Stepping back while staying engaged: On the cognitive effects of obstacles
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Chapter 1  General Introduction and Overview

How do people deal with obstacles to their goals? How do the basic ways in which we perceive and process information from our environment change when we realize that an essential ingredient for the dinner we are just about to cook for our romantic date is missing, when the main sponsor for the film festival we are organizing cancels all commitments, or when we think about how to overcome the biggest possible obstacles to our personal goals? Are the changes in our thinking and perception elicited by such obstacles conducive to dealing with them?

This dissertation has two aims. First, it seeks to shed light on the basic cognitive processes that are elicited when people try to deal with obstacles to their goals. Second, it aims to examine how these cognitive processes might be functional. More specifically, the following chapters address the questions of whether and when people respond to obstacles by mentally "stepping back" and "looking at the big picture", as well as how "stepping back to see the big picture" might help them to find more creative means.

Before immersing into the empirical research, I will introduce several obstacle-related concepts that have been examined in the past and will specify how obstacles are defined in the current work. I will then present theoretical perspectives and empirical findings regarding the affective, motivational, and cognitive consequences of obstacle-related concepts. Along the way, I will identify gaps in previous research that this dissertation aims to close. Finally, I will present my own perspective on the cognitive effects of obstacles, which is mainly based on Lewin's (1935) field theory and on recent research on global versus local processing styles (for a review, see Förster & Dannenberg, 2010), psychological distance (for a review, see Liberman & Trope, 2008), construal levels (for a review, see Trope & Liberman, 2010), and novelty (Förster, Marguc, & Gillebaart, 2010; see also Förster, Liberman, & Shapira, 2009). I will end the introduction with a short overview of the research reported in each of the empirical chapters.

What Are Obstacles?

According to the Oxford English Dictionary (http://oed.com), an obstacle is "something that stands in the way or that obstructs progress (lit. and fig.); a hindrance, impediment, or obstruction." In the psychological literature, the term has been used somewhat loosely and at times synonymously to other concepts such as difficulty (e.g., Vallacher & Wegner, 1987, 1989; Wegner & Vallacher, 1986; Wegner, Connally, Shearer, & Vallacher, 1983; Wegner, Vallacher, Macomber, Wood, & Arps, 1984), frustration and goal-blockage (e.g., Berkowitz, 1989; Burnstein & Worchel, 1962; Dollard, Doob, Miller,
Mowrer, & Sears, 1939; Geen, 1968; Geen & Berkowitz, 1967; Klinger, 1975; Lewis & Ramsay, 2005; Martin & Tesser, 1989, 1996; Strube, Turner, Cerro, Stevens, & Hinchey, 1984), or temptations (e.g., Fishbach, 2009; Zhang & Fishbach, 2010). One might thus be tempted to conclude that anything that can render goal pursuit more tedious also constitutes an obstacle. However, is this really the case? Do the different concepts all refer to the same thing? How have they been used and studied in the past? What are the similarities and differences between obstacle-related concepts that describe some kind of interference people might experience while they are pursuing a goal and the current definition of obstacles?

Related Concepts

**Difficulty.** The most generic concept related to obstacles is probably difficulty. Indeed, there are many factors, including obstacles, goal-blockage, frustration, interruption, a sense of disfluency, or physical barriers that can add difficulty to a certain goal pursuit. However, research by Vallacher, Wegner and colleagues (e.g., Vallacher & Wegner, 1987, 1989; Wegner & Vallacher, 1986; Wegner et al., 1983, 1984) specifically focused on difficulty. This research typically referred to situations in which a routine action was rendered more difficult or tedious and the solution to the problem was very clear because the specific means towards the goal were either obvious or specified in advance. For example, participants could simply use more strength to lift a heavy, unwieldy mug versus a regular mug (Wegner et al., 1984) or they were explicitly instructed to use chopsticks rather than their hands in order to eat Cheetos snacks (Wegner et al., 1983).

