitment is necessarily followed by intense planning. It is rather assumed that such concerns originate only when smooth implementation of the goal is threatened; for instance, when special circumstances or means are required that still need to be developed or created, when the critical opportunity may be missed because it is difficult to recognize, happens infrequently, or presents itself only for a short moment, and when competing goals continue to block implementing the critical goal. Third, the model of action phases does not exclude the

possibility of overlap between these phases. In the predecision phase, deliberation of wishes concerning a goal can easily be interrupted so that actions in the service of other already chosen goals may be planned, initiated, completed, or evaluated. Also, in the postdecision (preaction) phase, the individual may deliberate various wishes and evaluate some completed goal pursuits while waiting for the opportunity to act on a newly chosen goal. Similarly, during the execution of goal-related actions, individuals may deliberate wishes, ready themselves for implementing other goals, or evaluate some terminated goal pursuit as long as executing the critical actions is largely automatized. Fourth, the model uses the metaphor of crossing the Rubicon to describe the turning of wishes (potential goals) into binding goals. Here the allusion is not so much to having gone beyond a point of no return as it is to putting incessant deliberation to a rest. The model simply assumes that making a goal decision stops the “babble of competing inner voices” (Jones & Gerard, 1967).

### Deliberative Versus Implemental Mindsets

The goal concept did not only help to delineate the four phases of action in the Rubicon model. It also allowed us to find a way to test whether these distinctions are valid as research on goals had in the past been linked to studying people’s mindsets (Külpe, 1904). A mindset was considered to be the sum total of the activated cognitive procedures associated with trying to solve a given task. So we thought demonstrating that the phases of the Rubicon model are characterized by different mindsets suggested that these phases are indeed distinct, each requiring to solve a unique task.

The Würzburg School of psychology was particularly interested in studying the cognitive consequences of assigned task goals (i.e., when people try to solve an *Aufgabe*, given to them by the experimenter). Oskar Külpe (1904), the founder of the Würzburg School (see Boring, 1950, pp. 401–406; Humphrey, 1951, pp. 30–131), had participants view pictures of four nonsense syllables, each written in a different color. The letters composing the syllables, the positioning of the colors, and syllables themselves were varied over trials. Most importantly, Külpe also varied the *Aufgabe* (the assigned

task goal) prior to each picture presentation. Subjects had to attend to a particular aspect of the stimulus display (e.g., the frequency of a certain letter, the positioning of the colors, the figure represented by the positioning of the syllables, or the kind of letters composing the syllables). Immediately after each stimulus presentation, lasting 0.125 second, he requested the subjects to report the solutions to the tasks; in addition, he asked them to recall the other aspects of the stimulus display, of which they had not been instructed to take notice. The results showed drastic effects of task instruction: Whenever the experimenter’s questions were related to the instructions prior to viewing the display (e.g., subjects were asked to attend to the positioning of the colors and then asked to recall it), subjects were highly accurate in their answers; however, whenever there was a mismatch (e.g., subjects were asked to attend to the positioning of the colors but had to report on the different letters composing the four different syllables), subjects were extremely inaccurate. In a very similar experiment, Chapman (1932) observed comparatively more accurate reports when the instructions given prior to stimulus presentation matched the inquiry posed after stimulus presentation.

The representatives of the Würzburg School of Psychology used particular words to talk about such effects, speaking of the instructions prior to stimulus presentation as constituting the *Aufgabe* (assigned task goal), which creates in the individual who accepts it a corresponding *Bewusstseinslage* (mindset). This mindset in turn was assumed to “prepare” the individual by activating the needed cognitive procedures to analyze the presented stimulus material effectively, resulting in proper task completion. Note that this original mindset notion (*Bewußtseinslage*) is different to that used in the growth mindset research (see Dweck, 2006). When people adhere to the belief (or naïve theory) that personal attributes are malleable rather than fixed, they are said to hold a growth mindset. It is studied what kind of goals are set by people who believe in malleability (i.e., learning goals rather than performance goals), and whether and how believing in malleability affects constructive coping with failure.

Based on the research of the Würzburg School, we felt that the strongest evidence that the phases delineated in the Rubicon model are indeed distinct was experimental findings that

placing people into these phases is associated with different mindsets (Gollwitzer, 1990, 2012). These mindsets should be characterized by the activation of exactly those cognitive procedures that make it easier to solve the respective task that the Rubicon model sees linked to each of the four phases. So in a first step, we explicated the nature of the task goals people are confronted with when entering these phases. For the predecisional phase, we assumed that the task the person faces is to make the best possible choice between potential action goals (i.e., one's current wishes). In the postdecision (preaction) phase the task seems to be one of promoting the initiation of actions that are instrumental for moving toward the chosen goal. In the action phase, the person obviously faces the task of efficiently executing such actions, whereas the task in the postaction phase may best be described as having to determine whether the intended outcome and its desired consequences actually accrued and whether or not further action is needed.

