Unraveling Effects of Novelty on Creativity

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Novelty is inherent to creative processes. A positive effect of novelty on creative task performance was therefore predicted. However, creativity can benefit from divergent, as well as convergent thinking. Subsequently, novelty may benefit creative performance when divergent thinking is required, but it could inhibit creative performance when convergent thinking is required. In Study 1, participants were primed with novelty or familiarity, and performed a creativity task that required divergent thinking. Results showed a beneficial effect of novelty priming on originality of the answers. In Study 2, a creativity task that required convergent thinking was framed as novel, familiar, or neutral. Results showed an inhibitory effect of novelty on creativity. Results are related to information processing styles, and implications for creativity and novelty research are discussed.

The world is rapidly developing and continuously changing. Creativity helps people cope with these developments and changes, rendering it crucial for keeping track of their surroundings. Furthermore, it is a key component in problem solving (Mumford, Mobley, Uhlman, Reiter-Palmon, & Doares, 1991; Runco, 1994, 2004; Torrance, 1971). Creativity can be defined in terms of ideas, insights, solutions, or products that are original and useful (Amabile, 1983; Paulus & Nijstad, 2003). As such, creativity allows people to flexibly adapt to changing environments (Flach, 1990; Runco, 1986, 1994).

Research within the area of creativity has uncovered an array of variables that affect creative behavior. For instance, affect, hedonic tone, motivation, learned behavior, approach/avoidance behavior, and temporal distance all have been shown to influence creativity (Baas, De Dreu, & Nijstad, 2008, 2011; De Dreu, Baas, & Nijstad, 2008; Epstein, 1990; Friedman & Förster, 2000, 2001, 2002). Among many contextual influences on creativity are those of task instructions. For example, merely mentioning creativity in creativity task instructions increases creative performance (e.g., Harrington, 1975; Manske & Davis, 1968; Shalley, 1991; Speller & Schumacher, 1975). Motivational underpinnings for this effect have been proposed: Mentioning rewards for original thinking may enhance extrinsic motivation, increasing creative performance (e.g., Eisenberger & Rhoades, 2001). However, such creative instructions might include notions of novelty, because creativity implies generation of something new. Förster, Marguc, and Gillebaart (2010) postulated Novelty Categorization Theory, proposing that when people encounter novel events or are being primed with novelty, they tend to use broader mental categories, as compared to encountering familiar events. Novelty Categorization Theory also suggests that this tendency is based on a motive to know, because broadening of mental categories facilitates integration of novel information into preexisting knowledge schemas, making the novel information easier to understand. This mindset that comes with novelty may, in fact, be functional in creative performance, because broadening of mental categories could facilitate thinking outside of the box. On the other hand, increasing creative thought when encountering novel information may be functional as well, because it may facilitate understanding and learning of the novel event (see also Förster, Liberman, & Shapiro, 2009).

However, novelty should not enhance all aspects of creativity. Creativity can profit from both convergent
and divergent thinking. Divergent thinking is defined as the ability to produce multiple original responses to a specific stimulus (Clark, Veldman, & Thorpe, 1965; Guilford, 1956). It can be measured with an instances-task (e.g., Friedman & Förster, 2001; Murray, Sujan, Hirt, & Sujan, 1990; Smith, Ward, & Schumacher, 1993), during which participants are asked to generate as many ideas, objects, or uses for a certain object they can think of (e.g., “Name as many things you can think of that move on wheels”). Creativity is then assessed by looking at the amount of answers given and categories used, and originality of responses. Convergent thinking is defined as the ability to select a correct response from a set of alternatives, or deducing this correct response from a set of stimuli. Although divergent thinking is usually considered to be more related to creativity than convergent thinking (Clark et al., 1965; Guilford, 1956), both can be adaptive in creative processes (Baas et al., 2008; De Dreu et al., 2008; Nijstad, De Dreu, Rietzschel, & Baas, 2010; Ward, 1975). For instance, the Remote Associates Task (RAT) for measuring creative ability requires the participant to form “mutually distant associative elements into new combinations which are useful and meet specified as well as unforeseen requirements” (Mednick, 1962, p. 213). Specifically, participants are presented with sets of three words (e.g., wine, dark, cold) and are asked to identify the common link (e.g., cellar). One can imagine convergent thinking to be beneficial in finding the required association here.

