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Creativity: Intuitive processing outperforms deliberative processing in creative idea selection

Yuxi Zhu*, Simone M. Ritter, Barbara C.N. Müller, Ap Dijksterhuis

Behavioral Science Institute, Radboud University, The Netherlands

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ABSTRACT

Creative ideas are highly valued, and various techniques have been designed to maximize the generation of creative ideas. However, for actual implementation of creative ideas, the most creative ideas must be recognized and selected from a pool of ideas. Although idea generation and idea selection are tightly linked in creativity theories, research on idea selection lags far behind research on idea generation. The current research investigates the role of processing mode in creative idea selection. In two experiments, participants were either instructed to intuitively or deliberatively select the most creative ideas from a pool of 18 ideas that systematically vary on creativity and its sub-dimensions originality and usefulness. Participants in the intuitive condition selected ideas that were more creative, more original, and equally useful than the ideas selected by participants in the deliberative condition. Moreover, whereas selection performance of participants in the deliberative condition was not better than chance level, participants in the intuitive condition selected ideas that were more creative, more original, and more useful than the average of all available ideas.

1. Introduction

Creativity is one of the most important cognitive skills in our fast-changing world (Ananiadou & Claro, 2009; Geisinger, 2016), and various techniques have been designed to maximize the generation of creative ideas over the past decades. However, before creative ideas can be actually implemented, the most creative ideas must be selected from a larger pool of ideas. Although idea generation and idea selection are tightly linked in creativity theories (e.g., Basadur, 1995; Finke, Ward, & Smith, 1992; Guilford, 1967; Lubart, 2001; Maier, 1967; Newell & Shaw, 1962; Reiter-Palmon & Illies, 2004; Runco & Basadur, 1993; Runco & Vega, 1990; Sawyer, 2006; Simonton, 2003; Sternberg, 2006), research on idea evaluation and idea selection lags far behind research on idea generation (Amabile & Mueller, 2008; Herman & Reiter-Palmon, 2011; Hunter, Friedrich, Bedell, & Mumford, 2006; Kozbelt, 2007; Rietzschel, Nijstad, & Stroebe, 2010; Runco & Smith, 1992). This is unfortunate, as history is replete with cases in which creative ideas were first unwisely rejected. For example, flying, personal computers, and online shopping were first deemed to be crazy, but eventually became big successes that changed our world. In addition, the scarce research on idea selection has shown that people perform poorly at selecting creative ideas. They tend to select mainstream ideas at the expense of creative ideas (Faure, 2004; Putman & Paulus, 2009; Rietzschel, Nijstad, & Stroebe, 2006), even when they are explicitly instructed to select creative ideas (Rietzschel et al., 2010).

Thus far, few studies have been conducted to investigate creative idea selection. In comparison, idea evaluation, which is closely related to idea selection, has attracted more attention. In the literature on the creative problem-solving process, researchers have stated that idea evaluation happens after idea generation and before the selection of ideas for implementation (e.g., Amabile, 1983; Herman & Reiter-Palmon, 2011). During idea evaluation, available options are assessed against certain standards (Hunter et al., 2006) for implementation, rejection, or revision (Mumford, Lonergan, & Scott, 2002). Creativity researchers have observed errors in the evaluation of ideas, in that people tend to underestimate the originality of ideas (Licuanan, Dailey, & Mumford, 2007). They prefer commonplace ideas but disregard original ideas (Blair & Mumford, 2007). To investigate how people's evaluation performance can be improved, several studies have been conducted and some means have been examined to be effective. For example, Blair and Mumford (2007) found that participants are more likely to prefer original ideas when evaluation criteria are loose and time pressure is high. In other research, Mueller, Wakslak, and Krishnan (2014) found that participants with a high-level abstract construal can evaluate a creative idea more accurately than participants with a low-level concrete construal.