In a second step, we turned to the question of which activated cognitive procedures could best help meeting these various task demands. So far, mindset research regarding the action phases of the Rubicon model primarily focused on delineating the cognitive features of the mindsets of the first two action phases, that is, the predecision and preaction phases with the respective deliberative versus implemental mindset. We figured that before making a decision, pondering over the desirability and feasibility of potential goals (wishes) requires open-mindedness (i.e., even peripheral, incidental information is processed), impartial processing of desirability-related information (i.e., pros and cons are given equal weight), and objective judgments of feasibility (i.e., realistic judgments of difficulty and probability of success). When deliberation is coming to an end and a decision is made, entering the preaction phase requires that people start planning the implementation of their set goal, namely, the when, where, and how to act to attain the desired outcome are to be stipulated. Such planning requires optimistic judgments regarding feasibility (i.e., increased perceived control over outcomes), partial processing of desirability-related information (i.e., pros receive more weight than cons), and relative closed-mindedness (i.e., peripheral information is ignored).

Extensive experimental research demonstrated that placing people into a predecision or a postdecision (preaction) phase induces mindsets that are characterized by the cognitive orientations that help people meet the task demands of the respective action phase (e.g., Bayer & Gollwitzer, 2005; Puca, 2001; Gollwitzer, Heckhausen, & Steller, 1990; Gollwitzer & Kinney, 1989). There is also evidence that these distinct cognitive orientations have different downstream consequences. Looking at successful goal striving, for example, individuals in an implemental mindset evinced heightened persistence exhibited in the face of difficulties (Brandstätter & Frank, 2002). Furthermore, individuals in an implemental mindset were more eager to work on their goals, expressed in both shorter-time predictions with respect to goal attainment and actual shorter time needed for task completion (Brandstätter, Giesinger, Job, & Frank, 2015).

In all of the mindset experiments reported above, the deliberative mindset is evoked by asking participants to (a) first name an unresolved, important personal problem that is causing rumination but for which they have not made a decision yet, and then (b) reflect on whether to take action or not. To enhance the depth of reflection, participants are also requested to list a number of positive and negative, short- and long-term consequences of both deciding to act and deciding to maintain the status quo (i.e., deciding not to act); indicating the probability of the occurrence of each of these consequences is also required. In contrast, the implemental mindset is evoked by asking participants to think of a personal project for which they have already made the decision to act but did not initiate any action yet. Subsequently, participants are asked to list the steps necessary for successful goal attainment and to plan out in detail when, where, and how they intend to act on each of these steps.

Importantly, research suggests that pondering more complex and important unresolved personal problems or planning out more demanding chosen personal projects leads to stronger deliberative and implemental mindsets (Taylor & Gollwitzer, 1995), and this is why participants are commonly asked to refrain from naming easily solvable or mundane personal problems or projects. Moreover, in all of these studies the theme of the unresolved personal

problem or the chosen personal project that people had to deliberate or to plan out in order to induce a deliberative and an implemental mindset, respectively, were not related to the theme of the tasks that were used to assess the predicted activation of certain cognitive procedures; for instance, when the prediction was open- versus closed mindedness on the dependent variable side the breadth of participants noun span was assessed by using words that had nothing to do with the participants' unresolved personal problems or chosen personal projects.

There are a number of recent developments in the research on deliberative and implemental mindsets further indicating that deliberative and implemental mindsets are characterized by cognitive consequences geared toward facilitating the task goals people in the respective action phases are facing: to turn a desirable but also feasible wish into a binding goal versus to get started with the implementation of the chosen goal. For instance, investigating the consequences of inducing deliberative versus implemental mindsets on visual attention, [Büttner and colleagues \(2014\)](#) observed that participants in an implemental mindset do not only exhibit relative closed-mindedness with respect to processing new information ([Fujita, Gollwitzer, & Oettingen, 2007](#)) but also show a narrower breadth of visual attention compared to participants in a deliberative mindset. The breadth of visual attention was determined by tracking eye movements while participants processed visual scenes (i.e., nature slides); participants in an implemental mindset exhibited a narrower breadth of visual attention by focusing on foreground objects while participants in a deliberative mindset were more likely to process the whole nature scene more evenly. These results suggest that implemental as compared to deliberative mindsets not only lead to closed-mindedness when it comes to the processing of new information but already operate at the level of visual attention.

