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Marguc, J.; van Kleef, G.A.; Förster, J.

DOI

[10.1111/caim.12071](https://doi.org/10.1111/caim.12071)

Publication date

2015

Document Version

Final published version

Published in

Creativity and Innovation Management

[Link to publication](#)

Citation for published version (APA):

Marguc, J., van Kleef, G. A., & Förster, J. (2015). Welcome interferences: dealing with obstacles promotes creative thought in goal pursuit. *Creativity and Innovation Management*, 24(2), 207-216. <https://doi.org/10.1111/caim.12071>

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Welcome Interferences: Dealing with Obstacles Promotes Creative Thought in Goal Pursuit

Janina Marguc, Gerben A. Van Kleef and Jens Förster

Life often presents us with obstacles to goals and the work arena is no exception. Two studies examined whether dealing with such obstacles promotes creative thought in goal pursuit. In Study 1, thinking about how to reach a goal with (versus without) an obstacle led participants to broaden especially goal-relevant categories, which suggests that people first and foremost open up to more unusual means when tackling an obstacle. Moving beyond a passive broadening of categories, thinking about how to reach a goal with (versus without) an obstacle in Study 2 also led participants to actively generate more original means. Together these findings suggest that people's basic cognitive responses to obstacles are in the service of goals. Theoretical and organizational implications as well as the role of motivation and emotions are discussed.

Introduction

Goal pursuit sometimes resembles an obstacle course and the work arena is no exception: the projector might break down just before a presentation, entrepreneurs might have to launch their new startup with minimal funding, employees might struggle with too many tasks, and architects might have different views of what a building should look like than their clients. Given the variety of events (e.g., objects, persons, mental states) that can hinder progress to goals, we adopt an operational definition of obstacles as interfering forces (Higgins, 2006) that prevent people from reaching their goals along the most direct or initially intended path and therefore require them to figure out what to do (Marguc, Förster & Van Kleef, 2011).¹ Recent research revealed that obstacles can elicit a more holistic (Marguc, Förster & Van Kleef, 2011) and distant perspective (Marguc, Van Kleef & Förster, 2012), both of which have been associated with creative thinking (e.g., Friedman et al., 2003; Förster, Friedman & Liberman, 2004; Jia, Hirt & Karpen, 2009). But what do these findings mean in the context of the origi-

nal goal? How far do people open up their minds when tackling an obstacle? Can obstacles really increase goal-related creativity? These are the questions the current research seeks to address.

The Importance of Creative Means Generation

Undoubtedly, goals can often be attained in fairly uncreative manners. A person can take the same route to work every day and a patisserie can be highly successful by sticking to traditional recipes. Following tried-and-true paths to goals may indeed be less error prone and appear less risky than diverting from them. However, the costs of this approach can also outweigh its benefits. People could collaborate across continents prior to e-mail and scientists could conduct research without online databases. But doing so was more time consuming and expensive than it is today. Looking even further back in history, creative means generation may have evolutionary advantages. The invention of new tools, for instance, allowed humans to hunt larger game (Buss, 2011) and thereby helped to promote

individual and group survival. Even though unwanted consequences can occur, such as the widespread use of cars having contributed to pollution, tackling those consequences paradoxically again requires considering more unusual means to reach the same goal. Creative means generation might thus gradually add to an overall improvement of circumstances through new forms of collaboration, new products or tools.

The Role of Obstacles in Innovation

Might an upside of obstacles be the very fact that they take us off the beaten track? Both anecdotal evidence and research on related topics (e.g., Moreau & Dahl, 2005; Stokes, 2005; Miron-Spektor, Gino & Argote, 2011) seem to corroborate this notion. Janet Echelman's building-sized sculptures (www.echelman.com) made of fishnet only came to exist because the artist's paint went missing on a working trip. Similarly, the budget for the sci-fi movie *Mars et Avril* was just a fraction of the usual costs for comparable productions. The director Martin Villeneuve consequently faced numerous obstacles to realizing his cinematic vision. Yet, he claims that this only improved the results (Torgovnick, 2013). Finally, leaders in IT and design, including Marissa Mayer who was the public face of Google and is now CEO at Yahoo! (2006), John Kolko who founded the Austin Center for Design (2011), and Steve Jobs who was the co-founder and later CEO of Apple (see Fischer, 2012), share the view that obstacles and similar problems might be catalysts for innovation. Moving beyond such anecdotal evidence, the current research aims to examine experimentally whether dealing with obstacles to goals indeed promotes creative thinking about means.