A novelty prime may activate remote exemplars of certain categories, supportive of divergent thinking, by broadening mental categories. However, a novelty prime may inhibit people’s focus on the given material because of too much broadening of mental categories, reducing the ability to deduce a correct option when prompted, and may thus be detrimental to convergent thinking. Two studies were conducted to test these predictions on novelty and creative performance.

In Study 1, novelty was predicted to enhance originality in divergent creativity, because novelty leads to global information processing, broadening of mental categories, and abstract thinking, all of which may benefit divergent thinking. A noncreative task was added to the design to rule out the possibility that novelty priming generally enhances motivation. This would follow from the suggested explanation for the positive effects of mentioning creativity in task instructions (e.g., Eisenberger & Rhoades, 2001). An additional prediction was that effects of the nontask-related novelty prime would carry over to the unrelated creativity task, in contrast with studies using the mentioning of creative in the actual creativity task instructions. However, novelty was predicted to inhibit convergent creativity, because of global processing, broad categories, and abstract thinking inhibiting convergent thinking. This prediction was tested in Study 2. Because affect has also shown to influence creativity (Baas et al., 2008), measures of mood, motivation, and liking were included in both studies.

STUDY 1: NOVELTY PRIMING AND DIVERGENT THINKING

Method

Participants and design. Ninety-nine first-year psychology students (75 women, M<sub>age</sub> = 21.4 years, SD = 3.61 years) from the University of Amsterdam participated in this study. All participants signed an informed consent form and were rewarded with course credit. Participants were randomly distributed over four conditions (novelty–creative, familiarity–creative, novelty–noncreative, familiarity–noncreative).

Materials and procedure. A novelty versus familiarity priming procedure was adapted from Förster et al. (2009). Participants in the two novelty conditions spent 5 min writing about a cruise vacation as if they had never been on one, and participants in the familiarity condition spent 5 min writing about a cruise vacation as if they had been on one. Subsequently, participants performed the allegedly unrelated creative/noncreative task.

As a creative task, the aforementioned instances-task was used (Wallach & Kogan, 1965). Participants were asked to name as many things they could think of that moved on wheels during 8 min. Responses were scored on four components by two independent raters who were both blind to the participants’ conditions (procedure adapted from research by Baas, De Dreu, & Nijstad, 2008; Guilford, 1967; Mumford, 2001; Torrance, 1966):

1. Originality: If a response was given by 5% or more of the participants, no points were rewarded. If the response was given by 1-4% of the participants, one point was rewarded. If the response was given by less than 1% of the participants, two points were rewarded.
2. Fluency. Total amount of valid responses.
3. Flexibility. Total amount of different categories used (e.g., transportation, toys)
4. Elaboration. Participants received one point if there was a detailed answer, (e.g., “the tram passing by my house” compared to “tram”).

Dividing originality by fluency, an originality ratio was calculated to control for contamination between originality and fluency (more answers resulting in more original answers).

Novelty priming was specifically predicted to enhance originality, because this dimension best reflects divergent
Noncreative task 2.00 1.00 2.20 .87
Flexibility 2.21 .66 2.32 .75
Fluency 26.71 6.04 25.64 6.30

As predicted, participants interaction, tions are displayed in Table 1. There was no significant (novelty performance on the creativity task explored using a 2
time, before novelty priming and after
Originality ratio .21

To be able to control for any mood effects, participants indicated how they were feeling at that moment on a 7-point Likert scale (1 = very bad to 7 = very good) two times, before novelty/familiarity priming and after the creative/noncreative task. Finally, participants were debriefed and rewarded.

Results

The effect of novelty versus familiarity priming on performance on the creativity task explored using a 2 (novelty/familiarity) × 4 (originality/fluency/flexibility/elaboration) MANOVA. Means and standard deviations are displayed in Table 1. There was no significant interaction, F(6,42) = 1.61, p = .17, and simple main effects were analyzed to test the specific predictions (Rosnow & Rosenthal, 1996). As predicted, participants primed with novelty gave more original answers than participants primed with familiarity, F(1,47) = 6.05, p < .05, η²p = .13, also when controlling for fluency by using the originality ratio, F(1,47) = 6.48, p < .05, η²p = .10. As predicted, novelty priming did not affect fluency, flexibility, and elaboration, Fs < 1. A one-way ANOVA showed no effect of novelty condition on noncreative performance, F < 1. Measured mood did not differ between the novelty/familiarity and creativity/noncreativity conditions before or after the priming phase, and mood did not mediate any of the effects.