In line with mindset effects on illusory feelings of control observed by [Gollwitzer and Kinney \(1989\)](#); [Hügelschäfer and Achtziger \(2014\)](#) observed that participants in an implemental mindset were more confident in having correctly answered questions in a general knowledge test than did participants in a deliberative mindset. And [Dennehy, Ben-Zeev, and Tanigawa \(2014\)](#) found that an implemental mindset

helps to shield oneself from the detrimental effects of stereotype threat. The authors compared participants with low versus high socioeconomic status (SES) in a speeded mental arithmetic task known to elicit performance anxiety; as expected, participants from a high SES background outperformed participants from a low SES background. However, the induction of an implemental mindset helped participants from a low SES background to overcome this difference. So the authors conclude that asking individuals to plan out when, where, and how to act on a personal but unrelated project may in fact help them to shield their math performance from the effects of stereotype threat.

Recent research also tested whether deliberative versus implemental mindsets manage to influence risk-taking behavior ([Keller & Gollwitzer, 2017](#)). The authors assessed risk taking by using the Balloon Analogue Risk Task (BART; [Lejuez et al., 2002](#)). In the BART, one has to decide after each pump whether to go on pumping a balloon one more time or to save its current value and opt out. By going on, participants increase the balloon's current value by a fixed amount but also increasingly risk the balloon's popping and thereby the loss of the balloon's current value. Using pumping up a balloon as the risk-taking task, the BART mirrors risk taking in the real world quite well (i.e., has a high ecological validity) as indicated by the fact that it can differentiate smokers from nonsmokers ([Lejuez et al., 2002, 2003](#)). Indeed, [Keller and Gollwitzer \(2017\)](#) found that participants in a deliberative mindset on average stopped pumping earlier on each balloon than participants in an implemental mindset, thus saving more balloons. The deliberation of taking action on an unresolved personal problem or not versus the planning out of when, where, and how to act on a chosen project apparently impacts the degree to which we take risks in a risk-taking measure that is ecologically valid.

In the research discussed so far, deliberative mindsets were induced by asking participants to consider the question of whether they wanted to act or not on an unresolved personal problem. But by adopting a goal perspective, one wonders what will happen when people are asked to deliberate whether an already chosen goal should be acted on or not? [Nenkov and Gollwitzer \(2012\)](#) gave participants explicit instruc-

tions to deliberate a set goal (i.e., asking the participants to deliberate on the positive and negative, immediate and long-term consequences of making a change or preserving the status quo). The authors found that participants were subsequently even more committed to their goal than before. It turned out that these participants used deliberation to justify and bolster the commitment to their initial decision, thus exhibiting what the authors coined postdecisional defensiveness. In contrast, participants who had not yet made a decision to pursue a certain goal were less inclined to pursue it after deliberating the pros and cons of pursuing it. The increase in commitment observed as a consequence of postdecisional defensiveness did not only translate into a heightened planning intensity but also into an increased effort to search for information helping to attain the goal; participants exhibiting postdecisional defensiveness were 3.5 times more likely to visit a website offering instrumental information.

Renewed deliberation is also focused on by Brandstätter and Schüler (2013) in their research on so-called action crises. The authors posit the emergence of an intrapsychic conflict if progress toward reaching a set goal turns out to be dissatisfying or the chosen means proves ineffective. This conflict, referred to as an action crisis, is thought to be characterized by the renewed deliberation on whether to continue goal striving or to abandon the goal altogether; in the words of the Rubicon model, an action crisis is a motivational phenomenon emerging in a volitional phase (i.e., the action phase). In a longitudinal study with dozens of measurement points over the course of 18 months, Herrmann and Brandstätter (2015) observed that the severity of respective action crises at the beginning of the study predicted disengagement from an academic goal as well as two idiosyncratic personal goals. More specifically, the more the students experienced an action crisis with respect to their academic goal at the beginning of the study, the fewer courses they completed during their first college year and the earlier they disengaged completely.

While in Nenkov and Gollwitzer's (2012) work, participants were explicitly asked to redeliberate a chosen goal anew, Herrmann and Brandstätter (2015; Brandstätter & Schüler, 2013) instead focus on the self-induced redeliberation of set goals that turn out to be more

difficult or more frustrating to attain than expected. Given that these set goals are still highly valued, an action crisis is experienced. This crisis sets the stage for a renewed deliberation over pursuing it or not, which then can ultimately lead to abandoning it.

