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Divergent and Convergent Collaborative Creativity

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Much creative activity happens in groups. Many domains such as science, the arts, technology, marketing, and government involve collaborative discussions to generate ideas for solutions to problems. Potentially these discussions can lead to novel ideas and solutions as participants share ideas, are stimulated to think of new ideas, and build on the shared ideas. People typically enjoy these discussions and perceive them to be effective (Paulus, Dzindolet, Poletes, & Camacho, 1993). Information exchange in teams is associated with perceptions of enhanced creativity (Hülsheger, Anderson, & Salgado, 2009). Further, perceptions of team creativity tend to be greater in contexts where team members feel psychological safety, mutual trust, and cultural support (West, 2003).

Although the team literature provides some support for the creative benefits of collaborative innovation, most of the studies have used self- and other-reports of creativity. These may reflect reality to some extent, but studies have found that self-reports are often an unreliable measure of creativity (Paulus et al., 1993; Reiter-Palmon, Robinson-Morral, Kaufman, & Santo, 2012). Most research with more objective measures of performance have been limited to controlled studies of temporary groups in laboratory settings. These studies allow for detailed measures of performance and testing of theory-based hypotheses. This research and the related theoretical models provide a strong basis for the practice of collaborative innovation in real world settings and

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some of the major findings appear consistent with those of the team innovation literature (Paulus, Dzindolet, & Kohn, 2012).

However, much of the past research has focused almost exclusively on group brainstorming and divergent processes that contribute to idea generation (Cropley, 2006; McMahon, Ruggeri, Kämmer, & Katsikopoulos, 2016). Although divergent ideation is integral to creativity, real-world innovation often requires the type of convergent synthesis rarely studied in laboratory groups (Harvey, 2014). Innovative groups are often tasked with not only generating novel ideas, but also idea evaluation and selection, elaboration and development of ideas, and finally idea implementation. In this chapter our major focus will be to highlight both divergent and convergent thinking processes in groups and the relationship between the divergent ideation phase and the convergent phase of developing a specific innovation. There has been much research on divergent creativity, some on convergent creativity but little on the link between divergent and convergent creativity (e.g., de Vries & Lubart, 2017). We will provide brief reviews of the major findings on divergent and convergent creativity in groups and present some recent research findings on the connection between divergent and convergent creativity in groups.

Divergent Creativity in Groups

Divergent processes are those that involve the exploration of diverse categories of information, generation of remote associations, and creation of new solutions (Harvey, 2014). Guilford (1967) suggested that fluency (number of ideas), flexibility (variety of ideas), originality, and idea elaboration should be considered as four major categories of divergent thinking. This approach has been commonly accepted in the field (Baer, 1993), and we have also focused on these categories in our work (e.g., Deuja, Kohn, Paulus, & Korde, 2014). A major interest in laboratory-based group creativity research has been determining the factors which enhance the production of ideas and categories of ideas. Two models of group creativity form the basis for much of this research: Brown and Paulus' (Paulus & Brown, 2003, 2007) cognitive motivational model of group creativity and the Search for Ideas in Associative Memory model (SIAM) (Nijstad, Diehl & Stroebe, 2003; Nijstad & Stroebe, 2006). These models both assume that individuals will systematically search their memory for ideas to share with the group. More accessible ideas are tapped first and a search process proceeds according to semantic similarity. Thus, there is a tendency for individuals to generate ideas within particular catego-

ries or domains until it becomes difficult to generate new, semantically-related ideas. Then, the focus shifts to new categories or domains. Because more common or accessible categories or ideas are tapped first, it is likely that the most novel ideas occur toward the end of the idea generation session.

A broad range of studies has assessed hypotheses related to these models. For example, exposure to a larger number of ideas increases the generation of ideas (Dugosh & Paulus, 2005; Dugosh, Paulus, Roland, & Yang, 2000; Nijstad, Stroebe, & Lodewijkx, 2002; Paulus, Kohn, Arditti, & Korde, 2013). Exposure to a more diverse set of ideas also increases idea generation (e.g., Nijstad et al., 2002). These findings are consistent with the assumption that exposure to ideas will lead to semantic associations that will stimulate further ideas. Other work shows that focusing on one category at a time increases idea generation, compared to being exposed to all categories at once (Coskun, Paulus, Brown, & Sherwood, 2000; Dennis, Valacich, Connolly, & Wynne, 1996), presumably because the former encourages participants to more fully tap ideas within each category. Focusing on a limited set of categories also increases the novelty of generated ideas because of a greater chance of deeper exploration within categories (Rietzschel, Nijstad, & Stroebe, 2007).

