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FlashReport

Lessons from a Faraway land: The effect of spatial distance on creative cognition

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ABSTRACT

Recent research [Förster, J., Friedman, R. S., & Liberman, N. (2004). Temporal construal effects on abstract and concrete thinking: Consequences for insight and creative cognition. *Journal of Personality and Social Psychology, 87*, 177–189] has identified temporal distance as a situational moderator of creativity. According to Construal Level Theory [Liberman, N., Trope, Y., & Stephan, E. (2007). Psychological Distance. In E. T. Higgins & A. W. Kruglanski (Eds.), *Social psychology: A handbook of basic principles* (pp. 353–381). New York: Guilford Press], temporal distance is just one case of the broader construct of psychological distance. In the present research, we investigated the effect of another dimension of psychological distance, namely, spatial distance, on creative cognition and insight problem solving. In two studies, we demonstrate that when the creative task is portrayed as originating from a far rather than close location, participants provide more creative responses (Study 1) and perform better on a problem solving task that requires creative insight (Study 2). Both theoretical and practical implications of this finding are discussed.

Introduction

Performance on creativity tasks is highly valued in society (cf. Sternberg & Lubart, 1996), and social psychological research has been intrigued by the question "When are people most creative?" Some potent situational moderators of creativity have been identified: mood (e.g., Hirt, Devers, & McCrea, 2008; Isen, Daubman, & Nowicki, 1987; Murray, Sujan, Hirt, & Sujan, 1990), intrinsic/extrinsic rewards (see Amabile, 1996, for a review), regulatory focus (Friedman & Förster, 2001), and even bodily cues (Friedman & Förster, 2000, 2002). One such moderator that is particularly relevant here is the manipulation of temporal distance (Förster et al., 2004). Based on the recent development of Construal Level Theory (Trope & Liberman, 2003; Trope, Liberman, & Wakslak, 2007), which suggests that temporal distance is simply one dimension of psychological distance, we investigated whether another form of psychological distance, namely, spatial distance, has parallel effects on one's creativity.

Contrual Level Theory

According to CLT (Liberman, Trope, & Stephan, 2007; Trope & Liberman, 2003;), one's mental representation of an event or object is a function of its psychological distance. Specifically, individuals represent psychologically near events with concrete, low-level construals and psychologically distant events with abstract, high-level construals. Low-level construals encompass concrete, contextualized, and subordinate features of events. High-level construals, in contrast, refer to abstract, decontextualized, and superordinate features of events. Thus, while low-level construals include fine-grained and even peripheral details, high-level construals are concerned with fewer, central meanings of events. Consider an illustration used by Bar-Anan, Liberman, and Trope (2006) about two children playing catch with a ball in a backyard. A low-level construal of this activity might include such details as the way the ball flies across the backyard and the kind of shoes the children are wearing. In contrast, the primary features of playing catch and "having fun," instead, comprise the main representation of a high-level construal of the same activity.

Psychological distance, which is an index of "closeness" with reference to one's self, determines the level at which an object is mentally represented. In general, psychologically distant events are represented at high-level construals and psychologically near events are represented at low-level construals. So far, four dimensions of psychological distance have been empirically identified: spatial distance, temporal distance, social distance, and hypotheticality (Liberman et al., 2007). Individuals represent an event at high-level construals when it is going to happen a year later vs. tomorrow (Liberman & Trope, 1998), when it occurs at a place 2000 miles vs. 2 miles away (Fujita, Henderson, Eng, Trope, & Liberman, 2006; Henderson, Fujita, Trope, & Liberman, 2006), when it is enacted by a person dissimilar vs. similar to the observer (Liviatan, Trope, & Liberman, 2008), or when it is highly unlikely vs. likely to happen (Wakslak, Trope, Liberman, & Alony, 2006).

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Construal level and creativity

Förster et al. (2004) demonstrated that high-level construals, as opposed to low-level ones, enhance one's performance on a diverse range of tasks that require creativity or creative insight. Specifically, participants in the high-level construal condition demonstrated better mental insight (Study 1), better visual insight (Studies 2 and 3), and generated more creative responses (Studies 4 and 5). This beneficial effect of high-level mental representations on creativity presumably derives from the fact that high-level construal encourages abstract thinking, a critical condition that has been theorized to facilitate creative cognition (e.g., Finke, 1995; Ward, 1995). Given that individuals' cognition becomes more abstract when they are induced into higher level mental representations, they also become better at solving creative problems.