Even though such research is informative about what happens when people know what to do upon facing difficulty, it does not tell us what happens when the solution to a problem is not all that clear. The present research aims to close this gap by focusing specifically on situations in which people first need to **figure out** how to deal with a problem.

**Goal-blockage, frustration, and interruption.** Given that obstacles stand in the way of reaching a desired end-state, one might also be inclined to consider them as a case of goal-blockage (e.g., Lewis & Ramsay, 2005; Martin & Tesser, 1989, 1996), frustration (e.g., Berkowitz, 1989; Dollard et al., 1939; Geen, 1968; Klinger, 1975), or interruption (e.g., Atkinson 1953; Weiner, Johnson, & Mehrabian, 1968; Zeigarnik, 1927). However, a close look at research and theorizing on the latter concepts reveals that they have been primarily used to describe situations in which the initial goal can
no longer be reached. For example, in typical studies on goal-blockage and frustration participants had to work on unsolvable puzzles or tasks (e.g., Geen, 1968; Geen & Berkowitz, 1967; Strube, Turner, Cerro, Stevens, & Hinchey, 1984) or a confederate would continuously disrupt them and ask questions until it was clear that they could no longer attain their assigned goal (e.g., Burnstein & Worchel, 1962; Geen, 1968). Similarly, in studies on interruption (e.g., Atkinson 1953; Weiner et al., 1968; Zeigarnik, 1927) participants could typically not resume their assigned tasks or activities after the interruption and were thus prevented from completing them within the experimental session.

Such research provides important insights about what happens when it is clear that a specific goal cannot be attained. However, it does not suffice to answer questions concerning how people deal with obstacles in daily life. After all, when people encounter an obstacle to their goals, they often do not know at first whether or not it can be overcome. Therefore, the focus of the current work is on situations in which the interference can, at least potentially, be overcome.

**Fluency versus disfluency.** The concept of fluency, which has been defined as "a subjective experience of ease or difficulty associated with a mental process" (p. 238, Oppenheimer, 2008; see also Alter & Oppenheimer, 2009), has recently gained considerable interest in psychology (for a review, see Alter & Oppenheimer, 2009). Numerous sources of fluency have been identified, including, for example, conceptual fluency (e.g., previously primed vs. not primed concepts, Reder, 1987; Whittlesea, 1993), perceptual fluency (e.g., easy-to-read versus difficult-to-read fonts, Alter & Oppenheimer, 2008; Novemsky, Dhar, Schwarz, & Simonson, 2007; Simmons & Nelson, 2006), linguistic fluency (e.g., easy-to-pronounce versus difficult-to-pronounce words; Alter & Oppenheimer, 2008), memory-based fluency (e.g., low versus high number of items to retrieve, Schwarz et al., 1991; see also Tversky and Kahneman, 1973), and embodied fluency (e.g., smiling versus furrowing one’s eyebrows; Stepper & Strack, 1993; Strack & Neumann, 2000).

Given that obstacles might produce a subjective experience of difficulty associated with a particular goal pursuit, one might wonder whether they are just another source of disfluency. Indeed, there seems to be some overlap. However, a major difference between previously studied sources of fluency versus disfluency and obstacles is that the former have been explicitly associated with the performance of cognitive tasks (see Alter & Oppenheimer, 2009; Oppenheimer 2008), whereas the latter can be associated both with cognitive tasks and with tasks or situations that are
not very cognitive to begin with. To illustrate, an injury could be an obstacle to an athlete and a sore throat could be an obstacle to an opera singer. Hence, although there are some similarities, the concept of fluency—as it is currently used—does not seem to capture the range of situations in which obstacles may occur. In addition, it is unclear to what extent fluency effects reflect goal-related processes.

