Stepping back while staying engaged: On the cognitive effects of obstacles
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Chapter 4  Obstacles and Creativity

This chapter is based on: Marguc, J., Förster, J., & Van Kleef, G. A. (2011). A camel is a camel is a vehicle... How obstacles promote creative goal pursuit. Manuscript submitted for publication.
Obstacles are common in goal pursuit: The road to work is blocked by a construction site; a doctor travelling on an airplane has to treat an emergency without the proper tools around; a student preparing for an exam has to juggle social life with studying; an injured dancer has to find ways to secure her income. Given the variety of obstacles (e.g., physical, social, mental) and the diverse contexts in which they may occur (e.g., private, work, clinical), we define obstacles by what they all have in common: They represent interfering forces (Higgins, 2006) that impede the standard course of action and thus require people to find out how they can achieve their goal despite the obstacle (see also Marguc, Förster, & Van Kleef, 2011).

How do people overcome such obstacles? Almost eighty years ago, Lewin (1935) theorized that to overcome a barrier, people need to perceive the entire problem situation such that the "path to the goal becomes a unitary whole" (p. 83). He also argued that psychologically distancing oneself without disengaging from the problem should facilitate taking an overall perspective. Indeed, recent studies suggest that completing a task with compared to without an obstacle leads people to focus more on the overall Gestalt rather than the details of objects and to use more inclusive conceptual categories in unrelated tasks (Marguc et al., 2011). In line with research showing bi-directional links between global processing (i.e., a broad perceptual and conceptual scope) and psychological distance (i.e., the subjective experience that something is far versus close relative to "me, here, now"; see Trope & Liberman, 2010), studies further revealed that obstacles increase psychological distance, leading people to estimate unrelated places to be further away from their own location (Marguc, Van Kleef, & Förster, in press).

Such findings are informative about the basic cognitive processes elicited by obstacles. However, are such processes really functional? How might adopting more global, distanced perspective help people to overcome obstacles and ultimately reach their goals? The present research aims to answer these questions by drawing on a growing body of research on construal level theory (CLT; for a review, see Trope & Liberman, 2010) and GLOMO\(^6\) (for a review, see Förster & Dannenberg, 2010) that has repeatedly revealed links between global processing, psychological distance, and creative thinking. For example, studies have shown that attending to the overall Gestalt versus the details of objects leads people to think of more unusual category exemplars

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\(^6\)Previous research on the cognitive effects of related phenomena often involved situations in which participants could not resume activities after a disruption or the specific means with which to perform an action were specified beforehand (e.g., Zeigarnik, 1927; Marsh, Hicks, & Bink, 1998; Wegner, Vallacher, Macomber, Wood, & Arps, 1984). By contrast, we are interested in what happens when obstacles can potentially be overcome and people need to find out how to reach their goal themselves.
and to generate more creative uses for a brick (Friedman, Fishbach, Förster, & Werth, 2003). Furthermore, a distant versus close future time perspective has been found to increase performance on creative insight and creative generation tasks (Förster, Friedman, & Liberman, 2004). People also perform better on such tasks if those are described as originating from a distant versus close location (Jia, Hirt, & Karpen, 2009).

These associations suggest that one function of the cognitive processes elicited by obstacles might be to help people find more creative means. Going beyond earlier research on global versus local processing styles that mainly focused on the broadening or narrowing of categories *in general* (i.e., a completely loose creative thinking style; e.g., Friedman & Förster, 2000; Marguc et al., 2011) we thus assume that in the context of obstacles broadening *especially* those categories that are relevant for problem solving should be more functional than broadening all kinds of categories. To illustrate, if one wants to organize a film festival but lacks funding, broadening the category of "potential funding sources" would seem more promising than broadening the category of "vegetables". This reasoning is in line with research by De Dreu and Nijstad (2008) showing that a conflict mindset leads to a broadening of conflict-related (e.g., weapons), but not of conflict-unrelated (e.g., clothes) categories.

We tested our prediction that obstacles should increase goal-related creativity in two studies. In Study 4.1, participants imagined a scenario in which in which they had to overcome an obstacle on the way to a birthday party, or not. Subsequently, they rated the typicality of objects for goal-relevant and goal-irrelevant categories. In Study 4.2, we went beyond a rather passive broadening of categories to examine whether people also actively *generate* more original means when dealing with obstacles. Participants first specified an important study goal and either thought of the biggest possible obstacle that might interfere with reaching it, or not. Then they were asked to generate as many means as possible. All participants were probed for suspicions, remunerated, thanked, and debriefed.

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7 In both studies, we controlled for mood and motivation to reach the goal after the manipulations. These factors had no effect and are not discussed further.
Study 4.1

Participants

Sixty-four Dutch native speakers (51.6% female; \( M_{\text{age}} = 25.53, \text{SD} = 10.31 \)) completed an online questionnaire for the possibility of winning an MP3 player. Two participants who did not follow task instructions and two who guessed the purpose of the study were excluded from analyses.

