

## Chapter 10

# Planning and the Control of Action

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Planning has been found to have a powerful effect on human actions (e.g., Gollwitzer & Sheeran, 2006). But how do people plan? In this chapter we first introduce implementation intentions (e.g., Gollwitzer, 1999) as an efficient way of planning. Implementation intentions refer to specific plans in which individuals and groups can specify when, where, and how they intend to act using an if-then format (e.g., “If I come home from work on Fridays, then I will immediately put on my jogging shoes and go for a 30-minute run!”). After we examine how they support goal pursuit, we differentiate between spontaneous and strategic planning—two ways in which if-then plans can be made on the basis of goal-related knowledge.

With respect to spontaneous planning, we highlight the importance of the accessibility of goal-related knowledge. We introduce goal systems theory (Kruglanski, Shah, Fishbach, Friedman, Chun, & Sleeth-Keppler, 2002) as a conceptual framework because it addresses the question of how goals can increase the accessibility of knowledge about when, where, and how to pursue the goal. To illustrate how the accessibility of goal-related knowledge facilitates goal attainment, we discuss a set of recent studies. They show that individuals spontaneously grasp goal-relevant information in the form of implementation intentions (Marquardt, Tröger, Wieber, & Gollwitzer, 2016; see also Marquardt, 2011) even if it is incidentally provided in their environment and that they use this knowledge to improve their goal attainment without being prompted to do so.

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P. Meusburger et al. (eds.), *Knowledge and Action*, Knowledge and Space 9,  
DOI 10.1007/978-3-319-44588-5\_10

169

Regarding strategic planning, we argue that individuals' knowledge about their goals, potential obstacles during goal pursuit, and effective goal-directed actions is central to devising effective plans and to the successful control of action. We introduce Mental Contrasting with Implementation Intentions (MCII; Oettingen, Wittchen, & Gollwitzer, 2013; Oettingen, 2014) as an effective self-regulation strategy with which to systematize the selection of goal-relevant knowledge and the translation of that knowledge into if-then plans. In this chapter we discuss a recent experimental study suggesting that such strategic planning is very useful in unstructured situational contexts that require identification and selection of appropriate goal-relevant knowledge. We further suggest that strategic planning is less useful in structured situational contexts that prompt the goal-directed actions without requiring any knowledge about advantageous opportunities to act and about potential obstacles (Sailer et al., 2015). We conclude by emphasizing how useful spontaneous and strategic planning is for transforming individuals' goal-related knowledge into action.

## Controlling Actions by Goals and Implementation Intentions

In the psychology of action (e.g., Lewin, Dembo, Festinger, & Sears, 1944; Gollwitzer & Bargh, 1996), two phenomena are thought to be relevant to goal pursuit: goal-setting and goal-striving. They are governed by different principles. Goal-setting is concerned with the choice of a desired end state for which to strive (What is being pursued?); goal-striving is associated with moving toward the desired end state (How is the goal being pursued?). Goals are thereby defined as desired end states that people intend to attain and to which they commit themselves (Gollwitzer & Oettingen, 2012). For individuals to commit themselves firmly to a goal, they must perceive it as highly desirable and feasible. These assessments are based on an individual's knowledge about a potential pursuit of the goal. Knowing that sunny weather has been forecast and having no commitments for the coming weekend, for example, one might judge a weekend trip to a nearby national park as both desirable and feasible and might consequently commit oneself to the goal of going on a weekend trip to that place.