**Barriers.** In his field theory, Lewin (1935) described "barriers" as restraining forces that create detour problems because they stand in the way of reaching a desired object and require an initial movement away from the most direct path in order to attain it. He gives examples of children trying to grasp a piece of chocolate on the other side of a bench, trying to get a ring off a long vertical stick, and trying to sit down on a chair or a stone while approaching it with their face turned forward. One aspect shared by these examples is that the children need to depart from the most direct path in order to attain their goal: To obtain the piece of chocolate, they first need to move around the bench; to take the ring, they first need to pull it up rather than towards them; and to sit down on the chair or the stone, they first need to turn their face away from it. Another shared aspect is that these examples all refer to physical barriers. In fact, even the Oxford English Dictionary (http://oed.com) defines the term "barrier" as a "fence or material obstruction of any kind erected (or serving) to bar the advance of persons or things, or to prevent access to a place." Based on this definition and on the examples provided by Lewin (1935), one could say that barriers constitute the most prototypical kind of obstacle. Indeed, an image that might come to mind immediately when hearing the word "obstacle" could be a race in which people (or horses) literally jump over, climb, or run around physical barriers on the way to their goal. But the range of obstacles people can encounter in their goal pursuits is much more diverse. In fact, obstacles can even be immaterial (i.e., they can be purely imagined or “felt”) such as when people's lack of motivation prevents them from studying for an important exam. Hence, although the term barrier describes the most prototypical example of an obstacle, it is somewhat limited because it typically refers to *physical* objects blocking the path from A to B.

**Obstacles in The Current Work**

Given the variety of obstacle-related concepts that have been studied in the past, the various situations in which obstacles may occur (e.g., private, clinical, work), and the diverse shapes that they can take (e.g., physical, mental, social), my approach to defining the term "obstacle" was to search for what they all have in common: They act as *interfering forces* (Higgins, 2006) that prevent people from reaching their goals along
the most direct or initially intended path and thus require them to figure out how to accomplish what they want to do despite the obstacle (Marguc, Förster, & Van Kleef, 2011). In other words, something constitutes an obstacle if (a) it directly interferes with a goal pursuit or is perceived as something that needs to be overcome and (b) the solution is not immediately clear. As is the case with many phenomena in social psychology, some factors rendering goal pursuit less smooth may naturally qualify as obstacles (i.e., "objective" obstacles), whereas other factors only act as obstacles when people construe them as something they need to overcome (i.e., "subjective" obstacles).

**Objective obstacles.** Objective obstacles are interfering forces that directly interfere with goal pursuit. For example, a network downtime would naturally constitute an obstacle to a blogger whose work largely depends on being online. To resume her work, the blogger would need to find ways to deal with the problem, such as calling the internet provider, going to an internet cafe, scribbling preliminary ideas on a piece of paper, and so forth. Similarly, an injury might directly interfere with a professional dancer’s typical way of earning a living. To secure his or her income, the dancer would have to figure out how to overcome the problem and, for instance, think about how others have dealt with such a situation, become a choreographer, work in a less physically demanding profession related to dancing, or make use of other talents that can be turned into money. In short, something constitutes an "objective obstacle" if it directly interferes with the most straightforward, usual, or initially intended path to a goal and the specific means for how to deal with the problem are not self-evident.