Basic Cognitive Effects of Obstacles

Theoretically, our research is rooted in Lewin's (1935) theorizing about barriers, which can be considered the most prototypical kind of obstacle because they literally interfere with moving from a current location or state A to a desired location or state B along the most straightforward path. In his view, barriers can be overcome by perceiving the entire situation such that the 'path to the goal becomes a unitary whole' (p. 83). Moreover, he proposed that increasing psychological distance without disengaging from the problem should facilitate the adoption of an overall perspective.

In line with this theorizing and assuming that people face obstacles throughout their lives, a recent series of studies (Marguc, Förster & Van Kleef, 2011) examined whether obstacles can prompt people to routinely

adopt a more *global processing style* (i.e., a perceptual and conceptual focus on 'the forest' rather than 'the trees'; for a review, see Förster & Dannenberg, 2010a, 2010b). In one study, participants solving verbal anagrams with versus without an interfering background noise (i.e., random words) indeed responded faster to global (versus local) stimulus features in a subsequent task measuring global versus local perception (Navon, 1977). In another study, solving anagrams with a task-irrelevant background noise (i.e., random numbers) framed as an 'obstacle to overcome' versus 'a distraction to ignore' led participants to include atypical exemplars more into given categories in a content-wise completely unrelated task. This reflects the notion that global processing provides access to less accessible representations, leading to the construction of more inclusive mental categories (see Förster, Friedman & Liberman, 2004; Friedman & Förster, 2008, 2010).

As research by Liberman and Förster (2009) showed bi-directional links between global processing and *psychological distance* (i.e., the subjective experience that something is far versus close relative to 'me, here, now'; for a review, see Trope & Liberman, 2010), the finding that obstacles can also increase psychological distance (Marguc, Van Kleef & Förster, 2012) may be less surprising. In one study, participants imagined they were driving to their best friend's birthday party and a physical obstacle either did or did not suddenly block the most direct route to their goal. As predicted, those who thought about how to overcome an obstacle estimated a larger distance between their current and another location unrelated to the goal pursuit than those who merely thought about how to reach their goal. Consistent with the notion that objects look smaller from afar and research showing that motivational states can alter size perception (e.g., Veltkamp, Aarts & Custers, 2008; Van Koningsbruggen, Stroebe & Aarts, 2011), thinking about how to overcome the biggest possible obstacle to an important personal goal (e.g., 'to succeed in my studies/work', 'to quit smoking') also led participants to estimate smaller font sizes than merely thinking about how to reach it. This effect occurred primarily among participants who tend to stay engaged and follow through with ongoing activities, suggesting that people need to stay 'in the field' (see Lewin, 1935).

Obstacles and Goal-Related Creativity

The above studies illuminate the basic cognitive effects of obstacles. Yet, using dependent measures that are content-wise unrelated to

the original goal pursuit, they are silent on what happens when such measures are at least partly goal-related. Moreover, it remains unclear whether obstacles promote goal-related creativity. We aim to close this gap by drawing on a growing body of research on construal level theory (CLT; for a review, see Trope & Liberman, 2010) and GLOMO^{sys} (for a review, see Förster & Dannenberg, 2010a), which has repeatedly revealed links between global processing, psychological distance and creative thinking. For example, people asked to focus on the overall Gestalt versus the details of objects have been found to subsequently use more unusual category exemplars and generate more creative uses for a brick (Friedman et al., 2003). Similarly, a distant versus close future time perspective has been shown to increase performance on creative insight and creative generation tasks (Förster, Friedman & Liberman, 2004). People also do better on such tasks if those are described as originating from a distant versus close location (Jia, Hirt & Karpen, 2009).