Research has thus far shown that improving creative idea selection is difficult (Faure, 2004; Rietzschel, Nijstad, & Stroebe, 2014). Researchers (Faure, 2004; Putman & Paulus, 2009; Rietzschel et al., 2006)

* Corresponding author at: Behavioral Science Institute, Radboud University, Montessorilaan 3, 6525 HR Nijmegen, The Netherlands.
E-mail address: y.zhu@psych.ru.nl (Y. Zhu).

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studied idea selection performance by nominal groups (in which members perform tasks individually) and interactive groups (in which members perform tasks interactively). They found that the ideas selected by both groups were only of average originality and feasibility. In other words, participants did not select better than chance. Other manipulations, such as providing instructions to select creative ideas (i.e., participants were asked to select an idea that is both original and feasible; Rietzschel et al., 2010), providing quality ratings before selection (participants had to rate the quality of available ideas; Rietzschel et al., 2010), and using a narrow (versus broad) problem for which ideas were generated (i.e., a narrowly defined problem that is a subcategory of the overall problem; Rietzschel et al., 2014) had no effect on selection performance. Explicitly instructing participants to select the most creative (versus the best) ideas did facilitate the selection of more original ideas, but it also decreased participants' satisfaction and the rated effectiveness (i.e., the estimated likelihood that the idea will turn out to be an improvement) of the chosen ideas (Rietzschel et al., 2010). The failure of the earlier mentioned efforts suggests that creative idea selection is still far from being well understood and needs more exploration.

Selecting truly creative ideas is difficult as there are often no prototypes or explicit criteria against which an idea can be judged. In fact, the violation of expectations with regard to the solution is often at the heart of perceiving an idea as creative (for example, see research on effective surprise; Wiggins & Bhattacharya, 2014). Intuition is a common tool for coping with ill-defined situations (Pétervári, Osman, & Bhattacharya, 2016) and hence, in the idea selection phase, intuition may help people to recognize original contributions and to judge whether an idea will be useful. Sinclair (2012) has shown that filmmaking professionals use intuitive expertise as a means to create unity amongst film crew members, and employ intuitive foresight for selecting projects and spotting talents. Eling, Langerak, and Griffin (2015) investigated new product idea evaluation decisions during idea generation activities, and revealed that combining intuition and rationality leads to both the highest decision quality and improved decision speed. However, empirical research on the role of intuitive and deliberative processing in the creative idea selection process is lacking. Let us have a closer look at intuition and deliberation.

According to dual-processing theories, people commonly process information by using two distinct modes: intuitive processing and deliberative processing—intuitive processing is rapid, unconscious, and automatic, while deliberative processing is slow, conscious, and analytical (Gigerenzer, 2007; Wilson & Schooler, 1991). So far, many studies have been conducted to understand and distinguish the effect of processing mode in both decision making (Phillips, Fletcher, Marks, & Hine, 2016) and creative idea generation (for reviews, see Pétervári et al., 2016; Ritter & Dijksterhuis, 2014). Intuitive processing has been shown to outperform deliberative processing in various judgment and decision-making circumstances, such as deception detection (Albrechtsen, Meissner, & Susa, 2009) and complex decision-making (e.g., Usher, Russo, Weyers, Brauner, & Zakay, 2011). Meanwhile, intuition has also been identified to be important in idea generation of creative professionals, such as Nobel laureates (Marton, Fensham, & Chaiklin, 1994) and Michelin chefs (Stierand & Dörfler, 2016). Moreover, this beneficial role of intuition has been supported by empirical evidence, which demonstrates that intuitive individuals are able to generate solutions of higher quality and elegance (Eubanks, Murphy, & Mumford, 2010) and of higher originality (Garfield, Taylor, Dennis, & Satzinger, 2001) to specific problems than deliberative people. Moreover, an intuitive creativity technique could boost the generation of higher original and paradigm-modifying solutions than a deliberative technique (Garfield et al., 2001). However, the role of processing mode in creative idea selection, which combines decision making and creativity, has been scarcely studied (Eling et al., 2015; Pétervári et al., 2016). Interestingly, however, in many circumstances practitioners use their intuition when searching for highly original and useful ideas (Sadler-Smith, 2016; Stierand & Dörfler, 2016). For example, angel investors, who aim to find extraordinarily profitable investments by providing capital for a business start-up, report a heavy reliance on intuition in making their decisions (Huang & Pearce, 2015). Why may an intuitive processing style be beneficial for creative idea selection?

