3-1-2022

Leading creative teams: A process-perspective with implications for organizational leaders

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Recommended Citation

Leone, S. A., & Reiter-Palmon, R. (2022). Leading creative teams: A process-perspective with implications for organizational leaders. Translational Issues in Psychological Science, 8(1), 90–103. https://doi.org/10.1037/tps0000296

Leading Creative Teams: A Process-Perspective With Implications for Organizational Leaders

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Leaders often find themselves managing teams of individuals who are tasked with creative problem-solving while confronting complex issues and ambiguous situations. Using a process perspective, we review three core processes of creativity (problem construction, idea generation, and idea evaluation/selection) and provide best-practice recommendations for leaders to increase their teams' performance during each process. To facilitate problem construction, leaders should define constraints and goals without outright instructing teams on their course of action or defining the presenting problem. Leaders can apply project management techniques that budget for increased exploration and experimentation while building visions for the end product and providing opportunities for sensemaking. Idea generation can be facilitated by fostering a climate of psychological safety and avoiding the pitfalls of production blocking or evaluation apprehension. Leaders may recruit expert facilitators or apply technological solutions we describe. Finally, during idea evaluation, expert leaders may be well-situated to determine the best ideas themselves. However, nonexpert leaders should instruct their team to define evaluation criteria and take steps to avoid routine "tried-but-true" methods from being viewed disproportionately favorably during evaluation.

What is the significance of this article for the general public?

Creative problem-solving is a key skill for organizations seeking a competitive edge in dynamic markets. As organizations increasingly emphasize the use of teams to solve complex problems, the role of team leaders becomes crucial for both creative and organizational performance. In this article, we provide sciencebacked recommendations for leaders of teams to improve creative performance by focusing on the cognition of creative problem-solving.

Keywords:

creative teams, creativity, leadership, problem-solving, teams

As markets and organizations become increasingly complex, leaders are faced with a myriad of ambiguous and complicated problems. These complex problems

typically are not solved by simple or routine ideas and require creative or innovative solutions. The last few decades have seen major changes that force organizations to adapt, sometimes quickly, to new environments. The recent outbreak of COVID-19 is one such extreme example. Organizations and leaders had to adapt to work conducted remotely, brick and mortar stores had to adapt to consumers' preference of Internet shopping, teachers and students had to adapt to remote learning. Although this is an extreme case, the changes we have seen relied on previously existing trends of virtual and remote work, increased use of technology, globalization, and increased competition.

It is therefore not surprising that creative problem-solving skills have been identified as some of the most critical skills for 21st century workers and leaders. Indeed, creative problem-solving skills have been suggested to be the top skills for the 21st century workforce (National Research Council, 2012). Further, in a survey of 1,541 Chief Executive Officers (CEOs) across a wide variety of industries in multiple countries, IBM (2010) found that CEOs reported creative problem-solving to be the most important quality for modern leaders. Creative problem-solving refers to the generation of novel (i.e., original) and high-quality (i.e., effective) solutions to important problems (Mumford et al., 1991).

The complexity of problems that modern organization face requires diverse perspectives and the integration and synthesis of disparate knowledge— that is, the use of diverse and interdisciplinary teams (Harvey, 2014; Kozlowski & Bell, 2008). As a result, organizations require teams of individuals engaged in creative problem solving (i.e., creative teams) to address these complex problems (ReiterPalmon et al., 2012; West et al., 2004). Unfortunately, creative teams face multiple obstacles and challenges on their way to effectively solve problems. Issues such as ineffective communication, lack of coordination, and process loss have all been suggested as reasons why teams are less effective than individuals (Kozlowski & Ilgen, 2006). These factors seem to have an even stronger effect when teams of diverse members are tasked with the type of complex problems that require creativity to solve (Reiter-Palmon et al., 2013). Thus, the role of the leader becomes particularly important for teams engaging in creative problem-solving. Although multiple definitions of leadership exist, in this article we define leadership as the guidance, development, and management of subordinates with the aim of maximizing performance toward the attainment some goal (Bass & Riggio, 2010).

The extant literature on the effect leaders have on creative problem-solving in teams suggests multiple ways in which leaders can facilitate team creative problem-solving. Leaders can ensure creative problem-solving in teams by establishing a social environment where individuals feel safe contributing the irideas and solutions, promoting an environment conducive to creative problem-solving, facilitating effective communication and collaboration, and managing conflict that might arise between individuals involved in the creative problem-solving process (Reiter-Palmon & Royston,

2017). Further, leaders manage interactions between the team and the external environment by ensuring teams have sufficient resources, providing access to additional sources of information, protecting teams from negative organizational influences, and championing innovative initiatives (Mitchell & Reiter-Palmon, 2018). In this article, though, we focus on the role of the leaderin facilitating the cognitive processes associated with team creative problem-solving (Reiter-Palmon& Illies, 2004).