Although effects involving global processing and psychological distance are often independent of content (e.g., Macrae & Lewis, 2002; Friedman et al., 2003; Liberman & Förster, 2009; Marguc, Förster & Van Kleef, 2011), some studies suggest that goals can change this. For example, De Dreu and Nijstad (2008) found that participants expecting a negotiation with a competitive and hostile 'opponent' rated weak exemplars of conflict-related categories as more typical than participants expecting a co-operative 'partner' or participants in a neutral control condition. In another study, participants with a conflict mindset generated more original conflict versus co-operation tactics, whereas the opposite was true for participants with a co-operation mindset. Studies by Fitzsimons and Fishbach (2010) similarly revealed that when goals have a motivational priority due to slow progress, people draw instrumental others closer to themselves, whereas they do not do so with non-instrumental others, or with adequate progress. In one study, participants provided names of significant others who either facilitated or did not facilitate the pursuit of academic achievement. After thinking about the progress made, the progress still to make, or the goal itself, participants indicated how close they felt to those persons. Those who had focused on the progress still to make or only on the goal itself felt closer to helpful others compared to non-helpful others. This difference disappeared among those who had focused on the progress they had already made.

Integrating the above, we propose that if the basic cognitive processes elicited by obstacles

serve the pursuit of goals, people should first and foremost broaden categories that seem relevant for problem solving. For instance, if one planned to organize a conference but lacked funding, it might be more promising to first broaden the category of 'potential funding sources' than the category of 'vegetables'. Moving beyond our prior work (see Marguc, Förster & Van Kleef, 2011; Marguc, Van Kleef & Förster, 2012), we further propose that tackling an obstacle to a goal should facilitate the generation of original means.

We conducted two studies. In Study 1, participants first imagined a scenario we had previously used to investigate the cognitive effects of obstacles (Marguc, Van Kleef & Förster, 2012) and that affords examining the impact of obstacles on the broadening of goal-relevant and goal-irrelevant categories with a standard breadth of categorization task (Friedman & Förster, 2000; see also Rosch, 1975; Isen & Daubman, 1984). In Study 2, participants specified an important personal goal and either thought of the biggest possible obstacle that might interfere with reaching it, or not. Subsequently, they generated as many means to this goal as possible. All participants were probed for suspicions, remunerated, thanked, and debriefed.

Study 1

Participants

Sixty-four native Dutch speakers (51.6% female; $M_{\text{age}} = 25.53$, $SD = 10.31$) completed an online questionnaire in exchange 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 various unrelated studies on perspective taking and object evaluation. First, they imagined as vividly and realistically as possible one of several supposedly 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 included 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 favourite chocolate cake'. In both conditions, participants read that the radio programme they were listening to was interrupted by a newscast. In the obstacle [no-

obstacle] condition, it was announced that due to heavy storms their road [a road elsewhere in the Netherlands] was blocked by a fallen tree (see Marguc, Van Kleef & Förster, 2012; Study 1). Next, participants were asked to think about how they could get to the party despite the blockage [how they would drive to their friend's birthday party by car]. Everyone was thus instructed to think of concrete means. Participants were encouraged to take all the time they need for this as we would get back to it later.

Next, participants reported their current mood (1 = very bad, 9 = very good) and answered several questions about the 'situation just described'. They indicated how motivated they would be to go to the birthday party, how important it would be for them to go there, and how confident they were that they would ultimately arrive at the party. We included these questions as control variables. As a manipulation check, participants rated how hard they thought it would be for them to get to the party (all questions: 1 = not at all, 9 = very much).