In Study 2, the focus was on creativity requiring a convergent thinking style, thereby further unraveling the effects of novelty on creativity.

TABLE 1
Means and Standard Deviations on All Creativity Components and the Noncreative Task for the Novelty and Familiarity Conditions

<table>
<thead>
<tr>
<th>Noveltly</th>
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<th>Familiarity</th>
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<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Originality</td>
<td>5.88a</td>
<td>4.15</td>
<td>3.40b</td>
</tr>
<tr>
<td>Originality ratio</td>
<td>.21a</td>
<td>.13</td>
<td>.13b</td>
</tr>
<tr>
<td>Fluency</td>
<td>26.71</td>
<td>6.04</td>
<td>25.64</td>
</tr>
<tr>
<td>Flexibility</td>
<td>2.21</td>
<td>.66</td>
<td>2.32</td>
</tr>
<tr>
<td>Elaboration</td>
<td>1.08</td>
<td>1.28</td>
<td>1.00</td>
</tr>
<tr>
<td>Noncreative task</td>
<td>2.00</td>
<td>1.00</td>
<td>2.20</td>
</tr>
</tbody>
</table>

Note. Means with different superscripts in the same row differ significantly at the p < .05 level.

STUDY 2: NOVELTY FRAMING AND CONVERGENT THINKING

Methods

Participants and design. Sixty-two first-year psychology students from the University of Amsterdam (54 women, Mage = 21.3 years, SD = 7.16 years) participated in this study. All participants signed an informed consent form and were rewarded with course credit. Participants were randomly distributed over 3 conditions (novelty framing, familiarity framing, control condition).

Materials and procedure. The novelty versus familiarity framing procedure was adapted from Förster et al. (2009). In the novelty condition, the creativity task was framed as “a new task, a task you have never done before.” In the familiarity condition, the creativity task was framed as “a familiar task, a task that you have probably done before.” In the control condition, neither novelty nor familiarity of the task was mentioned.

To measure convergent creativity, an aforementioned RAT (Kray, Galinsky, & Wong, 2006; Mednick, 1962) was used, consisting of 30 items, in a random order. Of these items, 10 were easy (toe, shoe, walk – foot; participants usually answer 8 out of 10 correctly), 10 were medium (warm, night, striped – pajamas; participants usually answer 5 out of 10 correctly), and 10 were difficult (pig, egg, fat – bacon; participants usually answer 2 out of 10 correctly). Participants received 1 point per correct answer. Scores for the sets of easy, medium, and difficult items ranged from 0 to 10. Novelty framing was especially predicted to affect scores on the difficult items, because the effects are thought to be quite subtle, and may be overruled by the lack of cognitive resources required for performance on the easy and medium items.

Following the framed RAT, participants indicated how much they liked the task, and how motivated they were to perform the task (7-point Likert scales reaching
Results

A 3 (novelty/familiarity/control) × 3 (easy/medium/difficult items) MANOVA was conducted to explore effects of novelty/familiarity framing on scores on the easy, medium, and difficult RAT-items. Means and standard deviations are displayed in Table 2. There was no significant interaction effect between framing condition and difficulty of the items, $F(6,116)=1.61$, $p=.15$. Simple main effects were analyzed to test the specific predictions (Rosnow & Rosenthal, 1996).

There was a predicted effect of framing condition on the sum score on the difficult items, $F(2,59)=4.20$, $p<.05$, $\eta_p^2=.13$. Subsequent contrast analyses showed that participants in the novelty condition performed worse than participants in the familiarity condition, $t(59)=-2.77$, $p<.01$, and control condition, $t(59)=-2.03$, $p<.05$. The familiarity and control conditions did not differ, $t(59)=-.54$, $p=.59$, indicating an inhibitory effect of novelty rather than a facilitative effect of familiarity. No effects of framing condition were found for the easy and medium items, $F$s < 1. Participants did not differ in how much they liked the task, or in how motivated they were. Liking of the task and motivation during the task did not mediate any of the effects.