In sum, the goal concept has stimulated the Rubicon model's conceptual distinction between different phases of action. It has also brought back the mindset notion thus allowing to critically test the claim of the Rubicon model that these phases are distinct. Based on the mindset notion that different task goals (*Aufgaben*) are associated with the activation of different cognitive procedures it was demonstrated in many studies that the predcision phase and the postdecision preactional phase are indeed unique. Whereas early research focused on the cognitive features of the deliberative and implemental mindset, recent research has also started to focus on identifying various downstream consequences (e.g., the implemental mindset's blocking of the detrimental influence of stereotype threat). Importantly, the apparent lack of research regarding the action and postaction phases, respectively, asks for more research addressing these phases. Recent research on deliberation during goal striving (i.e., in the preaction and the action phase) offering a new perspective on defensive processing of information and disengagement from futile goals does support this call. Finally, future research might also want to focus more on the transition points specified in the Rubicon model, asking questions as done early on by Gollwitzer, Heckhausen, and Ratajczak (1990): What kind of deliberation creates a stronger readiness to move on to making a change decision (i.e., crossing the Rubicon)? Or even more basic, are there certain ways of thinking about the desired future implied by one's wishes that ultimately lead to stronger goal commitments than others (see the fantasy realization theory by Oettingen, 2012, 2014)?

### Goal Intentions Versus Implementation Intentions

The goal concept stimulated a further line of research distinguishing between different types of intentions: goal intentions versus implementation intentions. It all started with the observation that even though crossing the Rubicon is

associated with turning mere wishes into binding goals, people still are not very successful in realizing their goal. More specifically, the strength of a person's intention to reach a chosen goal only correlates around .30 with actual goal attainment (Sheeran, 2002). So we wondered whether there are any easy ways to ameliorate this problem such as asking people to prospectively plan out in advance when, where, and how they wanted to implement a chosen goal (e.g., to make a good grade in an upcoming exam)? They could then link in their mind the anticipated critical situation (a good opportunity or a tricky obstacle) with an action that is instrumental to realizing the goal by seizing the opportunity and overcoming the obstacle, respectively. Note that I am not talking here about encouraging people to make the desired outcome more specific by reducing the vagueness of it (such as moving from wanting to make a good grade to wanting to make at least an A-; Locke & Latham, 2013), or about changing the outcome goal of achieving a certain grade into a behavioral goal such as studying more (Fishbein & Ajzen, 2011). Both of these strategies are still focused on setting better goals.

What we wanted to turn to instead was suggesting to people to make plans (Gollwitzer, 1993), actually if-then plans that spell out in their if-part which situation (opportunity or obstacle) shall trigger a goal-directed response specified in the then-part: "If situation *x* is encountered (e.g., an opportunity such as waking up to a quiet Saturday morning or an obstacle such as an invitation from your friends to go partying), then I will initiate the goal-directed response *y* (e.g., immediately sit down at my desk at home on Saturday morning and get started with studying or telling my friends that this weekend is no good but probably next weekend, respectively)!" We hypothesized that adding such plans to one's goals should heighten the rate of goal attainment, and thus we used in all of the research on if-then planning a control condition where participants operated on mere goals only.

Even though both goals and plans are self-instructions to achieve certain changes in one's future, if-then plans do not have the structure of goals (such as "I want to reach outcome *x*!" or "I want to perform behavior *y*!"). Accordingly, top-down controlled discrepancy reduction in response to goal-frustration (in the sense of "I'm disappointed that I missed my goal. I need

to do better!") does not qualify as the mechanism that promotes effective action control by if-then plans (see Carver & Scheier, 1998). Rather, as the structure of if-then plans (implementation intentions) is geared toward linking a goal-directed response to a critical situation (opportunity or obstacle), it should now be bottom-up action control by the specified critical situation that does the job. So the insight of research on the goal concept that goals unfold their effects via top-down control geared toward discrepancy reduction forced us to come up with a novel process hypothesis by which implementation intentions (vs. goal intentions) might positively affect action control: We hypothesized that adding implementation intentions to one's goal intentions induces a switch from top-down control by mere goal intentions to bottom-up control by the situational cues specified in the if-part of the added implementation intentions; we referred to this switch hypothesis as the "delegation of control to situational cues" notion (Gollwitzer, 1993, 1999; Gollwitzer & Sheeran, 2006).

As bottom-up control is known to run off quite automatically, we then went on to predict that action control by if-then plans should carry features of automaticity. We referred to this type of automaticity as "strategic automaticity" as it is based on a simple mental act of linking a critical situation to a goal-directed response, all in the service of meeting the respective superordinate goal. Various lines of research were instigated to test the claim that implemental intentions (if-then plans) facilitate goal attainment via automatic processes. This body of research can be separated into three different lines asking the following questions (Gollwitzer, 2014): (a) Are if-then plans mentally represented in a way so that bottom-up control is facilitated?, (b) does action control by implementation intentions carry features commonly associated with automatic action control?, and (c) do implementation intentions manage to block unwanted speedy responses based on impulses or habits? In other words, can responses preprogrammed by if-then planning "outrun" such responses?