Nonetheless, even when individuals have strongly pledged themselves to a goal, such commitment does not guarantee successful goal attainment. This fact is referred to as the intention-behavior gap (e.g., Sheeran, 2002). In a meta-analysis by Webb and Sheeran (2006), for instance, a moderate-to-large change ( $d = 0.66$ ) in the strength of individuals' intentions resulted in only a small-to-moderate change in the individuals' behavior ( $d = 0.36$ ). In considering why the transition of one's intention into goal-directed actions might fail, researchers (e.g., Gollwitzer & Sheeran, 2006) have identified several typical problems that have to be overcome during goal-striving. People must start acting on a goal, persist or even intensify their efforts in the face of difficulties or obstacles, shield their goal from interferences or distractions, abandon ineffective means or even the goal itself if it becomes

obviously unattainable, and economize on their limited resources to self-regulate their actions. Knowledge about the when, where, and how of striving toward a goal is necessary, but not sufficient, for successfully attaining it. Even when individuals know how to pursue a goal, they might struggle to turn their knowledge into goal-directed actions. Strategies that allow effective regulation of one's thoughts, feelings, and actions during goal-striving are needed. One time- and cost-efficient strategy to promote individuals' goal-striving is to devise implementation intentions for planning when, where, and how one intends to act (Gollwitzer, 1993, 1999, 2014; overview by Wieber, Thürmer, & Gollwitzer, 2015b). In implementation intentions, people specify a well-suited or critical future situation and link an adaptive goal-directed response to it in an if-then format. For example, a person intending to learn a new language might opt for one of the following implementation intentions: "If I am finished eating my Sunday morning breakfast, then I will work through one lecture of the language course on my computer," or "If 'New E-mail' notifications pop up while I am working on the language course on my computer, then I will ignore them."

What is so special about such simple if-then plans? Researchers studying the processes underlying the effects of implementation intentions have systematically tried to answer to this question. Essentially, implementation intentions are at the junction of controlled and automatic processes (e.g., Evans, 2008; Strack & Deutsch, 2004). The intentional formation of if-then plans typically emerges from deliberation on when, where, and how to act. By contrast, the implementation of goal-directed action in response to an existing, specified, critical situation entails features of automaticity (e.g., Bargh, 1994): Effects of implementation intentions have been observed to be immediate and efficient, and once the specified situation is encountered they come about without requiring extensive deliberation on how to respond (e.g., Aarts, Dijksterhuis, & Midden, 1999; Webb & Sheeran, 2007, 2008; Wieber & Sassenberg, 2006).

Indeed, empirical evidence suggests that forming implementation intentions in addition to mere goals leads to faster responses to critical situations (e.g., Parks-Stamm, Gollwitzer, & Oettingen, 2007) and improved performance in a secondary task without compromising the simultaneous performance in a primary task (i.e., speed-up effects are still evident under high cognitive load; e.g., Brandstätter, Lengfelder, & Gollwitzer, 2001). This research also suggests that there is no need for a further conscious intent to act in a critical moment. For instance, Bayer, Achtziger, Gollwitzer, and Moskowitz (2009) found that implementation intentions encouraged successful pursuit of a goal even when the critical cue was presented subliminally, that is, when it was not consciously recognized. Moreover, studies of the human brain have found evidence that implementation intentions change action control from slow top-down to fast bottom-up processes (e.g., Gilbert, Gollwitzer, Cohen, Oettingen, & Burgess, 2009; Schweiger Gallo, Keil, McCulloch, Rockstroh, & Gollwitzer, 2009; Hallam et al., 2015). In summary, implementation intentions strategically automate the control of goal-directed actions, instantly and efficiently activating the action response linked to a critical situation when the individual enters it.

## The Role of Knowledge Accessibility in Planning and in the Control of Action

To assist the individual's pursuit of a goal effectively, implementation intentions need to specify relevant critical situations in the if-component and instrumental responses in the then-component (see also Gollwitzer, Wieber, Myers, & McCrea, 2009). Prior studies have generally observed that people can indeed identify and self-select suitable situations and responses (e.g., Adriaanse, de Ridder, & de Wit, 2009; Gollwitzer & Brandstätter, 1997). In fact, both experimenter-provided and self-generated implementation intentions have been shown to foster goal attainment effectively (Armitage, 2009). But how do people generate effective plans?

