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General Discussion
CHAPTER 5
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The core focus in this dissertation was on how to optimally match person and context to ensure that people perceive the creativity in novel ideas, and to stimulate optimal creative performance and task enjoyment. We expected that ‘one size does not fit all’, and that different people would thrive in different contexts. Following the interactionist perspective on creativity (Woodman, Sawyer, & Griffin, 1993), several open questions remained regarding the antecedents and consequences of creative performance. First, although the identification of novel ideas as creative is key to new product development and innovation (Zhou & Hoever, 2014), little is known of what constitutes a creative idea, why, and for whom, and for what purpose. Hence, we found it important to investigate how to create the optimal circumstances for people to attain creative idea generation, and when creative ideas are generated, to ensure that they are also recognized as such. This increases the likelihood that individuals, teams, and organizations can benefit from the creative ideas generated. By investigating these questions (Chapter 2), we found that the perception of creativity seems to imply some sort of valuation or appreciation of the idea (Runco & Smith, 1992), and is affected by the perception of novelty, feasibility, positive surprise, and disruptiveness. Perceptions of creativity were constituted similarly for laypeople and experts, and affected the expectations of success of novel ideas, willingness to endorse their implementation, and their perceived added value for further idea generation.

Second, knowing this, we tested if and how well people were actually able to use novel ideas as a starting point for further idea generation, and expected and found that this differed per person (Chapter 3). Given that group work is ubiquitous in modern organizations, and that group brainstorming remains highly popular despite the risks of productivity loss (cf. Nijstad & Stroebe, 2006), we found it important to understand more about the factors that contribute
to (or inhibit) creative idea generation. Although recognizing creativity revolves around perceptions of other people’s ideas, whereas cognitive stimulation concerns generating ideas oneself, our findings suggest that the two processes are strongly interrelated. We expected and found that the indirect effect of input novelty on cognitive stimulation through perceived creativity was affected by individual differences: in this case, people's psychological needs for structure and autonomy.

Last, we focused on individual differences in approach-avoidance motivation and people's tendency to use a specific cognitive pathway when brainstorming, in order to investigate what type of input (diverse or homogenous) would be optimal for cognitive stimulation to occur (Chapter 4). Our findings suggest that both approach-motivated and avoidance-motivated people seem to use input as an important additional search cue, and are stimulated to follow the cognitive pathway that aligns with the diversity level of the input. It thus seems that the input received has a strong effect on the cognitive pathway used, and that both approach- and avoidance-motivated people adapt their cognitive pathway to the input received. The following section gives an in-depth overview of the main research questions answered and the contributions per chapter of this dissertation.

Overview of Main Findings and Contributions

1. Does our common scholarly definition of creativity go hand-in-hand with people’s perception of what constitutes a creative idea? Not necessarily, as we saw in Chapter 2. In Chapter 2, we investigated and found in three studies that people’s perception of creativity includes more elements than novelty and feasibility alone (our common definition of creativity, cf. Hennessey & Amabile, 2010). Perceiving ideas as creative constitutes a positive evaluation of such ideas, but novel ideas may not always evoke this perception. We found it important to know how the perception of creativity is formed, as perceiving the creativity in proposed ideas forms a crucial first step to investigating, selecting, and implementing these
ideas (Bunzeck & Düzel, 2006; Johnston, Hawley, Plewe, Elliott, & DeWitt, 1990; Schulz, 2001; Zhou, May Wang, Jiwen Song, & Wu, 2016). We showed that perceiving ideas as creative relates to a perception of high novelty, feasibility, and positive surprise, and low disruptiveness. Thus, ideas are seen as creative when they are perceived as welcome, new, and useful additions to the task at hand. However, as novel ideas are less closely related to one’s own mental images (Dugosh & Paulus, 2005) and existing knowledge, this lowers the perception of novel ideas as being feasible, and increases the perception of their disruptiveness. Also, for both laypeople and people in creative industries, this serially affected the expectation of success of novel ideas, the willingness to endorse their implementation, and their perceived added value as a starting point for idea generation.