The theoretical models and related findings suggest that groups have much creativity potential. Through providing a larger, and at times diverse, pool of informational resources, groups may be better equipped to generate novel solutions to problems. However, early findings on group creativity or brainstorming revealed that, contrary to popular expectations, group brainstorming – in which ideas are shared verbally – is not very effective. Indeed, interactive groups are typically less productive than a similar number of individuals (nominal groups; see Diehl & Stroebe, 1987; Mullen, Johnson, & Salas, 1991). The larger the group, the greater the discrepancy in performance (Bouchard & Hare, 1970). A major reason appears to be production blocking, or the inability to express ideas as they occur because of the need to share speaking time with other group members (Diehl & Stroebe, 1987; Nijstad & Stroebe, 2006).

Social loafing and evaluation apprehension may also be contributing factors to comparatively poor group performance (Camacho & Paulus, 1995; Diehl & Stroebe, 1987). Performance in groups is typically not equally distributed, with one or two people often dominating the discussion. Other group members may "free ride" on the efforts of active members because they do not perceive their efforts to be needed (Kerr & Bruun, 1983). Alternatively, group members in general may have lower motivation to exert effort if their performance is not identifiable or easily distinguished (Karau & Williams, 1993). Increasing accountability for performance or inducing competition

can enhance group performance (Paulus, Larey, Putman, Leggett, & Roland, 1996). Furthermore, there is a tendency of group members to match their performance with the low performers in the group (Paulus & Dzindolet, 1993). One solution is to focus on individual idea generation if the generation of a large number of ideas is wanted. However, group creativity efforts are frequently required in real-world settings and people must work together to solve problems. Thus, it is important to discover how to optimize such collaborations. These research efforts have often focused on computer-based or writing-based approaches.

Studies of idea exchange using written notes and electronic methods have shown them to be effective techniques (Dennis, Minas, & Williams, in press; DeRosa, Smith, & Hantula, 2007; Paulus, Korde, Dickson, Carmeli, & Cohen-Meitar, 2015; Paulus & Yang, 2000). These techniques avoid the problem of production blocking; participants can share ideas as they occur. They may also reduce evaluation apprehension when each person's individual contributions are less identifiable. Using these methods, group performance can exceed that of nominal groups, suggesting the synergistic potential of creative groups (DeRosa et al., 2007). The best approach may be to alternate group and individual ideation sessions (Korde & Paulus, 2016). Individual sessions which follow group sessions show an elevation in the number of ideas generated, suggesting carry-over of cognitive stimulation from the group session. Studies have also shown that brief breaks in the individual brainstorming process can be beneficial (Paulus, Nakui, Putman, & Brown, 2006). These breaks allow individuals to overcome fixation on a limited range of ideas and to rehearse or reflect on the shared ideas.

In addition to timing and structure, brainstorming groups may benefit from clear rules. Groups without clear rules for brainstorming tend not to function effectively. Osborn (1953) – the original promoter of brainstorming – suggested that certain rules can increase the extent to which individuals feel free to express their ideas. Group members were told to not evaluate or criticize ideas and to say whatever came to mind. Osborn encouraged a focus on quantity, rather than quality, and encouraged building on others' ideas. The use of these rules has been shown to enhance performance (Meadow, Parnes, & Reese, 1959). Adding a rule to keep the expression of ideas efficient (e.g., by not elaborating or telling stories) can also increase the number of ideas generated substantially (Putman & Paulus, 2009). However, there has not been systematic research on the relative importance of these different rules. Although emphasizing quantity of ideas increases both the number of ideas and number of good ideas compared to an emphasis on quality, or both quantity and quality (Paulus, Kohn, & Arditti, 2011), evidence for the benefit

of the 'do not criticize' rule is mixed. Some studies have demonstrated negative effects of evaluation concerns (Camacho & Paulus, 1995; Diehl & Stroebe, 1987), but others have found that critical feedback during brainstorming is not detrimental (Nemeth & Ormiston, 2007; Valacich & Schwenk, 1985).