Individuals have to access goal-relevant knowledge before they can further process this information. Generally, psychological research shows wide agreement that knowledge accessibility is important for individuals' cognition and behavior (overview by Wyer, 2008). As for the accessibility of goal-related knowledge, goal systems theory (Kruglanski et al., 2002) affords a helpful conceptual framework for understanding how pursuing a goal affects the accessibility and application of knowledge that is relevant to planning. This theory rests on a cognitive approach to motivation. Its proponents apply a network conceptualization that allows for dynamic and malleable modeling of the activation and permits application of cognitive content to motivation content. Within this "motivation-as-cognition" approach, goal systems are defined as "the mental representations of motivational networks composed of interconnected goals and means" (Kruglanski et al., 2002, p. 333). Given this connectedness of goals and means, the activation of a mental representation of a goal should also activate the mental representation of suitable means to pursue this goal. When this idea is applied to planning, it follows that when one is pursuing a goal (e.g., to prepare a healthy dinner), knowledge of possible means that is relevant to planning the when, where, and how of goal-striving becomes easily accessible (e.g., thinking of the salad in one's fridge and of the tomatoes that one has to purchase on the way home).

Two properties of the interconnections are thus especially interesting for the activation of goal-relevant knowledge: structure and strength. As far as the structure of the interconnections are concerned, the number of means that are attached to a goal can vary. For one person, activating the physical fitness goal might activate only the means of going to the gym, but for another person it might activate a multitude of means (e.g., going to the gym, riding a bike to work, and taking the stairs). In addition to such interindividual differences, the number of means connected to a goal might also vary from one goal to the next. For instance, there might be numerous ways to pursue the goal of eating healthily (e.g., eating at least five portions of fruit and vegetables a day, drinking water rather than soft drinks) but only a few ways to pursue the goal of acquiring a driver's license (i.e., taking the official test). Concerning the strength of the interconnections, one may expect the strength of the cognitive association between the goal and the means for achieving it to be stronger when the number of those means is relatively low than when it is relatively high.

Going to the gym will probably be more likely to come to one's mind if it is the only means rather than one of several that are connected to one's physical fitness goal. In summary, the structure and strength of the goal-means interconnections relating to a given goal seem relevant to planning because the activation of knowledge about potential means is a starting point for individual planning. Thus, the activation of the goal should ease the access to the knowledge relevant to the when and where (the if-component) and to the how (the then-component) of implementing that goal.

### ***Spontaneous Use of Incidentally Presented Goal-Relevant Information***

Given the importance of accessibility, one might wonder whether incidental knowledge that is offered in an external context is also used by individuals to support their pursuit of a goal. In other words, are individuals capable of grasping goal-relevant knowledge about suitable opportunities, potential obstacles, and instrumental action strategies without much conscious effort?

Studies by Marquardt et al. (2016) addressed this question. They tested whether incidentally furnished goal-relevant information favors subsequent goal attainment. Moreover, they investigated whether the spontaneous use of incidentally provided implementation intentions depends on the activation of the particular goal. The authors expected that individuals would make spontaneous use of incidentally provided implementation intentions—but only when the goal had been previously activated.

Marquardt et al. (2016) first examined whether incidentally communicated plans can promote high school students' achievement in a school setting. Initially, the researchers implicitly activated the achievement goal of the participating students by having them work on a crossword puzzle containing either achievement-related words (achievement-goal condition) or neutral words (no achievement-goal-control condition). Priming the goal rather than asking individuals to set the goal themselves was intended to reduce the likelihood that they would try to plan consciously. To induce spontaneous implementation intention, all students in the study completed on paper a puzzle about sentence construction. It presented 34 sentence fragments in scrambled order. The task of the students was to (a) form six meaningful sentences by connecting the fragments and (b) write down these sentences. All six sentences had been composed as conditional phrases (if-then structure). The only difference between the intention conditions was that one of the six sentences in the implementation-intention condition was relevant to the subsequent creativity task ("If I have found a use, then I will instantly search for the next use."), whereas none of the six sentences in the no-achievement-goal condition and the mere-achievement-goal condition were relevant to the subsequent creativity task.