2. Is novel input stimulating in generating creative ideas? Not for everyone, as we saw in Chapter 3. In Chapter 3, we showed that perceiving the creativity in novel ideas forms a necessary first step to be cognitively stimulated by the input (that is, to achieve more productivity and idea diversity, to increase task enjoyment, and not to feel blocked). Here, we aimed to address the inconsistent finding in the brainstorming literature that cognitive stimulation sometimes results from novel input (e.g., Berg, 2014), and other times from non-novel input (e.g., Dugosh & Paulus, 2005). Although one might intuitively expect that idea novelty enhances cognitive stimulation (see, for example, Connolly, Routhieaux, & Schneider, 1993), its role appears to be complex. With three experimental studies, we demonstrated that the link between input novelty and cognitive stimulation partly depends on people's psychological needs for structure and autonomy. Additionally, we showed that the perceived creativity of the input mediates this relationship, in line with previous research indicating that the role of novelty in the perception of creativity is less than straightforward (e.g., Mueller, Wakslak, & Krishnan, 2014; De Jonge, Rietzschel, Van Yperen, & Mueller, 2019 (Chapter 2)). The effect of novel input (vs. non-novel input), through perceived
creativity, on cognitive stimulation was stronger for people who were either low in need for structure or high in need for autonomy. Also, when the input people received did not fit their needs, they experienced less psychological cognitive stimulation from this input (i.e., less task enjoyment and feeling more blocked) compared with when they did not receive any input. Hence, the level of cognitive stimulation in brainstorming seems to depend on input novelty, perceived creativity, and people's psychological needs.

3. *How do we use input to come up with creative ideas?* In Chapter 4, we showed that input diversity and individual differences determine the effectiveness of two cognitive pathways to generate ideas when brainstorming. Previous research indicates that input can result in cognitive stimulation both when it covers a wide and when it covers a small range of perspectives (i.e., is high or low in diversity) (Nijstad, Stroebe, & Lodewijkx, 2002). Yet, the extent to which input does so may depend on individual differences (also see, De Jonge, Rietzschel, & Van Yperen, 2018 (Chapter 3)) that are associated with a preference for a particular cognitive pathway towards creativity. Approach-motivated people tend to use a flexible cognitive pathway that is characterized by generating ideas from diverse semantic categories, whereas avoidance-motivated people use a persistent cognitive pathway by generating ideas from deeper within few semantic categories. We argued and demonstrated in two experimental studies that both the type of input and people’s approach-avoidance motivation determine which cognitive pathway results in creative idea generation. Diverse input stimulated the use of the flexibility pathway, while homogeneous input stimulated the use of the persistence pathway, both in turn increasing idea generation. Sometimes, the cognitive pathway reflected by the input formed a beneficial addition that was used next to people’s usual pathway; other times, the stimulated pathway formed a better alternative for cognitive stimulation to occur. These findings indicate that both approach-motivated and avoidance-motivated people use input as an important additional search cue to achieve further
idea generation, and are stimulated to follow the cognitive pathway that aligns with the diversity level of the input.

**Limitations**

While the findings of the current dissertation may already be useful and insightful for brainstorming, it is important to also highlight some general limitations. In the current dissertation, we often used a simulated group brainstorming situation. This format was chosen as it allowed us to control the type of input received, and enabled us to investigate how different types of input affect one’s cognitive stimulation and idea generation. A limitation of this simulated setting is that we cannot draw inferences about group level creativity. Also, we only looked at the effects of task relevant information (that is, receiving information that is in line with the task goal). Participants received ideas, but did not have the ability to communicate thoughts or questions and could not synchronously chat with each other. This decision was made in order to create a controlled experimental setting in which the type of ideas received could be manipulated. Future research could extend the current investigations by moving towards an actual group brainstorming situation and allowing for synchronous communication. Besides sharing ideas, this will likely also result in communicating emotional connotations, expectations, values, and attitudes. Additionally, it is not uncommon for people to share and receive entirely irrelevant information that require one’s attention in order to determine its relevance for one’s job (Forster & Lavie, 2008). Including these elements will give further insight in the effect such information sharing has on further idea generation and creative performance.