Participants then completed the breadth of categorization task used by Friedman and Förster (2000; see also Rosch, 1975; Isen & Daubman, 1984). This task was ostensibly part of a larger study in which we gathered information about how people categorize objects. Specifically, participants rated the typicality (1 = not typical, 9 = typical) of various exemplars for given categories (vehicles, clothing, vegetables) presented in random order.² In each category, there were three good (vehicles: car, bus, motorbike; clothing: dress, shirt, pull-over; vegetables: beans, potatoes, carrots), three moderate (vehicles: wheelchair, yacht, tractor; clothing: bathing suit, nightgown, raincoat; vegetables: eggplant, radish, broccoli), and three poor exemplars (vehicles: foot, camel, elevator; clothing: ring, handbag, walking stick; vegetables: seaweed, pickles, rice).

Because the poor exemplars are most indicative of a broader conceptual scope, they were the main focus of our analysis. Based on previous research concerning the effect of obstacles on conceptual scope (Marguc, Förster & Van Kleef, 2011), which used dependent measures that were content-wise completely unrelated to the task in which the obstacle occurred, we predicted that obstacles might still lead to an overall increase in category breadth. However, because goals can determine which categories are most relevant for their attainment (De Dreu & Nijstad, 2008), we further predicted that obstacles should first and foremost lead people to broaden the category of vehicles, rather than the categories of clothing or vegetables.

Results

Manipulation Check

As expected, participants in the obstacle condition ($M = 6.10$, $SD = 2.47$) considered getting to their final destination to be harder than participants in the no-obstacle condition ($M = 4.39$, $SD = 2.16$), $F(1,58) = 8.26$, $p = 0.006$, $\eta_p^2 = 0.13$. This implies that participants indeed perceived the obstacle as interfering with the goal pursuit.

Conceptual Scope

We computed mean typicality ratings for poor exemplars (a) across categories and (b) for each category separately. In line with previous findings (Marguc, Förster & Van Kleef, 2011), a one-way ANOVA with overall ratings and ratings per category as dependent variables revealed that, altogether, participants in the obstacle-condition assigned higher ratings to poor exemplars than participants in the no-obstacle condition, $F(1,58) = 4.79$, $p = 0.03$, $\eta_p^2 = 0.08$. However, this difference only reached significance in the goal-relevant category of vehicles, $F(1,58) = 4.49$, $p = 0.04$, $\eta_p^2 = 0.07$, and not in the goal-irrelevant categories of clothing³ or vegetables, all $F_s < 2.47$, all $p_s > 0.12$ (see Table 1). To rule out overall shifts in response bias (see Isen & Daubman, 1984; Friedman & Förster, 2000), we performed the same analyses on mean ratings of typical (i.e., combined intermediate and good) exemplars, which should be included anyway. We found no effects, all $F_s < 1$.

Control Variables

A one-way ANOVA revealed no difference between obstacle conditions with regard to self-reported mood ($M_{obstacle} = 5.62$, $SD_{obstacle} = 1.80$; $M_{no-obstacle} = 6.29$, $SD_{no-obstacle} = 1.60$), motivation ($M_{obstacle} = 7.62$, $SD_{obstacle} = 1.32$; $M_{no-obstacle} = 7.58$, $SD_{no-obstacle} = 1.39$), importance ($M_{obstacle} = 7.62$, $SD_{obstacle} = 1.12$; $M_{no-obstacle} = 7.61$, $SD_{no-obstacle} = 1.84$), and confidence ($M_{obstacle} = 7.00$, $SD_{obstacle} = 1.85$; $M_{no-obstacle} = 7.61$, $SD_{no-obstacle} = 1.84$) in arriving at the party, all $F_s < 2.33$, all $p_s < 0.12$. Including these variables separately as covariates in univariate ANOVAs did not alter the impact of obstacles on typicality ratings for atypical exemplars.