Students then worked on an ostensibly unrelated alternative-uses task (Guilford, 1967), in which they had to write down as many different ways of using a matchbox

as possible. The number of different ways that students came up with was used to measure the effects of the manipulations of the goal and the plan. The results showed that participants in the achievement-goal-plus-implementation-intention condition found more uses for a matchbox than did the participants in the mere-achievement-goal and no-achievement-goal-control conditions. Thus, giving goal-relevant information (i.e., the implementation intention) improved goal attainment even when the information was delivered incidentally (i.e., before participants knew that it constituted an effective planning strategy for performing well on a later task). These findings tentatively bear out our argument that people can spontaneously use goal-related knowledge to bolster their goal attainment.

To corroborate these findings, Marquardt et al. (2016) ran a second study on the spontaneous use of goal-relevant knowledge. This time, the degree to which the individuals' healthy-diet goal benefited from incidentally shared plans to eat healthily was tested in a university cafeteria. The study was divided into two parts. The first part took place in the morning and served to manipulate participants' goal to eat healthily. Participants either read a short text of evidence-based arguments for a balanced diet with five portions of fruits and vegetables a day (healthy-diet goal condition) or a neutral text on nutrition science in Germany (no-goal-control condition), which was approximately the same length and had no words related to the healthy-diet goal.

Below the goal manipulation texts, a graphical display was positioned on the information sheet. This display was used to manipulate the incidentally offered plan. In all three conditions—no-healthy-diet-goal-control (A), mere-healthy-diet-goal (B), and mere-healthy-diet-goal-plus-implementation-intention (C)—participants received pictorial information on how to act on the healthy-diet goal. The graphical display consisted of three photographs showing the cafeteria's salad bar, the vegetable bar, and the fruit shelf (each seen from the perspective of an individual standing directly in front of it). All participants therefore had identical information on the how of eating healthily at the cafeteria. However, only participants in condition C received two additional pieces of information. First, to the left of the three photographs, the participants saw one photograph of the cafeteria entrance. This image thus depicted a suitable opportunity for them to act on their healthy-diet goal and can be thought of as specifying the if-component of an implementation intention. Second, they saw an arrow pointing from the picture of the cafeteria entrance to the three photographs of the suitable responses (i.e., selecting salad, fruit, and/or vegetables). The arrow thereby connected the different pictures and was an equivalent to the link between the if-component and the then-component in verbal implementation intentions. In summary, participants in condition C received information on the how of goal pursuit (photographs of the salad bar, the vegetable bar, and the fruit shelf), the when and where (picture of the cafeteria entrance), and a graphical link between the pictures that implied the characteristic structure of the if-then condition.

The second part of the experiment took place during lunch time. Participants completed a questionnaire after they had finished their meal at the cafeteria. They indicated how many portions of salad, vegetables, and fruit they had consumed

there on which day. The total sum was used to measure the effects that the goal and plan manipulation had on the diet of the participants. Participants in condition C consumed a greater quantity and variety of healthy foods than did participants in either condition A or B. Thus, passing on if–then information that was relevant to planning improved goal attainment even when this information came incidentally (in this case, through a graphical display).

Together, these findings further underline the importance of knowledge accessibility for individuals' goal pursuits. People readily used their newly acquired goal-related knowledge to conceive if–then plans for their goal attainment spontaneously. In our view, such spontaneous planning highlights the fact that automatic processes can be instrumental in the adaptive control of action. It is, however, important to note that the spontaneous planning occurred on the basis of an activated goal, further indicating that effects of implementation intention depend on the activation of a superordinate goal (Sheeran, Webb, & Gollwitzer, 2005).