**Subjective obstacles.** There are also factors, such as nuisances and temptations, that do not directly interfere with a goal pursuit, but that can act as an obstacle if they are perceived as such (see also Fishbach & Shah, 2006). For instance, a construction site in front of the window is, as such, irrelevant to the task of finding the right words for a screenplay and is thus unlikely to interfere directly with an author’s attempt to finish the next piece. However, if the author were bothered by the noise and considered it an obstacle to overcome, he or she would need to figure out how to deal with it and the situation would be similar to the one described above. Likewise, the smell of a freshly baked chocolate cake is, as such, irrelevant to my task of writing this introduction. However, if I were bothered by the smell and construed the temptation to eat a piece of cake as something I need to overcome, it would act as an obstacle and I would have to find a way to deal with it. In other words, even if something does not directly interfere with a goal or task at hand, it might constitute a "subjective obstacle" if it is construed as something that needs to be overcome and for which a solution needs to be found.
To sum up, many obstacle-related concepts have been studied in the past and each of them shares some aspects with the current definition of obstacles. However, the former have typically been used to describe situations that are somewhat different from the ones studied in this dissertation. More specifically, in prototypical studies on difficulty, the solution to a problem was rather clear (Wegner et al., 1983, 1984); in studies on goal-blockage, frustration, and interruption the goal could never be reached (e.g., Atkinson 1953; Burnstein & Worchel, 1962; Geen, 1968; Geen & Berkowitz, 1967; Strube, et al., 1984; Weiner et al., 1968; Zeigarnik, 1927); the term fluency has been defined in relation to cognitive tasks (e.g., Alter & Oppenheimer, 2009; Oppenheimer, 2008); and the term barriers typically refers to situations involving physical objects preventing direct access to a desired object or end-state (OED, 2011; see also Lewin’s examples, 1935). By contrast, the current definition of obstacles refers to situations in which the solution to a problem is not self-evident, in which the original goal can at least potentially be achieved, and that need not be restricted to cognitive tasks or physical objects blocking the path from A to B.

Consequences of Obstacles and Obstacle-Related Concepts

Affective Consequences

Because obstacles interfere with smooth progress to our goals, the first association one might have is that they should make us "feel bad". Indeed, research has shown that goal-blockage leads to negative arousal (e.g., Lewis & Ramsay, 2005) and that frustration increases aggressive tendencies (e.g., Berkowitz, 1989; Dollard et al., 1939). Blockage or frustration of highly valued personal goals was even posited to precede the development of depression (see Klinger, 1975). However, as mentioned earlier, these types of interference refer to situations in which people can no longer reach their goal. Would obstacles that can potentially be overcome have the same effects? Would the likelihood or intensity of negative affective responses decrease with the extent to which people perceive obstacles as being surmountable? Such assumptions are part of some models on motivation and coping, and there is evidence suggesting that this is indeed the case (e.g., Bandura, 1993, 1998; Folkman, 1984; Lazarus & Folkman, 1984).

Acknowledging the possibility that obstacles may influence people's mood and given the fact that positive versus negative mood influences the more basic ways in which people perceive and process information from their environment (e.g., Cacioppo, Berntson, & Crites, 1996; Easterbrook, 1959; Fredrickson, 2001; Fredrickson &
Branigan, 2005; Gasper, 2004; Gasper & Clore, 2002; Isen & Daubman, 1984; for reviews, see Baas, De Dreu, & Nijstad, 2008; Friedman & Förster, 2010), mood was measured in every study of this dissertation. However, because the main aim of the current work was to examine the cognitive effects of obstacles per se rather than the effects of emotions caused by obstacles, the studies presented in the empirical chapters focused on mild forms of obstacles that can potentially be overcome and that are unlikely to elicit strong negative emotions.

**Motivational Consequences**

Do obstacles increase or decrease motivation? Do they make a desired end-state more or less attractive? Indeed, research suggests that both might be the case. For example, Mischel and Masters (1966) have shown that pleasant activities (e.g., watching an entertaining movie) become even more attractive when they are interrupted and cannot be resumed. Similarly, Driscoll, Davis, and Lipetz (1972) have shown that romantic couples feel even more in love when their parents disagree or interfere with their relationship. More recently, research examining the impact of adverse task circumstances on value has shown that opposing an interfering background noise (e.g., words) while solving an anagram task increases the subjective value of a prize associated with good performance on the task, whereas coping with a non-interfering nuisance (e.g., dentist drills) decreases its value (Higgins, Marguc, & Scholer, 2011; see also Scholer & Higgins, 2009). The results from the former studies can be explained within the framework of reactance theory (Brehm, 1966; Brehm & Brehm, 1981). By contrast, the latter results speak to the more recent regulatory engagement theory (Higgins, 2006; Higgins & Scholer, 2009). According to this theory, trying to oppose or overcome the impact of an interfering stimulus may increase engagement in the focal task and thereby create value, whereas trying to cope with the negative feelings produced by a nuisance may decrease engagement in the focal task and thereby reduce value.

