



Fixation effect in creative ideas generation: Opposite impacts of example in children and adults



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ABSTRACT

Recent research with adults has shown that exposure to examples does not systematically constrain creativity and can, on the contrary, have a stimulating effect. In the present study, we examined the potential influence of examples on the generation of creative ideas in school-age children and adults. We utilized the egg task, in which participants design a method to drop a hen's egg from a height of 10 m to ensure that it does not break. First, we conducted a pilot study to confirm that the nature of the fixation effect in the egg task differs between children and adults, and we then explored the potential influence of examples on creative idea generation in a second study. The results revealed that exposure to the same example during a creative task has two opposite effects: adults were constrained in their ability to propose solutions, whereas this ability was enhanced in children. We explain this differing effect by noting that the same example can be within fixation for adults and outside fixation for children. The positive effect of examples allowed children to exhibit performance that was comparable to that of adults with regard to fluency and flexibility.

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1. Introduction

The ability to generate new ideas and creative solutions to problems is crucial for adapting to a changing and open-ended environment. This need is particularly apparent during circumstances in which individuals cannot simply choose between existing strategies but must create new strategies (DeHaan, 2011). From this perspective, creativity is a fundamental process that influences many areas of daily life, such as education and scientific reasoning. Cognitive psychology scholars who study creativity have identified a number of obstacles that most people are likely to encounter during idea generation (Abraham & Windmann, 2007; Smith, Ward, & Finke, 1995; Ward, Patterson, & Sifonis, 2004). Indeed, people tend to follow “the path of least resistance” and propose solutions that are built on the most common and accessible knowledge within a specific domain. For instance, when individuals must imagine and design a new original chair, a number of typical examples of chairs spontaneously come to mind. These spontaneous representations of what classically constitutes a chair may block

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the creative process, leading to a phenomenon called the “fixation effect” (Smith et al., 1995). Studies converge in showing that the fixation effect is reinforced when adults are exposed to examples of solutions before being asked to generate new ideas. For example, in a series of experiments, Smith, Ward, and Schumacher (1993) asked participants to imagine and draw new toys for a toy company. Participants were specifically told that their toys had to differ substantially from currently or previously existing toys. Prior to drawing the toys, participants were exposed to examples that had fundamental elements in common (e.g., the presence of a ball). Independent experimenters coded whether the subjects’ drawings contained any of the pre-cited elements. The results showed that participants tended to incorporate these elements into their own drawings, despite the explicit warning to avoid replicating features from the examples. These results are consistent with those of other studies (Jansson & Smith, 1991; Landau, Thomas, Thelen, & Chang, 2002; Landau & Leynes, 2004).

However, Agogu , Kazak i, et al. (2014) recently demonstrated that exposure to examples does not systematically lead to constraining creativity and can, on the contrary, have a stimulating effect (see also Dugosh & Paulus, 2005; Fink et al., 2010). Indeed, utilizing a creative idea generation task that involves designing a method to drop a hen’s egg from a height of 10 m to ensure that it does not break (called “the egg task”), the authors clearly showed that both the constraining and the stimulating effects of examples depend on the nature of the examples that are proposed prior to solving the task. The results indicated that the introduction of examples consisting of solutions generated using the most accessible knowledge constrained creativity, whereas examples consisting of less spontaneously accessible solutions reduced the fixation effect and stimulated originality. Thus, examples outside the fixation effect led participants to propose more original solutions, whereas examples within the fixation effect reduced both the number and the originality of the proposed solutions. Studies in the domain of analogical problem solving have reached to very similar conclusions (Bonnardel, 2000; Casakin & Goldschmidt, 1999). For example, Bonnardel and Marmeche (2004) reported that intradomain analogies decreased the production of new ideas in expert designers whereas interdomain analogies have the opposite effect, enhancing the evocation processes.

From a developmental perspective, studies examining creative thinking have obtained inconsistent results. For example, Jaquish and Ripple (1980) reported that fluency (i.e., the number of proposed solutions) and flexibility (i.e., the number of categories of proposed solutions) but not originality increase between children and adolescents, whereas Kleibeuker, De Dreu, & Crone (2013) utilized a creative task in which participants had to find alternative uses for conventional objects, demonstrating that originality rather than fluency or flexibility continues to develop during late adolescence. During an examination of divergent thinking skills in children and adults, Wu, Cheng, Ip & McBride-Chang (2005) observed that creativity regarding real-world problems increased between 10- to 12-year-old children and university students but decreased in the same age range on a figural task, suggesting that developmental patterns may depend on the types of tasks used to assess creativity.

Although numerous studies have examined the developmental trajectories for the ability to generate creative ideas across childhood and adolescence (Claxton, Pannels & Rhoads, 2005; Jaquish & Ripple, 1980; Kleibeuker, De Dreu, et al., 2013; Lau & Cheung, 2010; Wu et al., 2005), little is known about the potential influence of examples on children’s creativity. Previous research suggests that the influence of the fixation effect during the generation of creative ideas varies with age and expertise (Agogu , Poirel, Pineau, Houd  & Cassotti, 2014; Defeyter & German, 2003; German & Barrett, 2005). Specifically, a recent investigation conducted a qualitative analysis of responses to explore how age and education influence the fixation effect during the egg task (Agogu , Poirel, et al., 2014). Although most of the solutions proposed by adults consisted of slowing the fall, protecting the egg or dampening the shock, 10-year-old children did not spontaneously propose to slow the fall using, for example, a parachute. Preliminary results indicated that the accessible knowledge and design heuristics that participants used to explore the potential solutions to the task leading to the fixation phenomena differed between children and adults, despite children having the required knowledge base (e.g., they knew what parachutes were and how parachutes worked).

Based on these previous studies (Agogu , Poirel, et al., 2014), the following two hypotheses can be formulated regarding the influence of examples on creativity in children and adults: (1) exposure to examples of solutions based on the most accessible knowledge (within the fixation effect) should block the ability of adults to generate original ideas, and (2) if children do not show the same fixation effect as adults, then examples within the fixation effect for adults may serve as examples outside the fixation effect for children, which may decrease the ability of adults to generate original ideas and enhance children’s ability to propose solutions to creative tasks.

Thus, in the present study, we examined the potential effect of examples on the generation of creative ideas in school-age children and adults. To determine whether the introduction of examples of solutions influences the capacity to generate creative ideas, we utilized the egg task, in which participants must design a strategy to drop a hen’s egg from a height of 10 m to avoid breaking it. First, we conducted a pilot study to confirm that the nature of the fixation effect during the egg task differs between children and adults, consistent with Agogu , Poirel, et al. (2014) study. We then explored the potential influence of examples on the generation of creative ideas in a second study. To do so, participants were randomly assigned to one of the following two experimental conditions: a control condition without examples and a test condition in which a typical example of a solution was provided in the design brief.

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