### *Strategic Use of Goal-Relevant Knowledge with MCII*

The use of goal intentions to guide action is aided by the coactivation of means associated with a goal. However, identifying and forming effective if–then plans might vary in difficulty, depending on the individual, the situation, and the specific goal. It may well be that neither the automatic activation of goal-related knowledge nor the spontaneous acquisition and use of incidentally presented goal-relevant information is enough to guide individuals' actions successfully when pursuing the goal is difficult (e.g., when that pursuit is cognitively or motivationally demanding). A goal can be difficult for reasons related to the individual, such as internal obstacles (e.g., ego control or procrastination; see Gollwitzer, Bayer, & McCulloch, 2005; Wieber & Gollwitzer, 2010, *in press*). Or it may be difficult because of the situation, that is, because of external obstacles (e.g., distractions; see Wieber, von Suchodoletz, Heikamp, Trommsdorff, & Gollwitzer, 2011). Whatever the case, individuals must carefully select the action they include in the if- and then-components of their implementation intentions. Depending on the goal at hand and on the existing ideas about goals and means, individuals might either narrow their focus to fewer situations and responses or extend the range of situations and responses they take into account when pursuing their goal. If people experience problems with sticking to a healthy diet when watching TV in the evening, they might want to address this situation specifically. Or when people experience problems with recognizing opportunities to exercise, they might want to expand the situations and means connected to their physical fitness goal.

A systematic guide to planning would be helpful for such challenging goal pursuit, and that guide exists—the preparation of if–then planning by means of mental contrasting (e.g., Oettingen et al., 2009; Oettingen, Pak, & Schnetter, 2001; for summaries see Oettingen, 2012, 2014). Mental contrasting brings individuals to actively search through their goal-relevant knowledge and select or even derive

critical situations and suitable responses. In the application of the strategy, individuals are asked to formulate a personal wish, to imagine positive future outcomes of realizing that wish, and to mentally contrast these outcomes with current potential obstacles to their goal-striving. Mental contrasting thereby increases the accessibility of both a positive future vision and the current reality, instilling a sense that action is necessary. Moreover, mental contrasting is thought to activate relevant expectations that allow for an adjustment of personal goal commitment (a person's attachment to a goal or the decisiveness to reach it; Locke, Latham, & Erez, 1988). If the expectation of reaching the desired outcome is high, commitment is strengthened by mental contrasting; if it is low and effort might be in vain, commitment is weakened and individuals disengage.

In the next step, MCII guides individuals in using this knowledge of potential obstacles and in detecting instrumental responses to each of them. Corroborating the effectiveness of combining mental contrasting and implementation intentions, one study found that MCII participants reported greater success at reducing their unhealthy snacking consumption than did participants who used either only mental contrasting or only implementation intentions (Study 2 in Adriaanse et al., 2010). According to this line of thought, MCII is likeliest to contribute to one's goal attainment when the strategic search for one's goal-relevant knowledge and planning can make a difference. MCII is less likely to do so when one's environment prompts the when, where, and how of goal-directed actions to begin with.

One study by Sailer et al. (2015) addresses this argument. The authors ran an MCII intervention study on physical exercise in a clinical context. Previous research had indicated that regular exercise can have positive effects on both the physical and mental health of persons with schizophrenia. However, shortcomings in cognition, perception, affect, and volition make it especially difficult for people with schizophrenia to plan a behavior and follow through on it. As a result, studies that had incorporated exercise reported poor attendance and high drop-out rates, indicating that schizophrenic patients were not able to overcome the manifold barriers to physical activity. Sailer et al. therefore tested whether MCII helps convert schizophrenic individuals' exercise intentions into behavior while taking into account the supportiveness of the situational context.