Finally, in most studies, participants were led to believe they were working together with another participant on the task at hand. As participants never met the other participant, had no shared past, and had no expectation of working together in the future, these (fictitious) ad hoc teams were solely formed for the duration of the study and may differ in important
ways from teams formed in the work setting. Future studies could investigate brainstorming effectiveness in teams that are created for a much longer time, have a shared past, and an expected shared future. In teams with a shared past, aspects such as likeability, and the level of trust and familiarity with each other, will additionally affect work perceptions (Alge, Wiethoff, & Klein, 2003), and may affect the willingness and effectiveness of group brainstorming as well.

**Avenues for Future Research**

Although our results add to our understanding of how perceptions of creativity are formed, and provide insight into the circumstances that increase creative performance, more research is obviously needed. Several avenues for future research arise from the interactionist perspective on creativity (Woodman et al., 1993), and from aiming to bridge streams of research on creativity and innovation.

As elaborated in Chapter 1, the interactionist perspective on creativity describes creativity as evolving from a complex actor-context interaction (Woodman et al., 1993). In the current dissertation, the actor component was investigated from the individuals’ perspective. Other levels at which the actor component could be investigated are at the team or organizational level, and doing so could be a great avenue for future research. “At the team level, creativity is a consequence of individual creative behavior, the interaction between the group members (e.g., group composition), group characteristics (e.g., norms, size), team processes, and contextual influences (e.g., organizational culture, reward systems). At the organizational level, innovation is a function of both individual and group creativity (Anderson, Potočnik, & Zhou, 2014, p.1300)”.

In line with this, both Chapter 3 and Chapter 4 highlighted that cognitive stimulation not only depends on people’s personal characteristics and their preference for a specific cognitive pathway, but also depends strongly on the influence people experience from the input of others. These research findings provide a
starting point for further theoretical elaboration, and highlight the effect of both the individual and the team level in cognitive stimulation. Moving towards the team level, future research suggestions such as those mentioned in Chapter 4 could be very relevant to investigate. One fruitful possibility is to further extend the *Dual Pathway to Creativity Model* (DPCM) (De Dreu, Baas, & Nijstad, 2008) by including the group level, which might be called the *Dual Pathway to Creativity in Groups Model* (DPCGM). To this end, the view of groups as information processors provides a useful basis (Hinsz, Tindale, & Vollrath, 1997). It indicates that the sharing of ideas and information affects both individual- and team-level outcomes, and that cognitive processes occur not only within but also among team members. Resulting from this, we suggest that the DPCGM includes the aspect of input and its characteristics (such as novelty or diversity; see also, De Jonge et al. 2018; 2019 (Chapers 3 and 4)) and represents the cognitive pathways of flexibility and persistence at the group level. We speculate that this group-level tendency depends both on (a) the composition of the group members’ intrapersonal characteristics and preferences for a specific cognitive pathway (i.e., the individual differences and states included in the DPCM), and (b) on the interpersonal characteristics and the influence people experience from each other’s input. As further research is needed, and important, to test these interpersonal and group-level positions, we invite other researchers to investigate and further elaborate on the DPCGM.

Another fruitful avenue for future research is to further bridge lines of research on creativity with those on innovation. In the current dissertation, the focus was on the outcome of creative idea generation, and on investigating how creativity can optimally occur. As a next step, it is important to gain better insight into how to move from creativity to innovation, as each requires the other. “Whereas creativity focuses on idea production, innovation includes both idea production and implementation. As such, creativity is the first and crucial stage of innovation, but predictors of ideation and implementation are likely to differ” (Zhou &
Hoever, 2014, p. 335). Creativity is necessary for innovative behavior and organizational effectiveness (Amabile, 1983; Paulus & Nijstad, 2003). But creativity in itself - without moving towards innovation or successful implementation - is not very useful for the team or organization, as it does not result in any actual changes nor stimulate the added advantage hoped for.