Discussion

Study 1 conceptually replicated and qualified earlier research on the cognitive effects of obstacles. More specifically, it suggests that tackling an obstacle does not lead people to broaden categories randomly (Marguc, Förster

Table 1. Mean Typicality Ratings for Poor Exemplars (vehicles: camel, elevator, foot; clothing: ring, handbag, cane; vegetables: seaweed, pickles, rice) Overall and by Category (Study 1; SD in parentheses). Only the category of vehicles was relevant to reaching the goal (i.e., attending a birthday party in another city)

	No-Obstacle	Obstacle	F(1,58)	p
Overall	3.46 (1.15)	4.07 (1.00)	4.79	0.03
Vehicles	4.15 (1.77)	5.07 (1.57)	4.49	0.04
Clothing	1.98 (0.98)	2.49 (1.50)	2.53	0.12
Vegetables	4.24 (1.84)	4.63 (1.51)	0.82	0.37

& Van Kleef, 2011), but to first and foremost broaden those categories that appear relevant for problem solving. This further illuminates the basic cognitive effects of obstacles and supports our functional-broadening hypothesis. More generally, our finding complements recent research by De Dreu and Nijstad (2008) suggesting that goals determine which content is most relevant at any given time and how broad or narrow the conceptual scope needs to be. This qualifies the notion that global versus local processing styles are entirely independent of content, which could be inferred from research focusing on effects that transfer from one context to another (e.g., Macrae & Lewis; 2002; Friedman et al., 2003; Liberman & Förster, 2009; Marguc, Förster & Van Kleef, 2011).

One drawback of Study 1 is the hypothetical nature of the scenario. Moreover, although we asked participants to think about how to reach their goal, not everyone might have done so. To address these issues, participants in Study 2 first named an important study goal (and an obstacle) and then listed as many means to it as possible.

Because study goals and related obstacles to some extent resemble problems employees encounter at work (e.g., time constraints, distraction, or a lack of motivation to work on unpleasant assignments), this study also sheds some light on whether our basic effect is likely to generalize to the organizational domain. Finally, the dependent measure was modelled after standard creative generation tasks, in which participants might generate ways to use a brick (e.g., Friedman & Förster, 2001; Markman et al., 2007; Tadmor, Galinsky & Maddux, 2012), to protect the environment (e.g., Nijstad, Stroebe & Lodewijckx, 2003; De Dreu et al., 2012; Roskes, De Dreu & Nijstad, 2012), or to improve teaching (e.g., Rietzschel, De Dreu & Nijstad, 2007; De Dreu, Nijstad & Baas, 2011). Our main interest in Study 2 was

to examine whether tackling an obstacle can promote the generation of original means.

Study 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 named their most important study goal for the next six months (e.g., 'to pass the statistics exam', 'to get through to the next year'). Subsequently, participants in the obstacle condition specified the biggest possible obstacle that could interfere with reaching their goal (e.g., 'lack of time', 'lack of motivation'). Participants in the no-obstacle condition proceeded without specifying an obstacle. All participants indicated their current mood (1 = very bad, 9 = very good), how much they would like to reach the goal they had listed, how much they valued it, how motivated they were to reach it, and how confident they were that they would reach the goal (1 = not at all, 9 = very much).

Finally, all participants had three minutes to list as many means as possible for how they could reach their goal [despite the obstacle]. We predicted that participants who thought about how to overcome an obstacle to their goal would generate more original means than participants who only thought about how they would reach their goal.

Two independent coders blind to hypotheses and unfamiliar with our research rated the originality of each means by asking them-

selves 'To what extent is this idea infrequent, novel, and original in light of the goal (and the obstacle)?' and assigned a value between 1 (not original at all) and 9 (very original), respectively. Large differences were resolved by discussion, resulting in excellent inter-rater agreement ($ICC(3, 2) = 0.95$; Shrout & Fleiss, 1979). The average of their ratings served as our measure of originality.