### **The Mental Representation of If-Then Plans**

Because forming an implementation intention implies the selection of a critical future

situation (opportunity or obstacle), the mental representation of this situation should become highly activated and hence more accessible. This heightened accessibility of the if-part of the plan has been demonstrated in several studies using different experimental task paradigms borrowed from cognitive psychology: for example, lexical decision tasks (e.g., [Webb & Sheeran, 2004](#)), dichotic-listening as well as cued recall tasks ([Achtziger, Bayer, & Gollwitzer, 2012](#)). Further studies indicated that forming implementation intentions not only heightens the activation (and thus the accessibility) of the mental presentation of the situational cues specified in the if-part, it also forges a strong associative link between the mental representation of the specified critical situation and the mental representation of the specified response in the then-part ([Webb & Sheeran, 2007, 2008](#)). These associative links seem to be quite stable over time ([Papies, Aarts, & de Vries, 2009](#)), and they allow for priming the mental representation of the specified response (the plan's then-part) by subliminal presentation of the specified critical situational cue (if-part) ([Webb & Sheeran, 2007](#)). Moreover, mediation analyses suggest that both the cue accessibility and the strength of the cue-response link qualify as mediators of the impact of implementation intention formation on goal attainment (e.g., [Aarts, Dijksterhuis, & Midden, 1999](#); [Webb & Sheeran, 2007, 2008](#)). Finally, making if-then plans seems to also affect the perceptual processing of the specified situational cues. Using a well-established chronometric method (i.e., the psychological refractory period paradigm) and combining it with the locus-of-slack logic, [Janczyk, Dambacher, Bieleke, and Gollwitzer \(2015\)](#) found that if-then plans facilitate early perceptual processing and not just attentional responding to the specified critical cues.

### **The Features Associated With Action Control by If-Then Planning**

But will the critical situational cue specified in the if-part once encountered elicit the goal-directed response specified in the then-part in a manner that qualifies as automatic—exhibit features of automaticity including immediacy, efficiency, uncontrollability, and redundancy of conscious intent. There is extensive evidence that if-then planners act quickly (e.g., [Gollwitzer & Brandstätter, 1997](#), Experiment 3), deal effectively with cognitive demands (i.e., speed up effects still evince under high cognitive load; e.g., [Brandstätter, Lengfelder, & Gollwitzer, 2001](#)), 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; e.g., [Bayer, Achtziger, Gollwitzer, & Moskowitz, 2009](#)), and show uncontrolled attention to the specified cues (i.e., the situational cue specified in the if-part of an implementation intention still receives attention when it is presented in a task that requires ignoring it; [Wieber & Sassenberg, 2006](#)). In line with this latter finding, [Schweiger Gallo, Pfau, and Gollwitzer \(2012\)](#) observed that hypnotic instructions enriched with respective implementation intentions produced an increase in hypnotic responsiveness; importantly, this performance increase was accompanied by a felt involuntariness of responding. Finally, a recent line of research by [Martiny-Huenger, Martiny, Parks-Stamm, Pfeiffer, and Gollwitzer \(2017\)](#) suggests a further process by which implementation intentions achieve effective action control. The authors argue that prospectively planning actions in an if-then format induces sensorimotor simulations of the anticipated situation and the intended action (i.e., enacting the event in the sensory and motor brain areas). Due to their temporal overlap, these activity patterns are assumed to become linked. Whenever the previously simulated situation is encountered, the previously simulated action is partially reactivated through spreading activation and thus more likely to be executed. Empirical support for this line of theorizing is provided by demonstrating that implementation intentions which imply a certain movement (e.g., “If I see an apple, then I will immediately grab it” implies an elbow flexion) facilitate this very movement when the critical situation is later encountered in a different context (e.g., they speed up a pull response in a classification task that requires differentiating apples and other fruits from vegetables by pulling vs. pushing a joy stick).

The most direct test of the hypothesis that action control by if-then plans promotes bottom-up control has been conducted in an fMRI study reported by [Gilbert, Gollwitzer, Cohen, Oettingen, and Burgess \(2009\)](#). In this study, participants had to perform a prospective memory task (assessing whether people forget to act