In sum, considerable research suggests clear ways to enhance the number of ideas generated in groups (see also Paulus & Kenworthy, in press), and a corollary is that increasing the number of ideas also increases the number of good ideas (both novel and feasible; e.g., Paulus et al., 2011). There has been little evidence that group interaction increases the average novelty of ideas. However, there has been some evidence that idea sharing in diverse groups can lead to ideas of higher average novelty (Nakui, Paulus, & van der Zee, 2011; van Dijk, van Engen, & van Knippenberg, 2012). Of course, the ultimate aim of most collaborative creativity efforts is to generate high quality ideas – ones that are both novel and feasible – and to use these as a basis for developing an innovation or novel product. This requires shifting from a divergent thinking process to a convergent process of coming up with a specific solution.

Convergent Creativity

Although creativity is often equated with divergent thinking, convergent processes are also important (Cropley, 2006). A number of scholars have emphasized the importance of an evaluation stage after the divergent ideation stage (e.g., Lonergan, Scott, & Mumford, 2004; Runco, 2003). Others have emphasized a range of phases (Basadur & Gelade, 2006; Mumford, Mobley, Uhlman, Reiter-Palmon, & Doares, 1991; Reiter-Palmon & Robinson, 2009; Wallas, 1926). Although Osborn (1953) is most famous for the divergent brainstorming process, he and his disciples emphasized the different phases of the creative process: finding the facts, defining the problem, ideation, solution-finding and acceptance.

Research on convergent creativity in groups has been sparse. Convergent creativity has been conceptualized in a number of different ways. Larey and Paulus (1999) focused on the degree of divergence and convergence in the idea generation stage. Convergence was measured by examining how much groups focused on ideas in a specific category at one time. Harvey and Kou (2013) similarly evaluated in detail the divergent and convergent processes in the idea generation processes of four healthcare policy groups. During idea generation, evaluation of ideas tends to naturally occur. This may facilitate a

focus on the more promising ideas. Harvey (2013) points out that convergent creativity occurs in the idea generation stage as participants build on each other's ideas. She distinguishes this type of convergent process from idea selection (Cropley, 2006), or from selecting from a range of alternatives as in the decision-making domain (Stasser & Abele, in press). Kerr and Murthy (2004) compared divergent and convergent idea generation between computer-mediated and face-to-face groups and found that computer-mediated groups generated more ideas than did face-to-face groups, but in the convergent phase computer-mediated groups recommended both more relevant and irrelevant ideas. Kerr and Murthy (2004) suggest that face-to-face interaction facilitates feedback and is useful for eliminating irrelevant suggestions.

In coming to a consensus about a final product, participants need to select the best ideas based on their evaluations. In general, participants are not particularly good at this. A number of studies have shown that groups perform at about a chance level in picking the ideas that trained coders identify as novel (Putman & Paulus, 2009; Rietzschel, Nijstad, & Stroebe, 2006). People have a bias to select more feasible ideas, consistent with a noted general aversion to novel ideas (Mueller, Melwani, & Goncalo, 2012). Thus, the existing literature suggests that it is difficult for a group's best ideas to survive from the divergent stage into a final implementation stage.

One problem with the convergent process of evaluating, analyzing, and organizing a group's ideas is the experience of cognitive overload (Kolfschoten & Brazier, 2013), which occurs when a large number of ideas are shared and the task requires developing a shared understanding, reducing redundancy, and creating an overview by looking for relations among the contributions. De Vreede and colleagues promote the use of structured approaches such as Thinklets, which provide detailed scripts for how to conduct various aspects of the convergence process (e.g., de Vreede, Briggs, & Kolfschoten, 2006). They have conducted many workshops using these techniques, but there has not been a systematic evaluation of their effectiveness in selecting the best solutions. Of course, in most collaborative settings, the process is neither structured nor facilitated. Groups simply come together to share ideas in meetings or brainstorming sessions and then try to come to a consensus about the best option or alternative.

Linking Divergent and Convergent Creativity

The research and theory on divergent creativity in groups has provided some basis for understanding the flow of ideas among group members as they build on or react to shared ideas. Research on divergent group creativity finds that

idea flow is influenced by semantic similarity (e.g., Dugosh & Paulus, 2005). Therefore, it is not surprising that many studies have shown that more common stimuli have more stimulation value. Moreover, as noted earlier, idea generation should focus on a single category or domain at a time; the clustering of ideas generated within the same category is related to enhanced idea generation (Baruah & Paulus, 2011). This seems somewhat contrary to the notion that inspiring creativity requires exposure to radically new or novel ideas. However, radical ideas may not overlap with the recipients' semantic networks and may consequently have minimal associative potential.