Although increased motivation can be adaptive for overcoming obstacles, there are also situations in which it would be better to disengage and turn to more promising endeavors (e.g., Wrosch, Scheier, Carver, & Schulz, 2003; Wrosch, Scheier, Miller, Schultz, & Carver, 2003). In line with this reasoning, research by Oettingen and colleagues (e.g., Oettingen, 2000; Oettingen, Hönig, & Gollwitzer, 2000; Oettingen, Pak, & Schnetter, 2001; for a review, see Oettingen & Stephens, 2009) has shown that when people first think about the positive aspects of a desired future and then elaborate on the negative aspects of the present standing in the way of the desired future, they either
increase or decrease their commitment depending on whether their expectancies are high or low. By contrast, when people elaborate only on the positive aspects of the desired future, only on the negative aspects of present reality, or on negative aspects of present reality before the positive aspects of a desired future, they do not align their commitment with relevant expectancies. Presumably, this is because mentally contrasting a desired future with negative aspects of present reality renders both the future and the present very accessible and highlights the fact that one stands in the way of the other, eliciting a necessity to act. This in turn leads people to consider chances of success and increase or decrease their commitment accordingly.

One conclusion one may draw from this research is that for adaptive striving in the face of obstacles, people may be well advised to consider how an obstacle relates to their goal rather than to ignore the obstacle or focus on it so much that they lose sight of their goal. But, one might wonder, do people really do this? Do they spontaneously look at the "bigger picture" upon facing an obstacle? What happens on a basic cognitive level when people are confronted with an obstacle? With these questions, I now turn to the main theme of this dissertation, the cognitive consequences of obstacles.

Cognitive Consequences

In the past, researchers interested in the cognitive consequences of obstacles and obstacle-related concepts have mainly focused on questions concerning their impact on how much and on how people think about their goal pursuit. For example, research on the Zeigarnik effect (Zeigarnik, 1927, for a review, see Butterfield, 1964) has shown that accessibility and recall are higher for interrupted activities compared to completed ones (Marsh, Hicks, & Bink, 1998; see also Förster, Liberman, & Higgins, 2005). In line with this finding, Martin and Tesser (1989; 1996) theorized that blockage of highly valued personal goals can cause rumination (i.e., excessive thinking about the blocked goal). Others suggested that obstacles or difficulties encountered during goal pursuit might lead people to momentarily disrupt goal-directed behavior and evaluate the likelihood of reaching their goal despite the interference (Carver & Scheier, 1990). Notably, such disruption does not mean disengagement, because people are cognitively still preoccupied with their goal pursuit.

Addressing the question of how people think about an activity that is made unusually difficult, Wegner and colleagues asked participants to eat Cheetos snacks with chopsticks rather than with their hands (Wegner et al., 1983) or to drink coffee from an unwieldy, heavy mug rather than from a regular one (Wegner et al., 1984).
Their results suggest that rendering routine actions such as eating or drinking extraordinarily difficult leads people to describe those actions in more concrete rather than abstract terms (e.g., “moving food to my mouth” as opposed to “stilling my appetite”). This is in line with the assumption that "routine, familiar actions are best maintained with respect to relatively high-level identities" (Vallacher & Wegner, 1989, p. 664), whereas "successful performance of difficult actions depends on lower-level identification" (Wegner & Vallacher, 1986; p. 563). In other words, when a routine action becomes unusually difficult, focusing on the mechanics of that action may sometimes be necessary for sustained performance.