We allowed our coders to see the goals and obstacles because although all participants generated the same type of goal, there was still some variation in the specific goals they listed. For example, some participants wanted 'to pass the first year', whereas others wanted 'to pass the statistics exam' or 'to get a good grade for my masters thesis'. Similarly, the obstacles participants listed were fairly idiosyncratic, ranging from 'too little time for all the work' to 'lack of discipline' or 'illness that prevents me from working/studying'. If coders were blind to conditions, they might consider a means original because it seems unusual in light of the means listed by the entire sample, whereas they might consider the very same means unoriginal if they knew the specific goal and obstacle at hand. To illustrate, suppose someone wanted to pass the statistics exam and a means he or she listed was 'to set my alarm clock an hour earlier'. Without knowing the obstacle, this means might appear awkward at worst and relatively original at best. Now, suppose that the obstacle was 'missing the 9.00 a.m. statistics classes because I always wake up too late'. In this case, the same means would not only make sense, but also appear quite unoriginal. The fact that our coders were aware of the goals and obstacles at hand, but not of the background and hypotheses of our research, therefore allowed for a more conservative judgement of originality.⁴

Results

Originality

As predicted, a one-way ANOVA revealed that participants in the obstacle condition generated more original means ($M = 4.58$, $SD = 0.94$) than participants in the no-obstacle condition ($M = 3.88$, $SD = 0.75$), $F(1,36) = 6.35$, $p = 0.02$, $\eta_p^2 = 0.15$. Obstacles can thus indeed increase goal-related creativity.

Control Variables

There were no significant differences in participants' current mood ($M_{obstacle} = 5.85$, $SD_{obstacle} = 1.14$; $M_{no-obstacle} = 6.00$, $SD_{no-obstacle} = 1.46$), liking ($M_{obstacle} = 8.80$, $SD_{obstacle} = 0.41$; $M_{no-obstacle} = 8.56$, $SD_{no-obstacle} = .78$),⁵ motivation ($M_{obstacle} = 8.00$, $SD_{obstacle} = 0.80$; $M_{no-obstacle} = 7.89$,

$SD_{no-obstacle} = .96$), confidence ($M_{obstacle} = 7.45$, $SD_{obstacle} = 1.19$; $M_{no-obstacle} = 6.61$, $SD_{no-obstacle} = 1.92$) or valuation ($M_{obstacle} = 8.00$, $SD_{obstacle} = 1.03$; $M_{no-obstacle} = 8.06$, $SD_{no-obstacle} = 0.87$) of the goal, all $F_s < 2.89$, all $p_s > 0.097$, and none of these variables altered the significant effect of obstacles on originality when included as a covariate. Obstacles also did not influence ideational fluency (i.e., the number of unique means participants generated; $M_{obstacle} = 8.55$, $SD_{obstacle} = 3.71$; $M_{no-obstacle} = 9.06$, $SD_{no-obstacle} = 3.06$) and upon entering ideational fluency as a covariate the effect of obstacles on originality remained unchanged, all $F_s < 1$.

Discussion

Study 2 revealed that obstacles not only influence basic cognitive processes that have been associated with greater creativity (see Friedman et al., 2003; Förster, Friedman & Liberman, 2004; Jia, Hirt & Karpen, 2009; Marguc, Förster & Van Kleef, 2011; Marguc, Van Kleef & Förster, 2012). They can also promote goal-related creative ideation independently of current mood, liking, motivation, valuation of the goal and ideational fluency. Especially the latter suggests that the enhanced originality of means listed by participants who thought about how to overcome an obstacle does not stem from increased effort or persistence within one category (e.g., Rietzschel, Nijstad & Stroebe, 2006) and the concomitant number of ideas (i.e., 'quantity breeds quality') but from a change in cognition that grants access to more unusual ideas.

General Discussion

Two studies revealed that obstacles can increase goal-related creativity. Specifically, we found that thinking about how to reach a goal with (versus without) an obstacle leads people to primarily broaden those categories that seem relevant for problem solving (Study 1) and to actively generate more original means (Study 2).