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The most direct test of the hypothesis that action control by if-then plans promotes bottom-up control has been conducted in an fMRI study reported by [Gilbert, Gollwitzer, Cohen, Oettingen, and Burgess \(2009\)](#). In this study, participants had to perform a prospective memory task (assessing whether people forget to act

on their intentions or not) on the basis of either goal intention 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 of individuals with handicapped top-down action control and demonstrating that they can still benefit in their action control from forming implementation intentions. The participants in these studies ranged from people suffering from schizophrenia or substance abuse (Brandstätter et al., 2001, Studies 1 & 2), patients with frontal lobe damage (Lengfelder & Gollwitzer, 2001), to children with attention-deficit/hyperactivity disorder (ADHD; Gawrilow & Gollwitzer, 2008; Gawrilow, Gollwitzer, & Oettingen, 2011a). For example, response inhibition in the presence of stop signals was found to be improved in children with ADHD when they had formed respective implementation intentions, and this held for other executive functions such as task shifting and working memory performance. Finally, Gawrilow, Gollwitzer, and Oettingen (2011b) analyzed whether delay of gratification can be facilitated by asking children with ADHD to form respective implementation intentions. A computer task was developed in line with the delay of gratification paradigms used by Walter Mischel (1974) and Sonuga-Barke (2002)—waiting in the presence of a suboptimal cue to make money for a delayed optimal cue allowing for a higher total amount of money earned. In two studies, it was observed that the goal intention to do well on the task did not improve performance as compared to a control group that received mere task instructions specifying the reward contingencies. However, when the goal intention was furnished with an implementation intention that linked a waiting response to the suboptimal cue, a significantly higher amount of money was earned, indicating heightened delay gratification.

### The Control of Habitual and Impulsive Responses by If-Then Planning

By assuming that action control by implementation intentions is immediate and efficient, and adopting a simple horse race model of action control (Gurney, Prescott, & Redgrave, 2001), research explored whether people might be in a position to break unwanted impulsive and habitual responses by forming implementation intentions that spell out an antagonistic wanted goal-directed response. The research question was: Could an implementation intention that spells out an antagonistic response to a critical situation outrun an impulsive or habitual response that is otherwise shown to this very situation? Research on the control of impulsive and habitual unwanted responses by the use of implementation intentions has addressed this question by targeting cognitive, affective, and behavioral responses.

With respect to *cognitive* responses it has been shown that implicit stereotyping can be successfully controlled by forming implementation intentions (Gollwitzer & Schaal, 1998; Stewart & Payne, 2008); this even extends to the behavioral expression of such stereotyping (Mendoza, Gollwitzer, & Amodio, 2010). Schweiger Gallo, Keil, McCulloch, Rockstroh, and Gollwitzer (2009, Study 3) analyzed whether it is also possible to curb impulsive *affective* responses by forming implementation intentions. They found that implementation intentions specifying an ignore response in the then-component helped reduce fear in response to pictures of spiders in participants with spider phobia—to the low level that was experienced by participants who did not report any spider phobia. The obtained electro-cortical correlates (the authors used dense-array EEG) revealed that those participants who furnished the goal intention to stay calm with an ignore-implementation intention showed significantly reduced early activity in the visual cortex in response to spider pictures, as reflected in a smaller P1 (assessed at 120 milliseconds [msec] after a spider picture was presented). This finding suggests that the ignore-implementation intention assigned to individuals with a spider phobia achieved a strategic automation of the specified goal-directed response (i.e., an ignore response) when the critical cue (i.e., a spider picture) was encountered, so that—according to the horse

race metaphor—the planned response outran the habitual response (i.e., the fear response).

Various studies have targeted the control of habitual and impulsive *behavioral* responses by implementation intentions. For instance, Cohen, Bayer, Jaudas, and Gollwitzer (2008, Study 2; see also Miles & Proctor, 2008) observed the suppression of habitual responses using a Simon task paradigm; the Simon task allows to compare the control of habitual responses (e.g., grabbing things presented on the right side of the person with the right arm) as compared to nonhabitual responses (e.g., grabbing things presented on the right side with the left arm). Expanding this research to a clinical sample, Marquardt, Cohen, Gollwitzer, Gilbert, and Dettmers (2017) had stroke patients with a mild to moderate hand paresis perform the Simon task before and after they had formed respective if-then plans. A significant Simon effect (i.e., comparatively faster responding in corresponding trials where things need to be responded to with the arm of the side where the stimulus is presented as compared to noncorresponding trials) was observed in both the affected and the nonaffected arm; however, there was no longer a significant Simon effect for trials that were prepared by forming if-then plans. Apparently, making if-then plans effectively reduced the Simon effect for both the affected and the nonaffected arm. Importantly, this recent finding opens a potential new route to improving stroke rehabilitation as if-then plans may qualify as a viable strategy to overcome the commonly observed learned nonuse of the affected arm. Further studies on the control of unwanted automatic responses by implementation intentions analyzed abolishing concept and goal priming effects on behavior (using different concept and goal priming methods; Gollwitzer, Sheeran, Trötschel, & Webb, 2011), and breaking bad eating habits (using a lexical-decision task presenting the unwanted food item as the critical word; Adriaanse, Gollwitzer, De Ridder, De Wit, & Kroese, 2011).