To this end, it is useful to investigate how we can further optimize the processes of selection and implementation of those ideas that are most promising and creative, ensuring that ideas get implemented that are both novel and feasible, and that will likely create the added value aimed for. Previous research has unfortunately indicated that selecting the creative ideas generated is not a smooth or straightforward process. People often fail to select the creative ideas for implementation, instead selecting the more common and everyday ideas (cf. Rietzschel, Nijstad, & Stroebe, 2010; Mueller, Melwani, & Goncalo, 2014). This partly has to do with a bias against creativity: although people admire creative ideas, they often reject them owing to uncertainty about their usefulness and chances of success (Mueller et al., 2014). However, selecting the more common and everyday ideas for implementation will not result in innovation. These ideas are by default not creative, but represent ideas that are more routine, mundane, and reproductive. At the same time, uncommon ideas that are different from the usual are not guaranteed to be highly creative or innovative either (Simonton, 2018). In this sense, creative idea selection can be seen as a high risk, high gain situation: high in risk, as the successfulness of such new ideas is uncertain, but with the possibility of high gains when the implementation of creative ideas indeed results in the innovation and success hoped for.

Given that we do not know up front whether a novel idea will indeed be useful and result in innovation, developing and testing novel ideas may require a trial and error process in the form of “blind variation and selective retention” (Campbell, 1960, p.380). Hence,
developing and implementing new ideas may require some form of risk taking by the creator, feeling more at ease to risk failure (Simonton, 2018). Related to this, previous research indicates that feelings of uncertainty and motivation to reduce uncertainty can activate the previously mentioned creativity bias. This bias activates more negative associations with creativity, and results in lower evaluations of creative ideas (Mueller et al., 2012). This relates to other research indicating that innovative behavior is stimulated when positive performance outcomes are expected, but is hindered when the focus is on image outcomes (Yuan & Woodman, 2010). Also, innovative behavior can be seen as a risky endeavor that brings not only benefits, but also costs to employees who engage in it. Costs relate to possible dissent and conflict with colleagues who want to prevent innovative change, as aiming to implement new ideas challenges the status quo in the organization (Janssen, 2003). Future research is needed to test whether risk-taking is positively related to the selection and implementation of novel ideas.

**Practical Implications**

It seems that people can benefit from the ideas of others (Brown et al., 1998; Dugosh et al., 2000; Stroebe, Nijstad, & Rietzschel, 2010), but only in certain circumstances. In practice, organizations and teams could benefit from our findings by taking both the person and context into account, as well as the interaction between the two, by taking on an interactionist perspective (Woodman et al., 1993). First, being aware of the individual differences of team members rather than using a ‘one size fits all’ approach is important when aiming to increase productivity and cognitive stimulation. Managers or teams could, for example, discuss individuals’ personalities, needs, and preferences with them, and investigate together how the context can be adapted to the individual to enhance their creative performance. When brainstorming is conducted in groups with several members, all members bring their own personality and preferences to this group. It is thus very unlikely that the work
setting matches everyone’s needs. In these cases, team-level interventions may be necessary in order to make brainstorming work. A possible intervention is to investigate workers’ psychological need patterns and to create brainstorming groups composed of workers with similar preferences. This allows for the creation of a brainstorming setting that is adapted to everyone’s psychological needs (i.e., by creating a more structured versus ill-structured brainstorming setting).