The patients diagnosed with a schizophrenic spectrum disorder lived in either an autonomy-focused setting (a self-supply ward with daytime care by nurses, medical doctors, and psychologists) or a highly structured setting (a ward providing intense therapy to activate patients and affording continuous availability of psychiatric care). Whereas participants in the autonomy-focused setting had to manage attending the exercise groups on their own, those in the highly structured setting were actively reminded and invited to each exercise session. The authors predicted that engaging in MCII would help individuals attain their exercise goals in the autonomy-focused setting (in which each search and application of goal-relevant knowledge depended on the patients themselves) but not in the highly structured setting (in which the environment made the relevant information available in order to prompt the goal-directed actions). To test this prediction, participants who agreed to participate in the study were randomly assigned to an information-plus-goal-intention

condition (control group) or an information-plus-MCII condition (MCII group). Patients in the control group read a nonfiction text on the benefits of physical activity and on potential obstacles for which one must prepare (e.g., motivational problems and tiredness). They then set the goal to attend jogging sessions and wrote it down. Patients in the MCII group read the same nonfiction text and then worked through the MCII strategy, listing three positive outcomes associated with attending the exercise session (e.g., losing weight) and three obstacles (e.g., feeling tired). Next, they identified their most important obstacle and, with their therapist, worked out a specific solution to this obstacle before translating it into an implementation intention in the if-then format: "If [obstacle], then I will [response]." In both groups participants were treated by a trained therapist during individual training sessions that involved an equal amount of contact between the therapist and each of the patients.

The attendance and persistence of the patients in the exercise program of the participating clinics during the 4 weeks after their treatment was measured as the dependent variable. In both the autonomy-focused and the highly structured setting, two jogging sessions were scheduled every week and did not conflict with therapies or other events. During jogging sessions, participants could run at their own pace and decide how long they wanted to run. Results in the highly structured setting showed that MCII and control participants alike attended about 70 % of the offered exercise sessions. In the autonomy-focused setting, however, control participants attended less than 40 % of the sessions, whereas the MCII participants continued attending about 70 % of them. When it comes to successful goal attainment, these findings demonstrate the importance of self-regulating one's goal pursuits and goal-striving in rather unstructured situations. When goal-directed actions were prompted contextually, MCII did not improve goal attainment, for it was already rather high. But when goal-related knowledge mattered because remembering and initiating the goal-directed actions was up to individuals, MCII did improve goal attainment. These findings imply that the MCII self-regulation strategy constitutes a time- and cost-efficient action-control tool that helps patients with severe mental illness (see also Toli, Webb, & Hardy, 2016) to achieve their health-related goals in an autonomous setting.

### ***Strategic Planning of the Automatic Activation of Goal-Relevant Knowledge***

In addition to the spontaneous and strategic planning described above, planning with implementation intentions can also be beneficial as a context-sensitive reminder of one's strategies or goals that supports reflective decision making and goal-directed actions. This strategic use of the automatic effects of planning with implementation intentions is related to the demands that have been postulated for human-centered computer systems in information management. The aim in the

interaction between humans and computers in sociotechnical systems is to communicate the right information at the right time and the right place in the right way to the right person in order to empower that person to find and select the best goal-directed response (e.g., Fischer, 2012). Implementation intentions might also be used to achieve this end.

First, implementation intentions provide the relevant information about instrumental action responses in critical situations during goal pursuit. In a study on group decision-making (Thürmer, Wieber, & Gollwitzer, 2015a, 2015b), participants set themselves the goal of performing well. In keeping with this goal, they then either generated the specific goal of reviewing the advantages of the nonpreferred alternatives before making a group decision (control condition) or included this strategy in the implementation intention: “And when we finally take the decision sheet to note our preferred alternative, then we will go over the advantages of the non-preferred alternatives again” (Thürmer et al., 2015a, p. 104). As a result of this small difference in planning, implementation-intention groups succeeded more often than mere goal-intention groups at transforming their respective intentions into actions and thereby improving their goal attainment. Apparently, implementation intentions provided the strategy information to the group members just before the group decision was taken and thereby oriented them in their search for the best solution to the issue on which they were about to decide.