Materials and Procedure

Participants were told that the questionnaire comprised several unrelated studies on perspective taking and object evaluation. Their first task was to imagine one of several ostensibly randomly selected scenarios. All participants read that they were in the car driving to the birthday party of their best friend who lives in another Dutch city and whom they have not seen for a while. To bolster motivation, the scenario contained statements such as "you would really like to take this opportunity to see your friend" and "you have bought a nice present and even baked your friend’s favorite chocolate cake". Participants in the obstacle [no-obstacle] condition further read that due to heavy storms their road [a road elsewhere in the Netherlands] was blocked by a fallen tree. Their next task was to think of how they could get to their friend’s birthday party despite the blockage [how they would drive to their friend’s birthday party by car]. As a manipulation check, participants were asked how strenuous it would be to go there (1 = *not at all*; 9 = *very much*).

Subsequently, participants completed a variant of the breadth of categorization task used by Friedman and Förster (2000; see Isen & Daubman, 1984; Rosch, 1975). They rated the typicality (1 = *not typical*, 9 = *typical*) of nine exemplars for each of three randomly presented categories (*vehicles, clothing, vegetables*). In each category, there were three good, three intermediate, and three poor exemplars. Because the poor exemplars are most indicative of a broader conceptual scope, they were the main focus of our analysis. Based on our functional-broadening hypothesis, we predicted that obstacles would significantly broaden the category of vehicles (goal-relevant) but not the categories of clothing or vegetables (goal-irrelevant). As others, we used the intermediate and good exemplars to control for overall shifts in response bias (Isen & Daubman, 1984; Friedman & Förster, 2000). Here, we did not expect any effects because these exemplars should be included anyway.
Results and Discussion

**Conceptual scope.** We computed mean typicality ratings for poor exemplars (a) across categories and (b) for each category separately. Overall, participants in the obstacle-condition gave higher ratings to poor exemplars than participants in the no-obstacle condition. Looking at individual categories, results further revealed that whereas ratings for the goal-irrelevant categories of clothing and vegetables were non-significantly higher, ratings for the goal-relevant category of vehicles were significantly higher in the obstacle condition compared to the no-obstacle condition (for an overview, see Table 1). This supports our functional-broadening hypothesis. To control for overall shifts in response bias, we performed the same analyses on mean ratings of intermediate and good exemplars, but found no effects, all $F < 1$.

**Table 1**

*Mean typicality ratings for poor exemplars (vehicles: camel, elevator, foot; clothing: ring, handbag, cane; vegetables: seaweed, pickles, rice) overall and per category (Study 4.1; SD in parentheses). Only the category of vehicles was relevant to reaching the goal (i.e., attending a birthday party in another city).*

<table>
<thead>
<tr>
<th></th>
<th>No-Obstacle</th>
<th>Obstacle</th>
<th>$F(1,58)$</th>
<th>$p$</th>
<th>$\eta^2_p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>3.46 (1.15)</td>
<td>4.07 (1.00)</td>
<td>4.79</td>
<td>.03</td>
<td>.08</td>
</tr>
<tr>
<td>Vehicles</td>
<td>4.15 (1.77)</td>
<td>5.07 (1.57)</td>
<td>4.49</td>
<td>.04</td>
<td>.07</td>
</tr>
<tr>
<td>Clothing</td>
<td>1.98 (0.98)</td>
<td>2.49 (1.50)</td>
<td>2.53</td>
<td>.12</td>
<td>.04</td>
</tr>
<tr>
<td>Vegetables</td>
<td>4.24 (1.84)</td>
<td>4.63 (1.51)</td>
<td>0.82</td>
<td>.37</td>
<td>.01</td>
</tr>
</tbody>
</table>

**Manipulation check.** As expected, participants in the obstacle condition ($M = 6.10, SD = 2.47$) considered the trip to be more strenuous than participants in the no-obstacle condition ($M = 4.39, SD = 2.16$), $F(1,58) = 8.26, p = .006, \eta^2_p = .13$. However, perceived strenuousness as a covariate did not influence conceptual scope, all $F < 2.44$, all $p > .12$.

In sum, Study 4.1 shows that dealing with an obstacle leads people to broaden especially goal-relevant categories and thereby open up to more unusual means. This finding goes beyond earlier studies (Marguc et al., 2011), suggesting that the cognitive processes elicited by obstacles might promote goal pursuit in the face of obstacles by enabling people to think of a broader range of *goal-relevant* rather than *goal-irrelevant* behaviors.
In Study 4.2, we went one step further to examine whether people not only passively open up to, but also to actively generate more original means when dealing with an obstacle. Moreover, because abstract categories (e.g., organisms) are frequently broader than concrete categories (e.g., flowers; see Liberman, Sagristano, & Trope, 2002) and because abstract thinking has been posited to facilitate creative problem solving (e.g., Finke, 1995; Förster et al., 2004; Ward, 1995), we examined whether the link between obstacles and originality might be mediated by a more abstract construal of means. To illustrate, participants tackling an obstacle might construe the goal of "passing all exams" more in terms of "showing self-discipline" (more abstract) than in terms of "going to the library" (less abstract), and because one can show self-discipline in more diverse ways than going to the library, the former might facilitate finding more original means.