Brainstorming groups are prone to both cognitive and social convergence. Larey and Paulus (1999) proposed that the tendency toward "semantic convergence" during a divergent thinking stage would be exacerbated in a group brainstorming context. Social influence in groups also leads to a convergence in performance (Paulus & Dzindolet, 1993) and a focus on agreement or common information (Stasser & Abele, in press). Larey and Paulus (1999) suggested this convergence tendency should be stronger for those with a positive attitude to working in groups, and they indeed found that group brainstorming was characterized by a tendency to focus on a single issue for a longer period of time, compared to nominal groups. This was especially the case for those who enjoy working in groups.

Although the generation of a large number of ideas in a divergent stage is seen as a positive goal in brainstorming, in most real-world settings the focus is on selecting the best ideas and then developing one or more of those ideas into a final product. As we indicated earlier there is a bias toward ideas that are feasible (Putman & Paulus, 2009; Rietzschel et al., 2006). Thus it is likely that group members will not further develop the most novel ideas to create final products. In support of this, Glăveanu, Gillespi and Karwowski (in press) found that dyads working together on a divergent thinking task showed a preference for practical ideas. Several studies have examined the process of building on already-generated ideas. Using the brainwriting method, Kohn, Paulus, and Choi (2011) asked participants to build on ideas generated previously by other students. They were presented with either common ideas or unique ideas based on their prior normative frequency. Nominal groups generated more ideas than did interactive groups. However, interactive groups exposed to rare (but not to common) ideas generated combinations of higher novelty and feasibility than did nominal groups. This is somewhat surprising because exposure to common ideas typically stimulates more novelty than does exposure to unique ideas (see Dugosh & Paulus, 2005). However, group interaction may allow for a sharing of diverse ways to make unique ideas both feasible and more novel. McMahon et al. (2016) examined the extent to

which groups could enhance a specific idea. Among interactive groups, the resultant embellished ideas were rated higher along various dimensions (e.g., marketability) compared to those of nominal groups. Apparently the group interaction process involved a discussion of a wider range of topics when compared to the nominal condition. Groups have an advantage over individuals in the building process because they can share diverse perspectives to enhance ideas. Lonergan et al. (2004) suggest that the group's orientation to the building process is important. They asked students to evaluate and revise ideas that had been generated for a marketing campaign, with instructions to focus either on efficiency of the current process or on generating new ideas. Better quality plans were developed with a generative orientation for less original ideas, but with an efficiency orientation for more original ideas. Thus, the specific goal for groups should be tailored to the task itself. Of course in most cases one would want to build on novel ideas to make them more feasible. However, given the bias in favor of feasible ideas it is important to also make those more novel.

The sequence of alone and group sessions may also be important. Putman and Paulus (2009) found that those who had brainstormed alone were better able to discern the best ideas during a subsequent group discussion than were those who had brainstormed those ideas as a group. Girotra, Terwiesch, and Ulrich (2010) found that those with an alone-then-group sequence (compared to group-only) generated higher quality ideas and were better able to judge the quality of the best ideas. Apparently, generating one's own ideas first provides a useful reference point for subsequent idea evaluation because it provides a cognitive contrast between one's own ideas and those of the group. More novel ideas may become more salient in the alone-then-group sequence.

Very few studies have examined the development of a final group product in relation to a prior idea generation phase. A key issue here is the degree to which the processes of idea sharing and elaboration influence the final product. Given the general bias against the most novel ideas, we expect that such ideas might get less attention during the idea sharing process in terms of replying to or building on them. Ideas receiving replies from others are more likely to become salient in the group, and then to be included in a convergent discussion and final product decision. Furthermore, the novelty of those replies should have a greater impact on the final product because of their salience. Reply novelty suggests greater engagement in the process and commitment to improving the specific shared ideas as the group builds toward a convergent solution.

The diversity of the group members should also be an important factor on both divergent and convergent processes. The research on the benefits of

diversity on collaborative creativity has been rather mixed (see Paulus, van der Zee, & Kenworthy, in press, for a review). Differences in background, experience, and knowledge should increase the creative potential of groups. However, diversity can be related to intellectual gaps that make communication more difficult (Cronin & Weingart, 2007) and interpersonal differences may reduce interest in interaction. Thus, research has generally found negative effects or little benefit of demographic diversity, but some benefit of intellectual or cognitive diversity (van Dijk et al., 2012).