Second, implementation intentions have also been found to be capable of activating one’s goal at a critical juncture and thereby increasing the impact of this goal on individuals’ cognition and behavior (van Koningsbruggen, Stroebe, Papies, & Aarts, 2011). In a study on dieting, unsuccessful dieters either formed a think-of-dieting implementation intention (“The next time that I am tempted to eat chocolate [cookies, pizza, French fries, or chips], then I will think of dieting”) or just indicated why it was important for them to resist the temptation to eat chocolate [cookies, pizza, French fries, or chips]. In a subsequent word-completion task, participants in the implementation-intention condition were instructed to fill in unfinished words (e.g., \_ij\_e\_) that were preceded by one of the five food cues (e.g., chocolate). In completing the task, they used diet-related words (e.g., *lijnen*, Dutch for dieting) instead of neutral words (e.g., *tijger*, Dutch for tiger) more often than control participants did. Evidently, implementation intentions reminded individuals of their dieting goal when they encountered a tempting situation (Study 1) and thus empowered unsuccessful dieters to reduce their consumption of palatable foods (Study 2). Together, the findings of these studies (Thürmer et al., 2015a, 2015b; van Koningsbruggen et al., 2011; see also Wieber, Thürmer, & Gollwitzer, 2015a) demonstrate that strategic automation of action control by planning with implementation intentions can serve goal attainment even when a reflective decision needs to be made or when individuals are not aware of instrumental action strategies at the time of planning.

## Conclusion and Outlook

In this chapter we have examined the role that knowledge has in planning and action control. We have stressed that knowing which goal one intends to pursue and committing oneself to that goal are often only the first step toward successful goal attainment. Planning when, where, and how to act with implementation intentions has proven to be an effective self-regulation strategy for reducing this intention–behavior gap. Regarding the acquisition and use of plan-relevant knowledge, we have argued that individuals have a variety of ways to form implementation intentions. They range from spontaneous planning of how to approach a goal on the basis of accessible goal-related knowledge to strategic planning that includes a systematic search of knowledge for critical situations and instrumental action responses.

With respect to spontaneous planning, we have argued that the activation of a goal coactivates goal-relevant knowledge and thus greatly facilitates the decision on when, where, and how to pursue the goal. Although this automatic coactivation is likely to be an adaptive mechanism that promotes successful control of action most of the time, it can also hinder behavioral change. For instance, having the goal of getting to work might automatically induce one to take the car rather than use public transport, even if one intends to adopt a sustainable lifestyle (e.g., Bamberg, 2000). In that sense, strategic planning is a powerful self-regulatory tool informing behavioral change. In fact, authors of meta-analyses of effects that implementation intention has on physical activity (Bélanger-Gravel, Godin, & Amireault, 2013) and eating behavior (Adriaanse, Vinkers, de Ridder, Hox, & de Wit, 2011) found that implementation intentions successfully aid the translation of individuals' intentions into action. The strategic automation of action control by implementation intentions has even been found to remind the individual of a useful reflective strategy (Thürmer et al., 2015a), to reinforce one's goal in a critical situation (van Koningsbruggen et al., 2011), or to foster the restructuring of automatic goal–means connections that are required to change habitual behavior (e.g., Adriaanse, Gollwitzer, de Ridder, de Wit, & Kroese, 2011). Combining mental contrasting and implementation intentions in order to extend planning has proven more effective than either mental contrasting or implementation intentions alone (Study 2 in Adriaanse et al., 2010). Hence, strategic planning with MCII appears to be an especially effective tool for encouraging individuals to make effective use of their goal-relevant knowledge and thus improve the attainment of their goals. In summary, the planning research we have presented in this chapter highlights the adaptive role of spontaneous and strategic planning in turning an individual's knowledge into action.

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