A new line of research on the question of whether implementation intentions can control unwanted habitual responding has focused on *social phenomena* that are known to run off automatically. For instance, Wieber, Gollwitzer, and Sheeran (2014) demonstrated that mimicry effects on social interactions can also be controlled by forming implementation inten-

tions, even though people are not usually aware of the influence of being mimicked on their judgments and behaviors. Although mimicry generally facilitates social interactions, sometimes mimicry effects can hamper the pursuit of focal goals (e.g., when we fall for the persuasive efforts of a salesperson mimicking our bodily and facial expressions). In one of the studies reported by Wieber et al. (2014), participants formed the goal: “I want to be thrifty with my money! I will save my money for important investments!” or an implementation intention regarding this goal “I want to be thrifty with my money! And if I am tempted to buy something, then I will tell myself: I will save my money for important investments!” They were then mimicked by the experimenter who tried to seduce them to spend the money they had earned for participating in the experiment on some leftover coffee vouchers and chocolate bars. As compared to a control group, forming implementation intentions reduced participants’ giving in to the persuasive attempts of the experimenter to spend their money, whereas forming mere goal intentions to be thrifty failed to do so.

Social projection is another quite automatic social phenomenon, and as is true with social mimicry it can have both benefits and costs; for instance, spontaneously thinking that others are like me increases feelings of closeness and thus facilitates social interaction but it may induce costs when I start projecting that the majority of people smoke cigarettes and thus the needed behavior change is hindered. Accordingly, A. Gollwitzer, Schwörer, Stern, Gollwitzer, and Bargh (2017) explored whether implementation intentions could be used for both intensifying and reducing social projection. They found that implementation intentions managed to successfully up-regulate (“If I’m asked to estimate what percentage of people agree with me, then I will remember that other people are similar!”) as well as down-regulated (“If I’m asked to estimate what percentage of other people agree with me, then I will remember that other people are different!”) social projection.

Still, one wonders whether forming implementation intentions always manage to block impulsive and habitual responses? The answer by the *horse race metaphor* is a clear no. If the impulsive or habitual response is based on strong urges or strong habits (Webb, Sheeran, & Luszczynska, 2009) but the if-then guided re-

sponse is based on weak implementation intentions, then the impulsive or habitual response should win over the if-then planned response; and the reverse should be true when weak impulses and habits are sent into a race with strong implementation intentions. Accordingly, controlling behavior that is based on strong impulses or habits requires the formation of strong implementation intentions. One effective strategy for arriving at strong implementation intentions pertains to creating particularly strong links between the specified situational cue (if-part) and the selected goal-directed response (then-part). Knäuper, Roseman, Johnson, and Krantz (2009) found that instructing people to use mental imagery to make if-then plans increased the rate of initiation of the planned response by almost 50%, and Chapman, Armitage, and Norman (2009) observed that for the goal to increase one's fruit and vegetable intake an if-then plan instruction had greater impact than the instruction to simply think of the when, where, and how of acting toward the goal.

What else could strengthen the effects of implementation intentions? For strong implementation intention effects to occur people need to be highly committed to the superordinate goal (e.g., De Nooijer, De Vet, Brug, & De Vries, 2006; Sheeran, Webb, & Gollwitzer, 2005), which is facilitated when the goal is self-concordant (Koestner, Lekes, Powers, & Chicoine, 2002), the self-efficacy to reach the goal is high (Wieber, Odenthal, & Gollwitzer, 2010), there are no doubts whether pursuing the goal is worthwhile or not (Wieber, Sezer, & Gollwitzer, 2014), and one feels energized to move forward (e.g., is angry rather than sad; Maglio, Gollwitzer, & Oettingen, 2014). It was also found that the commitment to the formed implementation intention needs to be high to produce strong effects of if-then planning (e.g., Achtziger et al., 2012, Study 2).

This latter finding has raised the question of whether action control by implementation intentions shows costs in terms of a heightened degree of rigidity (Gollwitzer, Parks-Stamm, Jaudas, & Sheeran, 2008). Research on this question suggests however that goal striving guided by implementation intentions shows neither total rigidity nor total flexibility; instead it is characterized by *flexible tenacity*. Indication of tenacity comes from recent research assessing physiological measures of effort increase

(i.e., cardiac preejection periods, PEPs; Freydefont, Gollwitzer, & Oettingen, 2016). The authors observed that when task difficulty increased, only implementation intention participants continued to display shorter cardiac PEPs and thus mobilized additional effort, while mere goal and control participants failed to mobilize additional effort. But there is also indication that this tenacity shows features of flexibility. Legrand, Bieleke, Gollwitzer, and Mignon (2017) compared action control by implementation intentions with that by goal intentions under different degrees of pleasantness. When performing the goal-directed behavior was only somewhat unpleasant, participants with implementation intentions showed greater persistence than participants with goal intentions. However, when performing the goal-directed behavior became highly aversive (i.e., monetary loss) both goal and implementation intention participants were less likely to perform the goal-directed behavior.