Notably, Förster et al. (2004) manipulated construal level exclusively by varying *temporal distance*. Participants were generally told to imagine their lives tomorrow (near future) or on a day 1 year from now (distant future), and then to imagine themselves completing the task on that particular day. If it is the abstract cognition associated with a high-level mental construal that facilitates creativity, then manipulation of psychological distance other than temporal distance should produce the same effect.

Spatial distance and creativity

In the present research, we are interested in the effect of spatial distance on individuals' creative cognition. Spatial distance has both theoretical and practical importance. Although CLT does not differentiate among the various psychological distances (Liberman et al., 2007), spatial distance, as one of the developmentally earliest concepts (e.g., Clark, 1973), is likely to be centrally important by providing a metaphorical basis for the construction of all other psychological distances (Williams & Bargh, 2008). Practically, since we routinely work on tasks and with people from a diverse geographical range, thanks to the internet and email, it is important to explore the ways in which information about spatial distance affects performance on creative tasks.

Another objective of the present research is to further explore the conditions in which psychological distance impacts creativity. In Förster et al. (2004), the manipulations of temporal distance involved explicit imagination of the self working on the tasks in the future. As a result, it is unclear if minimal cues of psychological distance alone can influence individuals' creative cognition. We explore the effect of one such cue: the origin of a task. Without explicitly directing participants' attention to this information, the present research investigated whether psychological distance affects one's creativity without a highly involved imagination process.

Overview of current research

We conducted two experiments to achieve our aims. In Study 1, participants had to generate different modes of transportation. This creative generation task has been used in previous creativity research (Hirt, Levine, McDonald, Melton, & Martin, 1997; Hirt et al., 2008) and has the capacity to assess creative cognition on dimensions of *fluency*, *originality*, and *flexibility*, the last of which was not investigated in Förster et al. (2004). As previous research (e.g., Murray et al., 1990) has shown a close relationship between cognitive flexibility and creativity, we hypothesized that spatial distance would promote more flexible generation in addition to greater fluency and originality. In Study 2, participants worked on problem solving tasks that require creative insight (Förster et al., 2004; Schooler, Ohlsson, & Brooks, 1993). This task was designed to show that spatial distance not only increases individuals' creative output but also facilitates creativity on tasks with objective answers. In both studies, the spatial distance is manipulated by telling participants the task was either from a close vs. faraway location.

Experiment 1

Method

Participants

Sixty-five (21 male, 44 female) Indiana University introductory psychology students participated in return for partial fulfillment of a course requirement.

Procedure

Participants were randomly assigned to either the spatially near or distant condition. Those in the spatially distant condition were asked to complete a "linguistic skills" task developed by Indiana University (IU) students enrolled in a "Study Abroad Program in Greece." Participants in the spatially near condition read an identical cover story, but were told the task was developed by IU students currently enrolled in a program at "Indiana University–Purdue University, Indianapolis." In both conditions, we informed the participants that we had agreed to collect useful data for the "group of IU students."

The linguistic skills task (Hirt et al., 1997, 2008) gave participants unlimited time to list as many exemplars of the category "modes of transportation" as they could think of. The instructions emphasized that there were no right and wrong answers and participants' responses could be "as commonplace or as creative and out of the ordinary as you like." After completing the listing task, we administered the same set of questionnaires used in Hirt et al. (2008) (see Appendix A) to assess participants' task interest, task enjoyment, and affect, factors that have been shown to influence one's creativity (Hirt et al., 2008). Finally, participants were debriefed and probed for suspicion.

Results and discussion

Consistent with previous research (see Hirt et al., 1997, 2008), we derived three measures of creativity from the listed exemplars: fluency (the number of exemplars generated), flexibility (the number of distinct categories represented in the generated exemplars), and originality (the average uniqueness of the exemplars judged by independent raters). Three separate independent sample *t*-tests confirmed that participants in the distant condition displayed greater fluency, $t(63) = -2.50$, $p = .015$ ($M = 13.97$, $SD = 6.36$ vs. $M = 10.45$, $SD = 4.91$), were more flexible, $t(63) = -2.63$, $p = .011$ ($M = 4.00$, $SD = 1.00$ vs. $M = 3.28$, $SD = 1.20$), and generated more original exemplars, $t(63) = -2.45$, $p = .017$ ($M = 1.54$, $SD = .29$ vs. $M = 1.35$, $SD = .29$) than those in the near condition. None of the reported task interest, task enjoyment, or affect measures differed between the two conditions, all $ts < 1$.