No effects were found on self-reported motivational variables and mood. Because participants generally reported high levels of motivation, there might be a ceiling effect and our studies are silent about what happens when motivation is low. Obstacles were also not experienced in the heat of the moment and specific emotions such as anger, fear, sadness or disappointment were not assessed. Therefore, effects on affective states might have been absent, too subtle or too specific to detect. Future studies using more sensitive or fine-grained measures of affective states could indeed make more precise predictions in light

of recent research. For instance, obstacles provoking anger might elicit unstructured ideation with an early creative peak (Baas, De Dreu & Nijstad, 2011), whereas obstacles provoking fear or sadness could either undermine creativity altogether (Nijstad et al., 2010), or lead to more structured ideation and increased creativity over time due to appraisals of uncertainty and greater persistence (Baas, De Dreu & Nijstad, 2012).

Notably, the present studies differ methodologically from, and therefore complement, earlier research on constraints and creativity that has led to compatible conclusions (e.g., Moreau & Dahl, 2005; Stokes, 2005). For example, Stokes (2005) focused mainly on analysing the works of, and conducting interviews with, renowned architects, musicians, artists or advertisers. Moreau and Dahl (2005) based their conclusions on the relationship between specific task constraints and creativity on participants' own accounts of the cognitive processes they used while generating ideas in more mundane domains. We examined goal-related everyday creative thinking more directly by testing the effects of obstacles on domain-specific conceptual scope and judging the originality of means participants listed.

Because we previously found effects of obstacles on perceptual and conceptual scope (Marguc, Förster & Van Kleef, 2011), one might wonder which was driving the current effects. As the two are closely related and bidirectional links exist (for reviews, see Förster & Dannenberg, 2010a, 2010b), future research using mediation could help to answer this question. Furthermore, one might wonder about the role of engagement, a variable that moderated some of our earlier findings (Marguc, Förster & Van Kleef, 2011, Marguc, Van Kleef & Förster, 2012). Because all tasks in the present studies were at least partly goal-related and motivation was generally high, we can only speculate that participants were engaged and 'in the field' (Lewin, 1935) when completing the dependent measures. The role of engagement clearly warrants further attention in future studies.

Overall, our findings corroborate recent research suggesting that goals can determine how broad or narrow the focus needs to be, that is, which part of the proverbial forest or which one of the trees people focus on (De Dreu & Nijstad, 2008). This questions the notion that global versus local processing styles, which refer to cognitive procedures and thus the *how* rather than the *what* of information processing, are entirely independent of content and that they reflect two processing systems (e.g., Macrae & Lewis, 2002; Friedman et al., 2003; Liberman & Förster, 2009; Förster

& Dannenberg, 2010a; Marguc, Förster & Van Kleef, 2011). While maintaining the assumption of two systems, Förster and Dannenberg (2010b) indeed concur that people may 'zoom in or out strongly or only mildly' (p. 259). Yet, research such as ours seems to point towards a continuum and suggests that when goal priming is combined with procedural priming, the former might trump the latter by making content matter (see Förster, Liberman, & Friedman, 2007).

Because some of the goals and obstacles employees experience at work are likely to resemble those participants listed in Study 2, our results imply that obstacles might not always be bad for organizations. Indeed, obstacles might be helpful if they interfere with goals that should be approached creatively. In addition, original ideas that have been discovered while tackling an obstacle in one context could be recalled in other contexts, which in turn might promote change and innovation on a broader scale. For instance, an original approach to designing an appliance that is both affordable and helps people save energy could be recalled and used in the design of other products. Similarly, if people repeatedly experienced creative breakthroughs while dealing with obstacles, they might over time perceive obstacles as less threatening. Such possibilities could be addressed in real-world settings.