There is a further question though when it comes to the issue of flexibility/rigidity of action control by implementation intentions: Do their effects generalize to similar situations by still triggering the specified action? Studies on promoting physical exercise (Epton & Armitage, 2017) and enhancing safe driving (Brewster, Elliott, McCartan, McGregor, & Kelly, 2016) addressed this question and found that implementation intention effects do generalize to similar situations. In contrast, with dissimilar situations it is observed that implementation intention effects no longer evince (see also Masicampo & Baumeister, 2012; Parks-Stamm, Gollwitzer, & Oettingen, 2007). Finally, Bieleke, Legrand, Mignon, and Gollwitzer (2018) studied the flexibility/rigidity issue with respect to the question of: What will happen when a response is required that differs from the planned one? In a series of experiments, it was found that behavior was impaired when a similar situation required a behavior different from the planned one, suggesting that participants could not withhold the planned response (resembling a habit capture error). Moreover, the results also showed an impaired performance of the planned behavior when participants encountered different situations. No such impairments occurred, however, in different situations that required different responding.

Finally, recent research has addressed a further question: When it comes to controlling an unwanted impulsive or habitual response, are there any other effective kinds of if-then plans? Other than those based on the horse-race model which merely specify an antagonistic response to the unwanted impulsive or habitual response. In various studies, it was observed that indeed another type of if-then plan exists that can also be used to halt acting on the spur of the moment. This type of plan specifies a switch to reflective thinking once the critical situation that triggers unwanted impulsive or habitual responses is encountered (e.g., Doerflinger, Martiny-Huenger, & Gollwitzer, 2017; Bieleke, Gollwitzer, Oettingen, & Fischbacher, 2017). Apparently, people can use such implementation intentions to automate the initiation of deep thinking; they thus prevent being guided by unwanted impulses and habits by planning to think when thinking is needed.

In conclusion, let's return to the question of how the goal concept stimulated research on if-then planning. It is important to recognize that research on if-then planning has benefitted in multiple ways from keeping the goal concept in mind, but two aspects are most prominent. First, the beneficial effects of if-then plans on action control were always considered in comparison to action control by mere goals. Proceeding in this way, it quickly became apparent that making if-then plans qualifies as a powerful self-regulation strategy for closing the commonly observed gap between committing to goals and actually achieving them. It is thus not surprising that forming implementation intentions has become part of many modern-day behavior change interventions (see Oettingen, 2014; Rothman et al., 2015). Second, when exploring the mechanisms underlying the beneficial effects of if-then planning on action control it was quickly recognized that the top-down mechanisms on which action control by goals is based on do not qualify. As a consequence, new mechanisms had to be thought of and bottom-up processes appeared to qualify as the proper alternative mechanism. This ultimately led to the novel hypothesis that people can strategically automate the control of their action by making if-then plans, and this hypothesis received extensive empirical support by the many experiments it stimulated.

## Conclusion and Outlook

The aim of the present article was trying to demonstrate that the goal concept can help to develop and test theories in motivation science. This is exemplified by discussing self-completion theory, the Rubicon model of action phases, and the theory of action control by if-then planning. It is argued that relying on the goal concept helped to elucidate the phenomenon of compensation in people who strive for personal identities (symbolizing the possession of an aspired-to identity), to understand what is implied by moving from undecidedness to feeling determined with respect to realizing one's wishes and desires (crossing the Rubicon), to delineate the distinct cognitive features of the task-congruent mindsets associated with the various phases of action (deliberative vs. implemental mindsets), and to create hypothesis on how implementation intentions differ from goal intentions in how they guide a person's actions (bottom-up vs. top-down control of action).

What has not been addressed yet is how the goal concept can be used to elucidate the classic phenomena studied in motivation science. One such phenomenon that immediately comes to mind is making causal attributions for achieved outcomes (Weiner, 1986). Turning to the goal concept would allow to raise the question of what makes people attribute these outcomes to their goals rather than ability, effort, task difficulty, and luck, and whether goal attributions lead to different downstream consequences than other attributions (e.g., ability attributions). That such a goal approach to causal attributions could provide numerous novel insights is suggested by the very recent research of Olcaysoy Okten and Moskowitz (2018), differentiating between trait and goal attributions with respect to explaining the behavior of others. They discovered that there are distinctive antecedents to trait versus goal attributions related to whether behaviors are performed toward specific entities or not, and whether these behaviors are shown with high or low consistency over time.

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