Interestingly, research on fluency (Alter & Oppenheimer, 2008) has shown that instructions written in a difficult-to-read (i.e., disfluent) as opposed to an easy-to-read (i.e., fluent) font led participants to describe a city mentioned in those instructions in more abstract rather than concrete terms. This suggests that the impact of difficulty on people’s thinking might be less straightforward than was originally assumed.

In sum, researchers have been quite preoccupied with the cognitive consequences of interruptions and other difficulties people might experience while performing a task or pursuing a goal. However, there are some questions that previous research cannot answer. For example, how do people cognitively respond to obstacles that can potentially be overcome and to which the solution is not very clear? How do obstacles influence the more basic ways in which people perceive and process information from their environment? Might the cognitive effects of obstacles reach beyond the goal or task with which they interfere? These questions were the focus of the present research.

**Stepping Back While Staying Engaged**

Basketball player Michael Jordan once said, "Obstacles don’t have to stop you. If you run into a wall, don’t turn around and give up. Figure out how to climb it, go through it, or work around it." This quote is interesting because it alludes to two important aspects of the current research: First, when people want to overcome obstacles to their goals, they need to stay engaged—if they drop the problem, the process of figuring out what to do will be unlikely to even start. Second, when people stay engaged, they need to figure out what to do, that is, how they might reach their goal despite the obstacle.

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1 Retrieved on August 1, 2011, from: http://www.searchquotes.com/Michael_Jordan/Obstacles/quotes/
Almost eighty years ago, Lewin (1935) theorized that in order to find ways to overcome a barrier, people needed to perceive the entire situation "such that the path to the goal becomes a unitary whole" (p. 83). Moreover, he suggested that adopting an overall perspective should be easier to the extent that people can psychologically distance themselves from the situation at hand and detach from the motivational pull of the goal without disengaging altogether.

Indeed, empirical evidence for these assumptions was lacking at the time I started this project. However, research has shown that global versus local processing (i.e., a focus on the forest versus the trees) promotes understanding (see Fiske & Neuberg, 1990; Förster, Marguc, & Gillebaart, 2010; Förster & Dannenberg, 2010) and creative thinking (Friedman, Fishbach, Förster, & Werth, 2003; see also Förster & Denzler, 2011), both of which seem useful for dealing with obstacles. Similarly, psychological distance versus proximity (i.e., the extent to which something is subjectively far versus close relative to the directly experienced "me", "here", "now"), which is related to global versus local processing (Liberman & Förster, 2009a, 2009b), has been associated with increased creativity (Förster, Friedman, & Liberman, 2004; Jia, Hirt, & Karpen, 2009) and other effects that could potentially help people deal with obstacles to their goals. For example, greater psychological distance has been shown to enhance self-control (Metcalfe & Mischel, 1999; Mischel, Shoda, & Rodriguez, 1989; for conceptually similar findings, see Fujita, 2008; Fujita & Roberts, 2010; Fujita, & Sasota, 2011), to align people's behavioral intentions with their higher-order values as opposed to momentary feasibility concerns (Eyal, Sagristano, Trope, Liberman, & Chaiken, 2009; see also Fujita, Eyal, Chaiken, Trope, & Liberman, 2008; Kivetz & Tyler, 2007), and to reduce distress from negative experiences (Ayduk & Kross, 2009; 2010a; 2010b; Kross & Ayduk, 2008, 2011).

Based on Lewin’s (1935) theorizing and these recent findings, I reasoned that as people deal with obstacles throughout their lives, they might implicitly learn that mentally stepping back and looking at the bigger picture can be useful for dealing with obstacles. Over time, they might develop a mental stepping back response, which includes an "if obstacle, then global" routine and an "if obstacle, then distance" routine, is stored in procedural memory (Tulving & Schacter, 1990), and can be elicited spontaneously whenever people are trying to deal with an obstacle.