Finally, the present findings align with other research showing that disruptive events can have benefits at work. Under certain circumstances, for instance, negative emotional expressions of leaders have been found to increase employees' motivation, effort and performance (Sy, Côté & Saavedra, 2005; Damen, Van Knippenberg & Van Knippenberg, 2008; Van Kleef et al., 2009, 2010). Negative emotional expressions of co-workers can also boost creativity among individuals with high epistemic motivation (Van Kleef, Anastasopoulou & Nijstad, 2010). Notably, anger expressions in the latter research also increased *relative* originality, that is, the number of unique ideas relative to the total number of ideas generated. The effects of anger expressions thus converge with the effects of obstacles in that both can increase originality even after controlling for ideational fluency.

Whether disruptive events at work that increase goal-related creative thinking are enough for successful goal pursuit or innovation remains an open question in light of research showing that people tend to select the most feasible and desirable idea at the cost of originality (Rietzschel, Nijstad, & Stroebe, 2010). Accordingly, it could be that unless people have clear reasons (e.g., explicit

instructions) for choosing the most creative idea from those they have generated in response to an obstacle, they might just settle for 'what works'. Whether obstacles and similar events enhance chances of success might therefore depend on whether the explicit goal is to produce innovative products or products that work.

To conclude, one reason why challenger brands are often innovative might be that they have to overcome more obstacles (e.g., limited financial and human resources) than market leaders. Future research pending, we therefore propose that obstacles deserve a reputation boost and could be considered welcome interferences.

Acknowledgements

The authors wish to thank Jana Kemper and Simone Mandra for their assistance in collecting data, Lisa Baart, Wouter van Ginneken, and Daniela Becker for coding, as well as Adam Morgan and Mark Barden for invaluable insights on challenger brands and inspiring discussions about the real-world implications of our findings.

Notes

1. Research on related phenomena (e.g., frustration, goal blockage, difficulty) often involved situations in which participants could not resume activities after a disruption or the means with which to perform an action were specified beforehand (e.g., Zeigarnik, 1927; Wegner et al., 1984; Marsh, Hicks & Bink, 1998). 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.
2. The category of furniture was also presented. However, the pattern of results in this category diverged from the patterns we found in the other categories in a way that made it difficult to interpret. In the interest of economy of exposition, we therefore decided not to report these results. Interested readers may contact the corresponding author with questions concerning this category.
3. For the category of clothing, the assumption of homogeneity of variances was violated and the more robust Welch and Brown–Forsythe tests of equality of means were considered.
4. An anonymous reviewer suggested that the effect of obstacles on originality might be due to differences in goal abstractness (see Finke, 1995; Ward, 1995; Förster, Friedman & Liberman, 2004). To test this, two independent experts blind to conditions rated goal abstractness according to the scheme used by Alter and Oppenheimer (2008), as entirely abstract (i.e., given a value of 0; e.g., 'being successful in my studies'), entirely concrete (i.e., given a value of 1; e.g., 'to get 35 points at the statistics exam'), or a combination of abstract and concrete (i.e., given a value of 0.5; e.g., 'to collect all study points and study more effectively'). The inter-rater agreement was excellent ($ICC(3, 2) = 0.90$; Shrout & Fleiss, 1979). Conditions did not differ in goal abstractness, $F(1,37) = 1.85$, $p = 0.18$, $\eta_p^2 = 0.05$, and entering this variable as a covariate ($F < 1$) in the main analysis left the effect of obstacles on originality unaffected.
5. For liking of the goal, the assumption of homogeneity of variances was violated and the more robust Welch and Brown–Forsythe tests of equality of means were considered.

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At the time of the research, Janina Marguc (janina.marguc@gmail.com) was a PhD student in Social Psychology at the University of Amsterdam, the Netherlands. Her main research interests revolve around motivation, goals, creativity, social cognition, and self-regulation.

Gerben A. Van Kleef (G.A.vanKleef@uva.nl) is Full Professor of Social Psychology at the University of Amsterdam, the Netherlands. His main research interests revolve around emotion, power, social influence, conflict, and group processes.

Jens Förster (jens.foerster@rub.de) is Professor of Psychology at Ruhr University, Bochum, Germany. His research focuses on self-regulation, social cognition, knowledge activation, embodiment, metacognition and thinking and processing styles.