Second, the positive perception of another’s idea as being creative depends on its stimulating potential (Zhou et al., 2017) and on the elements of perceived novelty, feasibility, positive surprise, and disruptiveness (De Jonge et al., 2019) (Chapter 2). Our findings indicate that novel ideas open up new possibilities that have wanted and unwanted elements, which either positively or negatively affect the perception of creativity. Because of this, it may be fruitful to train people to reflect on the creative potential of various types of input (Chapter 3). People could be taught how to deal with and use original or unusual input: namely, as a useful tool to consider the topic from a new angle. Alternatively, it may help to indicate why the possible lack of feasibility of novel ideas does not have to be a problem. Seeing the idea as raw material for further development may help people to withhold immediate evaluation or rejection of such ideas in terms of their (in)feasibility. Making the revision and development of ideas a fundamental part of idea selection (see also, Lonergan, Scott, & Mumford, 2004) can help to open up the willingness to further adapt and refine novel ideas to make them implementable and valuable (Litchfield et al., 2015). Such training may be especially valuable for those high in need for structure, who tend to perceive novel ideas as disruptive rather than creative (Chapter 3). At the same time, people could be made aware of the potential benefits of receiving more common input: namely, as a starting point to activate a new train of thought, in order to generate more original ideas themselves. This may be especially useful for people high in need for autonomy, who tend to feel blocked by common ideas (Chapter 3).
Training teams to value information diversity might be a useful starting point in this regard, in order to stimulate the active consideration of the viewpoints and ideas of others. Previous research has indicated that such positive diversity beliefs increase the performance of informationally diverse groups, as they help people to elaborate more on the information shared (Homan, van Knippenberg, Van Kleef, & De Dreu, 2007). Focusing on the added value of diverse input may be practical as well, as we suspect that if one of the team members were to take on a flexibility approach by generating ideas from diverse perspectives (Chapter 4), the brainstorming group would automatically switch to sharing diverse rather than homogenous input.

Alternatively, electronic brainstorming could be implemented as a heterogeneous practice, in which different brainstorming formats are provided within the computer program used. In this case, a structured form can be provided, in which people receive input from co-workers structured per mental cluster to stimulate the persistence pathway, or an ill-structured form, in which people receive input from different mental categories at random to stimulate the flexibility pathway. Based on their personalities, needs, and preferences, individual group members can select what type of brainstorming suits them best (Chapter 4). This fit can increase workers’ motivation to attend to input from others, which in turn increases creative performance (Dugosh et al., 2000). Also, people could be informed about the two possible cognitive pathways (namely, flexibility and persistence) to idea generation, and that these seem to work well for different types of input. As people seemed to be able to take on a new cognitive pathway that differed from their usual tendency (Chapter 4), such training could aid the implementation of the cognitive pathway that most likely stimulates further idea generation in a certain situation. Such interventions hopefully increase the likelihood that individuals and teams can benefit from the input they receive, and can see the added value of various types of input in generating creative ideas themselves.

Conclusion

My key motivation in writing this dissertation on creativity was to understand why and how a context that is effective and stimulating for one person’s creativity can be ineffective and hindering for another. The findings presented in this dissertation indicate that ’one size does not fit all’, and that different people thrive in different contexts. We showed that both wanted (i.e., perceived novelty and positive surprise) and unwanted elements (i.e., expected low feasibility and disruptiveness) are inherently associated with novel ideas, and that these elements differently affect the perceptions of creativity and effectiveness of novel ideas. Focusing on creative idea generation, we found that the effectiveness of various input (input high or low in novelty or diversity) depends on and interacts with people’s individual differences. These research findings highlight the importance of matching person and context to attain creative performance. We encourage other researchers to investigate and further elaborate on the actor-context interplay, and to investigate the actor component from various levels (i.e., the person, team, and organizational levels). The current as well as future research will hopefully help us to better understand the mechanisms through which creative performance unfolds, and enable us to create the ideal circumstances for people to generate creative ideas when brainstorming.
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The identification of novel ideas as a creative contribution is key to new product development and innovation, but little is known of what constitutes a creative idea, why, and for whom, and for doing what. By investigating these questions (Chapter 2), we found that the perception of creativity seems to imply some sort of valuation or appreciation of the idea (Runco & Smith, 1992), and is affected by the perception of novelty, feasibility, positive surprise and disruptiveness. Creativity perceptions were constituted similarly for laypeople and experts, and affected the expected success of novel ideas, the willingness to endorse implementation, and the perceived added value for further idea generation. Knowing this, we tested if and how well people are actually able to use novel ideas as a starting point for further idea generation, and expected this to differ per person (Chapter 3). Given that group work is ubiquitous in modern organizations, and that group brainstorming remains highly popular despite the risks of productivity loss, we found it important to understand more about the factors that contribute to (or inhibit) creative idea generation. Although recognizing creativity revolves around the perception of other people's ideas, whereas cognitive stimulation concerns generating ideas oneself, our findings suggest that the two processes are strongly interrelated. We expected and found that the indirect effect of input novelty on cognitive