GENERAL DISCUSSION

Two studies revealed differential effects of novelty on creative performance requiring either convergent or divergent thinking. Novelty enhanced divergent creativity, but inhibited convergent creativity. Importantly, through measuring mood (Study 1), liking of the task (Study 2), and motivation to perform the task (Study 2), mood as a mediator seems unlikely; mood was also not responsible for effects of novelty on several measures of information processing styles in former studies and the materials used in the current studies have been shown not to elicit moods (Förster et al., 2009). Additionally, a general motivational effect of the prime was ruled out by including a noncreative task in Study 1.

In Study 1, the beneficial effect of novelty was limited to originality. Divergent thinking would, indeed, be most beneficial on this dimension. Global processing, abstract thinking, and broader mental categories would make it more likely for an original response to emerge. Divergent thinking does not necessarily have to lead to more responses in general (fluency, see Friedman & Förster, 2001). Also, global processing and broader mental categories would not necessarily change one’s ability to switch between categories (flexibility), or the amount of detail in one’s responses (elaboration).

Study 2 revealed an inhibitory effect of novelty on performance on difficult items of the RAT, and not on easy and medium items. This pattern of result was predicted, because the easy and medium items are relatively simplistic to begin with, and would thus require fewer resources. Performance on these items may, therefore, be hard to counteract. Our framing may thus have simply had no effect on the responses to these items.

Changes in processing style elicited by novelty/familiarity may underlie the effects on creative performance. Several studies have demonstrated that simply imagining novel events or framing tasks as new leads to more global information processing (focusing on the forest rather than the trees), broadening of mental categories (living vs. nonliving, rather than cats vs. noncats), and more abstract thinking (framing locking the door as attaining security, rather than turning a key) than familiarity (Förster et al., 2009). Moreover, broadening of mental categories and perception enhances creativity (Ashby, Isen, & Turken, 1999; Förster, Friedman, & Liberman, 2004; Murray et al., 1990). In line with this, Friedman, Fishbach, Förster, and Werth (2003) showed increased creativity following global processing. Changes in processing style or breadth of categorization may thus mediate the effects of novelty on creative performance. Future research may attempt to explicitly show a mediational pathway. However, using separate experiments to demonstrate each of the pathways explicitly, as has been done in previous research and our studies, may also allow for conclusions considering mediational processes (see Spencer, Zanna, & Fong, 2005). Findings from the current studies add to recent theorizing and empirical work on novelty and information processing (Förster et al., 2009; Förster et al., 2010). Furthermore, following studies that defined convergent and divergent thinking as orthogonal constructs (Clark et al., 1965), our findings also add to literature on creativity as a multi-component construct (Baas et al., 2008; De Dreu et al., 2008; Nijstad et al., 2010). Apparently, creativity can profit or suffer from one and the same prime, depending

### TABLE 2

<table>
<thead>
<tr>
<th>Novelty</th>
<th>Familiarity</th>
<th>Control</th>
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<tbody>
<tr>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Easy</td>
<td>6.48</td>
<td>1.34</td>
</tr>
<tr>
<td>Medium</td>
<td>5.91</td>
<td>1.78</td>
</tr>
<tr>
<td>Difficult</td>
<td>4.38</td>
<td>.66</td>
</tr>
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</table>

Note. Means with different superscripts in the same row differ significantly at the $p<.05$ level.
on the kind of creative thought required and presumably the processing style that is elicited by the prime.

As to facilitative effects of mentioning creativity in task instructions (e.g., Harrington, 1975; Manske & Davis, 1968; Shalley, 1991; Speller & Schumacher, 1975), our findings demonstrate that processes elicited by a novelty prime can carry over to an unrelated creativity task. This suggests that the extrinsic motivation explanation for task instruction effects (e.g., Eisenberger & Rhoades, 2001) does not cover the whole story. Instead, an additional process is proposed where processing and/or thinking styles affect different components of creativity. One may suggest that the creative instruction reminds people of novelty, triggering global processing in support of creative generation. If so, merely thinking of novel events should trigger creativity. Future research may show more explicitly whether mentioning creativity, indeed, activates thoughts of novelty. Future research may also focus on explicitly showing mediators in the effects of novelty on creativity, like global processing or broadening categories. For now, our findings hold several applied implications. For instance, if one wants to display divergent creativity, it might be a good idea to imagine something new before starting the task. However, if one desires a creative outcome based on convergent thinking, it might be useful to see beauty in the familiar, and let the unknown remain unloved.

REFERENCES


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