**Study 4.2**

**Participants**

Forty students at the University of Amsterdam (87.5% female; \(M_{\text{age}} = 20.90, SD = 2.88\)) participated for €7. Two participants who did not follow task instructions were excluded from analyses.

**Materials and Procedure**

After several unrelated tasks, participants were introduced to our "study on personal goals" and were asked to name their most important study goal for the next six months (e.g., "to pass all exams", "to get through to the next year"). Subsequently, participants in the obstacle condition specified the biggest possible obstacle that might interfere with reaching their goal (e.g., "lack of time", "lack of motivation"). Participants in the no-obstacle condition proceeded directly with the next task. This task, for which all participants had three minutes, involved listing as many means as possible for how they could reach their goal [despite the obstacle].

**Measures**

**Originality.** Two independent coders (Cronbach's \(\alpha = .87\)), who were blind to hypotheses and conditions, rated each means listed by asking themselves "To what extent is this suggestion infrequent, novel, and original?" and assigning a value between 1 (not original at all) and 9 (very original), respectively. The mean of the two scores was our measure of originality.
Abstractness. Two independent coders (Cronbach's $\alpha = .96$), one of whom was different from those who rated originality, rated the abstractness of each means listed based on the linguistic category model (LCM) manual (Coenen, Hedebouw, & Semin, 2006), assigning higher values to more abstract statements ($1 = \text{most concrete}; 4 = \text{most abstract}$). Differences or cases in which one of the coders was unsure were resolved by discussion. The mean of the two scores was our measure of abstractness.

Results and Discussion

As predicted, participants in the obstacle condition generated more original means ($M = 3.12, SD = 1.00$) than participants in the no-obstacle condition ($M = 2.36, SD = .66$). The former also evidenced more abstract thinking ($M = 2.08, SD = .31$) than the latter ($M = 1.90, SD = .23$). A bootstrap test (5,000 resamples) using mean-centered variables (Preacher & Hayes, 2008) further revealed a significant indirect effect of obstacles on originality through abstractness, which rendered the direct effect of obstacles on originality non-significant (see Figure 4.1). Accordingly, participants who had to deal with an obstacle generated more creative means by thinking more abstractly.

![Diagram](image-url)

Figure 4.1. Mediated effect of self-generated obstacles on the originality of means to reach a study goal (Study 4.2). Overall model: $R^2 = .31, F(2,35) = 8.01, p = .001$; Indirect effect: 95% confidence interval (CI) bootstrap percentile = .02, .31.
Final Remarks

Two studies showed that dealing with an obstacle sparks goal-related creativity. That is, thinking about how to reach a goal with versus without an obstacle led participants to broaden especially goal-relevant categories (Study 4.1) and to generate more original means by thinking more abstractly (Study 4.2). These findings are the first to suggest that the cognitive processes elicited by obstacles (see Marguc, Förster, & Van Kleef, 2011; Marguc, Van Kleef, & Förster, in press) are indeed functional. Moreover, the fact that participants in Study 4.1 broadened specifically goal-relevant categories questions the notion that global/local processing styles are entirely independent of content, as research focusing on carry-over effects from one context to another might suggest (e.g., Friedman et al., 2003; Liberman & Förster, 2009; Macrae & Lewis; 2002; Marguc et al., 2011). Rather, when goals are involved, processing styles seem to have a certain directedness (see also De Dreu & Nijstad, 2008). Researchers investigating global/local processing styles may therefore need to take into account what goals might be active in their studies, as goals might render effects more specific.

Although our rationale was based on Lewin's (1935) field theory, GLOMOsys (Förster & Dannenberg, 2010), and CLT (Trope & Liberman, 2010), one might also consider our findings in light of research by Oettingen and colleagues (for a review, see Oettingen & Stephens, 2009). This research suggests that construing aspects of the present reality as obstacles to a desired future by mentally contrasting the future with the present creates goal commitment and, together with implementation intentions (i.e., plans specifying when, where, and how an action is taken; Gollwitzer, 1999), promotes successful striving (Adriaanse, Oettingen, Gollwitzer, Hennes, De Ridder, & De Wit, 2010; Duckworth, Grant, Loew, Oettingen, & Gollwitzer, 2011). To the extent that our manipulation in Study 4.2 resembles mental contrasting, our findings imply that mental contrasting might not only support striving through motivational factors, but also through cognitive factors that increase goal-related creativity.

Finally, our findings have practical implications. For example, one might help people who fail to naturally adopt a more global, distanced perspective in response to obstacles (e.g., because they are in a very bad mood, see Förster, Liberman, & Shapiro, 2009; Isen & Daubman, 1984) to get unstuck by asking them to look at the skyline, to imagine their lives ten years from now, or to think about how their friend would solve the problem. In organizations plagued by a "we have always done it that way" mentality, one might spark innovation by imposing obstacles onto daily routines. Altogether, our research shows that the cognitive processes elicited by obstacles (see Marguc, Förster,
& Van Kleef, 2011; Marguc, Van Kleef, & Förster, in press) are functional: They promote a search for more creative means.