Creative ideas are generally characterized to be both original and useful (Hennessey & Amabile, 2010; Runco & Jaeger, 2012), and when selecting creative ideas one should take both the originality and the usefulness of the ideas into consideration. However, it is likely that during creative idea selection, people do not focus on originality and usefulness simultaneously, but follow a sequential order—they first focus on originality and, thereafter, on usefulness. Originality is viewed as the hallmark of creativity (Runco & Charles, 1993), and it is often associated with positive concepts such as intelligence (Niu & Sternberg, 2006). Therefore, it is not surprising that people value originality (Rietzschel et al., 2010) and even at an implicit level favor creativity and originality above practicality and usefulness. Using an Implicit Association Test (IAT), Mueller, Melwani, and Goncalo (2011) showed that in conditions of low uncertainty (or when a high tolerance for uncertainty was evoked), participants associated positive words more often with originality-related words (e.g., novel) relative to usefulness-related words (e.g., functional). Finally, original ideas are salient, and our brain gives priority to process salient, novel, and unexpected stimuli (Corbetta & Shulman, 2002). Therefore, when asked to select creative ideas, people may, at first place, intuitively focus on originality. In support of this idea, Rietzschel et al. (2010) have shown that when participants were instructed to select creative ideas (without mentioning its two sub-dimensions), they relied heavily on originality.

The goal of idea selection, however, is to select an idea that is not only original but also has the potential to be implemented. Therefore, the available ideas also have to be evaluated on their usefulness. Original ideas are by definition relatively new and untested, and the more original an idea is, the higher the uncertainty (Amabile, 1996), perception of risk (Rubenson & Runco, 1995; Simonton, 1984), likelihood of social rejection (Nemeth, 1986), and doubts about whether the idea can be realized (Metcalfe, 1986). Due to the uncertainty associated with original ideas, evaluating the usefulness of original ideas may elicit deeper and more analytical processing than when evaluating the usefulness of mainstream ideas. The existing literature has identified a positive relation between deliberative decision-making tendency and risk aversion. It has been shown that deliberative thinkers are more risk-aversive than intuitive thinkers, and that in risky and uncertain decision making environments deliberative processing is more likely to lead to conservative and risk-aversive decisions (Butler, Guiso, & Jappelli, 2014). Therefore, during creative idea selection, deliberative thinkers may focus on evaluating the potential risks of the available ideas. As a consequence, they may overestimate highly useful ideas of average originality, while underestimating original high-quality ideas. Mueller et al. (2011) showed that under condition of high uncertainty or when a low tolerance for uncertainty was evoked, participants were more implicitly biased against originality relative to usefulness. Also, participants in the low-uncertainty-tolerance condition evaluated creative ideas as less creative than those in the high-uncertainty-tolerance condition. Importantly, it has been shown that manipulating reliance on intuition can reduce risk aversion (Butler, Guiso, & Jappelli, 2013). By being less risk-aversive during creative idea selection, intuitive processing may lead to a more accurate evaluation of ideas and result in the preference of high-quality original ideas relative to mainstream ideas. As creativity correlates higher with originality than with usefulness (Diedrich, Benedek, Jauk, & Neubauer, 2015), we hypothesize that intuitive processing outperforms deliberative processing in selecting creative ideas. Two experiments were designed to test this hypothesis. In both experiments participants had to select the six most creative ideas from 18 possible solutions to a problem, and selection instructions were manipulated to foster an intuitive