We investigated the joint role of divergent and convergent processes in two studies that used a "naturalistic" approach to collaborative creativity. In one study by Coursey, Williams, Kenworthy, Paulus, and Doboli (in press) participants generated ideas using an electronic discussion board which allowed participants to generate ideas, vote for ideas, and elaborate on ideas. This methodology allowed both for divergent and convergent processes similar to the approach suggested by Harvey and Kou (2013). Groups of five generated ideas for improving the U.S. health care system in three 30-minute sessions over a period of four weeks. The idea generation process was done asynchronously in that participants reported individually to the lab to read ideas posted by prior participants in their group, and to add their ideas and replies or elaborations. The goal of this study was to examine the impact of group member diversity on the interaction process and the resultant number and novelty of ideas generated. We obtained information on gender, race/ethnicity, age, and political orientation (liberal, conservative, independent, etc.). Interestingly, age diversity was related to lower levels of creativity, but political diversity was related to a higher level of creativity even though participants were not aware of the characteristics of their group members.

An analysis of the interaction process revealed that the extent to which participants replied to or elaborated on the shared ideas was a factor in these outcomes. For example, political diversity was positively related to the number of replies, while age diversity and ethnic diversity were negatively related to the number of replies. The number of replies was in turn related to increased novelty of ideas. Thus, the convergent process of replying or elaborating on shared ideas, not the number of ideas generated, was a critical factor in predicting the novelty of the ideas. The number of replies may reflect increased engagement in the process which could be related to deeper levels of information processing and higher novelty as a result. Alternatively, the mixing of idea generation and evaluation or elaboration may be optimal for the development of novel ideas (Harvey & Kou, 2013).

In another study we examined the role of the divergent ideation process on the development of a new product (Coursey, Gertner, et al. 2018). Over three

separate sessions, groups of four generated ideas for a new sport. They first generated ideas individually for 30 minutes. In a second session, they individually read the ideas of the group, voted for the best ideas, and then were asked to elaborate on the shared ideas and to generate additional ideas. In a third session, they read the ideas from the second session, voted on them, and then were connected via audio Skype to decide upon a final sport. The groups were constituted based on their expressed expertise or interest in sports. One set of groups consisted of all high expertise members, another all low expertise, and one of mixed low and high expertise. Interestingly, the low expertise groups generated more ideas and more novel ideas compared to the mixed expertise group. These results are consistent with other studies that demonstrate the negative effects of expertise diversity on group creativity (Cronin & Weingart, 2007).

Of most interest to our focus on the relation of divergent to convergent processes was the link between the elaboration phase and the final sport development phase. The only factor that predicted the novelty of the final sport was the novelty of the elaborations in the second phase. The number of elaborations in this phase was related to the novelty of the elaborations in this phase and the novelty of the final sport. The number of ideas generated in the second phase was related to increased novelty of ideas but not the novelty of the final product. Again, the elaboration process, not the overall activity level, was the critical factor because the elaboration process may reflect a high degree of engagement and deeper level of information processing in the group. As a result there should be a higher level of shared consensus about which ideas had the most potential or value. The fact that the most novel ideas did not predict the final outcome is consistent with prior research suggesting a bias away from the most novel ideas to more feasible ones. Participants did, however, recognize the most novel ideas because novel ideas received more votes. Group members may have focused their elaborations on more feasible ideas and how to make them more novel (cf., Lonergan et al., 2004).

In future research we may want to have participants explicitly address and build on the more novel ideas during the exchange process, as was done by Kohn et al. (2011) and Lonergan et al. (2004). For example, Kohn et al. (2011) found that interactive groups were able to build effectively on novel ideas to come up with ideas that were both novel and feasible. Doing this in real time would require some type of computer-aided semantic analysis system for novelty. Alternatively, the participants could be asked to build on the ideas that they voted as most novel in a subsequent session. Cognitive overload of the number of ideas shared may also be a factor limiting the impact of the most novel ideas. Possibly, having a set of short divergence and convergence

sessions, followed by a final decision-making session, might be another way to minimize the overload issue.

Conclusions and a Research Framework

The research on divergent creativity has discovered many ways to increase the number of creative ideas and number of good ideas. However, our research suggests that, at least in unstructured naturalistic settings, groups may not effectively tap this wealth of ideas. Groups tend to be poor at selecting the best ideas, and our research has shown that the number and novelty of the ideas may not influence the final product. Of course, more research is needed to determine the generality of this problem. The key factor seems to be the extent to which participants elaborate on the shared ideas. We have also suggested some ways in which the group interaction can be structured to enhance the potential that highly novel ideas will be elaborated and made more feasible so they will more likely become part of a final creative product. Future research might also examine the role of individual differences. For example Fürst, Ghisletta, and Lubart (2016) found that different personality profiles are related to divergent and convergent thinking. Plasticity, which involves openness to experience and extraversion is related to more divergent thinking or idea generation. A convergent set of ambition, critical sense, precision and persistence predict better selection (evaluation and selection of the best ideas) (Fürst et al., 2016). Thus for tasks that require both divergent and convergent thinking, having group members who vary in these personality dimensions might be helpful.