Experiment 1 demonstrated that creative generation profits from greater spatial distance. Consistent with Förster et al. (2004, Studies 4 and 5), participants in the spatially distant condition produced more fluent and original responses than those in the spatially close condition. Furthermore, relative to those who believed the generation task was from Indianapolis, participants exhibited greater cognitive flexibility when they believed that the task was from Greece.

Three issues with Experiment 1, nevertheless, require further clarification. The manipulation of spatial distance was confounded by the fact that Greece is a foreign country while Indianapolis is not, a difference that might have affected participants' memory search processes in generating modes of transportation. Another

issue is that since our assessment of potential mediators (affect, motivation) was administered after the creativity task, it is possible that the experimental manipulation may have impacted these factors prior to task performance. Finally, without a control condition, we could not determine whether a greater spatial distance facilitates creativity or a close distance inhibits creative output. These problems are addressed in Experiment 2.

Experiment 2

Method

Participants

One hundred and thirty-two (30 male, 102 female) Indiana University introductory psychology students participated in return for partial fulfillment of a course requirement.

Procedure

In the cover story, participants were told that the upcoming problem solving task was developed by a research institution and that we had agreed to "collect some valuable data for them." To manipulate spatial distance, the location of the research institution was described to be either in Indiana ("it was actually 2 miles away from here"), or in California ("it's actually located around 2,000 miles away from here"), or its location was not mentioned at all to represent the near, far, and control conditions, respectively.

Before the creative insight problems, participants answered questions regarding potential mediators, namely, their current mood, expectancy regarding task performance, interest, and motivation for the task (Förster et al., 2004; see Appendix B). The three insight problems included in Experiment 2 met the criteria set by Schooler et al. (1993), that they may be understood as (a) ultimately solvable by the average problem solver; (b) likely to produce an impasse, a state of high uncertainty as to how to proceed, during the course of solution; and (c) likely to produce an "aha" experience. For instance, the first question (see Appendix C for all the three questions) reads:

> A prisoner was attempting to escape from a tower. He found a rope in his cell that was half as long enough to permit him to reach the ground safely. He divided the rope in half, tied the two parts together, and escaped. How could he have done this? [Solution: He unraveled the rope lengthwise and tied the remaining strands together.]

Participants had two minutes to solve each of the problems. Finally, they were debriefed and probed for suspicion of the purpose of the experiment.

Results

We conducted a one-way analysis of variance on participants' performance on the insight problems and it yielded a significant difference across the three conditions, $F(2, 129) = 6.08$, $p < .01$. A series of contrasts revealed that, as predicted, participants in the distant condition ($M = 1.093$, $SD = .894$) solved more insight problems than those in the near condition ($M = 0.587$, $SD = .617$), $F(1, 87) = 10.59$, $p < .01$, and the control condition ($M = 0.698$, $SD = .688$), $F(1, 84) = 5.797$, $p < .02$. The difference between participants' performance between the near and the control condition was not statistically reliable, $F < 1$. Participants did not differ on measures of mood, task expectancy, interest, and motivation across the three conditions, all Fs < 1.

General discussion

Implicitly altering people's spatial distance from a particular task by changing its perceived location of origin has a demonstrable impact on their creative performance. In Experiment 1, relative to those primed with near distance, participants in the far distance condition were not only more fluent and flexible in their response generation, but also generated more creative responses. In Experiment 2, the same spatial distance manipulation enabled a greater tendency to use creative insight by participants in the distant as opposed to the near and control conditions. The current finding is consistent with previous research showing the effect of psychological distance on creativity (Förster et al., 2004) and extends it from temporal distance to spatial distance. It is also consistent with the notion that it was the psychologically distant condition that enhances creativity rather than the near condition impeding it (Förster et al., 2004, Study 5).

As one major goal of the present research, we demonstrated that minimal cues of spatial distance were sufficient to influence individuals' creativity, without the need for an imagination process that heavily involves the self (Förster et al., 2004). On the one hand, this finding may arise from people's built-in system for the sensitive detection of spatial distance (Mobbs et al., 2007), which attests to Williams and Bargh (2008) claim that spatial distance plays a more fundamental role among the various dimensions of psychological distance. On the other hand, this finding is also consistent with research showing that individuals automatically assessed the psychological distance implied by words related to *all* forms of psychological distances (e.g., *tomorrow* vs. *a year later*; *friends* vs. *enemy*, and *maybe* vs. *sure*; Bar-Anan, Liberman, Trope, & Algom, 2007). Future research could more directly explore whether the present findings can be generalized to minimal cues of other dimensions of psychological distance. This line of research has the potential to shed important light on recent theoretical concerns regarding the differences and commonalities among the various dimensions of psychological distance (Liberman & Förster, in press; Liberman, Trope, & Wakslak, 2007; Williams & Bargh, 2008).