Because such routines activate cognitive procedures, which are by definition content-free, they can carry over from the situations or tasks in which they were elicited to content-wise completely unrelated ones (Schooler, 2002; Schooler, Fiore, &
Brandimonte, 1997; Schooler, Ohlsson & Brooks, 1993; see also Förster, Liberman, & Friedman, 2007; Förster, 2009). For example, the cognitive procedures activated while one is solving analytical tasks can carry over to and enhance or impede performance on subsequent tasks depending on whether those require the same or different procedures (Schooler, 2002). Illustrating the same principle in a very different content domain, Förster, Epstude and Özelsel (2009) found that participants primed with love versus sex (e.g., by asking them to imagine a situation of love without sex or a situation involving casual sex without love) expressed comparatively more thoughts about future events (see also Förster, Özelsel, & Epstude, 2010) and performed better on a subsequent creative insight task, which benefits from global processing. This is in line with the assumption that romantic love is often associated with long-term attachment goals and spending a life together (Mikulincer, 1998; Mikulincer & Shaver, 2007; Diamond, 2003, 2004), whereas lust is often associated with the "here" and "now" and does not necessarily involve long-term goals (see Sprecher & Regan, 1998). In light of such findings, I assumed that if obstacles increase global processing and psychological distance, their effects could also carry over to situations or tasks that are content-wise completely unrelated to the ones in which the obstacle originally appeared.

Notably, there are situations in which an "if obstacle, then global" routine or an "if obstacle, then distance" routine might not be elicited. For example, when people are not very concerned with following through and staying on track with what they are doing or when the obstacle does not interfere with their own path to their goal, but with someone else's path to their goals, adopting a more global, distanced perspective would be of little use. Therefore, the model proposed in this dissertation not only suggests that obstacles can increase global processing and psychological distance, but also specifies when this should be most likely to happen.

The chapters to follow tested the prediction that obstacles should increase global processing (Chapter 2) and psychological distance (Chapter 3) primarily when people are highly engaged and inclined to follow through with what they are doing (rather than when they are less engaged) and when the obstacle appears on their own path to a goal (rather than on other people's paths to their goals). The final empirical chapter (Chapter 4) examined whether one function of the cognitive processes elicited by obstacles might be to promote a search for more creative means.
Overview of Empirical Chapters

Chapter 2. When Obstacles Elicit Global Processing

The first part of Chapter 2 (Marguc et al., 2011) examined the question of whether an "if obstacle, then global" routine exists. In Study 2.1, participants first solved verbal anagrams either in the presence of an auditory obstacle (i.e., an interfering background noise) or in silence. Subsequently, they completed an unrelated task measuring perceptual scope in terms of response times to global and to local features of composite target figures (Navon, 1977; see also Derryberry & Reed, 1998; Förster, Friedman, Özelsel, & Denzler, 2006). Pointing towards the subjective nature of obstacles, all participants in Study 2.2 solved verbal anagrams in the presence of a task-irrelevant background noise that was either framed as an "obstacle to overcome" or as a "distraction to ignore." To examine effects on more complex cognition, participants then rated the typicality of various exemplars (e.g., "camel", "motorbike", "yacht") for given categories (e.g., "vehicle"). This task is based on the notion that unusual exemplars are more likely to be included into broad rather than narrow categories or, in other words, when people process globally rather than locally (see Isen & Daubman, 1984; Friedman & Förster, 2000; Förster & Denzler, 2011). Using eye tracker methodology, Study 2.3.a examined whether encountering an obstacle in a computerized maze leads to more global perception within the same task. To assess whether obstacles also increase people’s perceptual scope compared to doing nothing, participants in Study 2.3.b navigated a computerized maze with an obstacle, without an obstacle, or did nothing at all before completing the same global-local reaction time measure that was used in Study 2.1.