In Fig. 16.1 we provide an outline of some of the factors we believe are important in both divergent and convergent creativity, and the links between them.

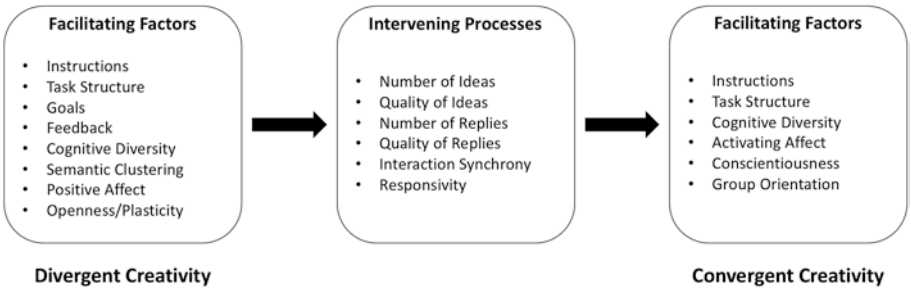

Fig. 16.1 A theoretical model of factors facilitating divergent and convergent collaborative creativity, including intervening processes linking divergent and divergent creativity

There is considerable evidence for the role of factors that influence divergent collaborative creativity as we have summarized in this and prior chapters (Coursey, Paulus, Kenworthy, & Williams, in press; Paulus & Coskun, 2013; Paulus & Kenworthy, 2017, in press; Paulus et al., in press). Thus research has demonstrated the importance of appropriate instructions, task structure (category focus, breaks), goals, feedback, cognitive diversity, semantic clustering of ideas, positive affect, and openness to experience or plasticity.

There is not much research on convergent collaborative creativity to guide our list of facilitating factors (cf., Rietzschel, Nijstad, & Stroebe, in press). However, we will suggest a number of potential factors. Instructions concerning how to approach the convergent task is likely to be important in how participants go about the process of evaluating the shared ideas (Lonergan et al., 2004; Kohn et al., 2011). For example, having group members first select the most novel ideas and then focusing on making them more feasible may result in a higher quality outcome than focusing on the most feasible ideas and trying to make them more novel because of the strong bias toward feasible ideas (Baruah, Paulus, & Kohn, 2018). Variations in task structure may also be important. Having group members individually select the "best" ideas prior to the group selection process and deliberations may facilitate selection and development of more novel ideas (Putman & Paulus, 2009). Cognitive diversity could also enhance the convergent refinement process as group members share their diverse perspectives (Larey & Paulus, 1999) as long as there are not significant intellectual gaps that would prevent a collaborative refinement of ideas (Cronin & Weingart, 2007). Higher levels of activating affect (higher levels of arousal or energy) may be associated with higher levels of task engagement and may thus enhance both the flexibility and persistence in the convergent innovation process (Baas, De Dreu, & Nijstad, 2008; To, Fisher, Ashkanasy, & Rowe, 2012). It is likely that those high in conscientiousness or ambition (Fürst et al., 2016) and those who have a positive orientation to working in groups may be more motivated to persist in the demanding stages of developing consensus about an innovative product.

Our suggestions for key facilitating factors for the convergent stage have so far little clear empirical support and thus provide a fertile domain for future research. However, there is considerable research support for the facilitating factors related to collaborative divergent creativity. Furthermore, our research has provided some evidence for the role of the processes that link the divergent and convergent stages. The extent of elaboration and the novelty of the elaborations appear to be key factors. A high level of these factors likely reflects a high level of engagement in the collaborative task with an associated high level of attention to the shared ideas and the motivation to build on or elaborate these

ideas. Also, the extent to which group members are "in sync" by being responsive to each other's suggestions, building on them collaboratively and providing mutual feedback (interactional synchrony, Dunbar & Mejia, 2013) should be related to a stronger link between the two phases. We hope our future studies will further enlighten the interactional and personal factors that influence the link between the divergent and convergent stages of collaborative creativity.

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