Our findings also have important practical implications in today's world, where modern technology allows us to routinely work on projects and with people from a diverse geographical range from us. To the extent that technologies are going to continue to remove spatial distance as a barrier to work and social interaction, future research should pay increasing attention to the effect of perceived spatial distance on cognition. In addition, the present research also encourages future investigations of the potential effects of other minimal cues of psychological distance inherent in real life projects on creativity. For example, as working with individuals from diverse cultural backgrounds begins to become the norm in a globalized community, it is particularly important to empirically explore whether the cultural diversity of a team (a greater average social distance among group members) promotes more creative performance of the individuals and the team.

In conclusion, the origin of a task is found to affect one's performance on creativity tasks. This extends previous research on the influence of psychological distance on creative cognition and highlights the importance of such minimal cues of spatial distance in predicting creative task performance.

Appendix A. Questionnaires assessing task interest and affect

1--------2-------3-------4-------5-------6-------7

strongly disagree strongly agree

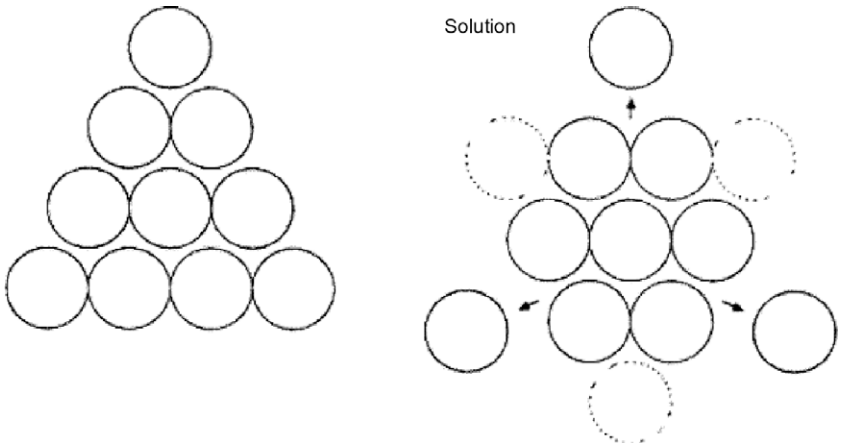

Fig. A1. Diagram and solution for the triangle problem. Adapted from Schooler et al. (1993).

1. Thinking about different modes of transportation was interesting.
2. If asked to list items from another category of objects, I would have been happy to do it.
3. I found the task of listing modes of transportation fun.
4. It was hard for me to get really involved with this task of listing modes of transportation.
5. I thoroughly enjoyed generating different modes of transportation.

On the scale provided below, to what degree a particular adjective fit their current mood.

1--------2-------3-------4-------5-------6-------7

not at all very much

Annoyed, happy, depressed, miserable, satisfied, gloomy, pleased, sad, delighted, content, frustrated, glad.

Appendix B. Measures of mood, liking, expectancies, and motivation

1. How do you feel right now?

1--------2-------3-------4-------5-------6-------7-------8-------9

very bad very good

2. How well will you perform on the following task?

1--------2-------3-------4-------5-------6-------7-------8-------9

very poorly very well

3. How much would you like to solve the following task right now?

1--------2-------3-------4-------5-------6-------7-------8-------9

not at all very much

4. How important you feel it is for you to perform well in the following tasks?

1--------2-------3-------4-------5-------6-------7-------8-------9

not at all very much

Appendix C. Creative insight problems

Problem 1: A prisoner was attempting to escape from a tower. He found a rope in his cell that was half as long enough to permit him to reach the ground safely. He divided the rope in half, tied the two parts together, and escaped. How could he have done this?

Solution: He unraveled the rope lengthwise and tied the remaining strands together.

Problem 2: A dealer in antique coins got an offer to buy a beautiful bronze coin. The coin had an emperor's head on one side and the date 544 B.C. stamped on the other. The dealer examined the coin but instead of buying it, he called the police. Why?

Solution: In 544 B.C. Jesus had not been born, so a coin from that time would not be marked "B.C."

Problem 3: Show how you can make the triangle below [see Fig. A1] point downward by moving only three of the circles.

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