The second part of this chapter went beyond a purely mechanical effect, examining motivational factors that determine when an "if obstacle, then global" routine will most likely be triggered. This part acknowledges the fact that sometimes people may not be very engaged in what they are doing (e.g., they might think about what else they would prefer to do instead) and that in such situations processing more globally in response to obstacles would be of little use. Accordingly, Study 2.4 examined whether participants high in chronic engagement would be more likely than those low in chronic engagement to focus on the overall Gestalt rather than the details of geometrical figures (Kimchi & Palmer, 1982; Gasper & Clore, 2002) after navigating a computerized maze with an obstacle rather than without an obstacle. Moving beyond perception, Study 2.5 examined whether participants high in chronic engagement would also be more likely than those low in chronic engagement to perform better on
tasks requiring active integration of seemingly unrelated concepts after navigating a maze with an obstacle rather than without an obstacle. Study 2.6 conceptually replicated Study 2.5 using a newly developed manipulation of engagement. This allowed for testing whether situational factors, such as working environments in which persistence versus multitasking are valued, can also lead to high or low engagement in ongoing activities and thereby influence people's cognitive responses to obstacles.

Chapter 3. When Obstacles Increase Psychological Distance

Because psychological distance is related to global processing (Liberman & Förster, 2009a, 2009b) and increasing psychological distance in response to obstacles constitutes a cognitive procedure that is, as such, content-free, Chapter 3 (Marguc, Van Kleef, & Förster, in press) examined the impact of obstacles and engagement on the sense of psychological distance between oneself and other objects. In Study 3.1, participants were first confronted with a goal-relevant or a goal-irrelevant obstacle to a social goal. Subsequently, they were asked to estimate the spatial distance between their current location and a city that had not been mentioned before (see also Liberman & Förster, 2009b). Taking engagement into account, Study 3.2 examined whether participants high rather than low in chronic engagement would be more likely to increase psychological distance after thinking about how to reach a personal goal with versus without an obstacle. In this study, a new measure of psychological distance, using font size estimates, was introduced. This measure was based on the notion that objects tend to look smaller from afar and on research showing that motivational factors influence size perception (e.g., Veltkamp, Aarts, & Custers, 2008; van Koningsbruggen, Stroebe, & Aarts, 2010). Study 3.3 conceptually replicated Study 3.2 by manipulating engagement experimentally (see Study 2.6) and assessing the impact of obstacles encountered in a computerized maze on estimates of yet another spatial distance (i.e., the distance between "here" and Central Station).

Chapter 4. How Dealing With Obstacles Sparks Goal-Related Creativity

Addressing the question of how the mental stepping back response discovered in the previous chapters might help people to deal with obstacles to their goals, Chapter 4 examined whether the cognitive processes elicited by obstacles promote a search for more creative means. In Study 4.1, participants first thought about how to reach a social goal with versus without an obstacle. Then they were asked to rate the typicality of various exemplars for given categories, some of which were relevant for problem solving and some of which were irrelevant. It was predicted that if a mental stepping
back response to obstacles is functional, participants should broaden especially those categories that are relevant rather than irrelevant for problem solving (see also De Dreu & Nijstad, 2008). Finally, moving beyond a passive broadening of categories, Study 4.2 assessed whether thinking about how to reach an important study goal with versus without an obstacle would also lead participants to actively generate more original means. In addition, because abstract categories (e.g., people) are typically broader and more inclusive than concrete categories (e.g., children; see Liberman, Sagristano, & Trope, 2002) and abstract thinking has been posited to facilitate creative problem solving (see Finke, 1995; Förster et al., 2004; Ward, 1995), this study examined whether abstract thinking might mediate the impact of obstacles on originality.

In sum, the three empirical chapters assessed the impact of obstacles and engagement on global versus local processing (Chapter 2), on psychological distance (Chapter 3), and on creative problem solving (Chapter 4). In each chapter, various manipulations and dependent measures were used. Because Chapters 2-4 were each written as separate research articles, they can be read independently and readers will notice some overlap between theoretical introductions and methods sections.