Specifically, we focus on three core processes of creative problem-solving: problem construction, idea generation, and idea evaluation (Figure 1; Mumford et al., 1991). In the following sections we describe each process and discuss leadership strategies that can facilitate each process and overall team creative performance. We support our recommendations with empirical research on team creative problem-solving performance and emphasize findings related to how leaders can enable followers' creative teamwork.

First Process: Team Problem Construction

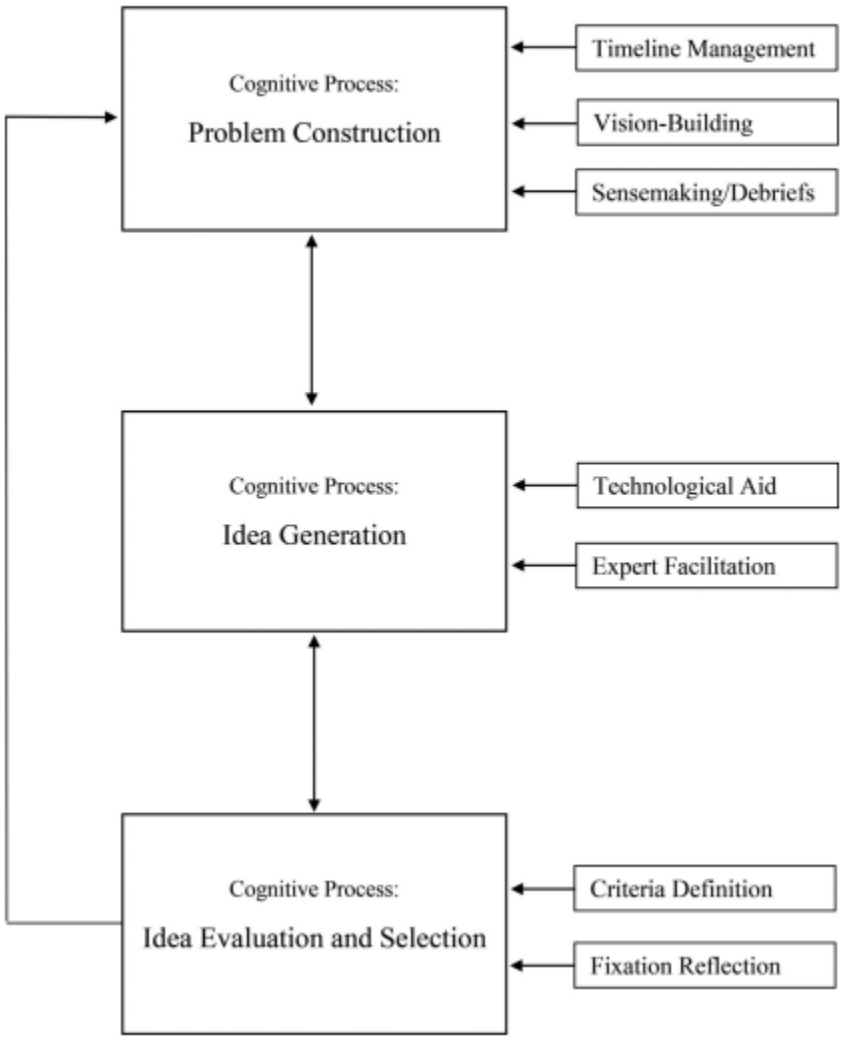
Creative teams do not necessarily benefit from overly undefined tasks or vague leader expectations arising from dynamic and ambiguous environments (Hunter et al., 2011). Cognitive theorists contend that individuals naturally construct mental representations of presenting problems (Holyoak, 1984). These knowledge structures, referred to as *problem representations*, are based on past problem-solving experiences and include strategies, goals, procedures, and other information relevant to the present problem (Mumford et al., 1994). Problem representations are stored in memory and become activated by environmental cues or problem elements that resemble previous problemsolving tasks and efforts (Reiter-Palmon et al., 1997). Thus, *problem construction* refers to the process by which an ill-defined problem is structured using problem representations (Mumford et al., 1991, 1994).

Teams working in ambiguous environments who are not provided a certain degree of task or goal definition by their leaders may lack the appropriate cues needed to produce robust problem representations that translate into creative solutions or products (Mumford et al., 1994). Indeed, underdeveloped problem representations can hinder the creative efforts of teams and their leaders. For example, Reiter-Palmon and Murugavel (2018) found that teams who engaged in directed problem construction efforts (a) generated significantly more original problem solutions, (b) were more satisfied with their teamwork experience, and (c) displayed less intrateam conflict than teams who did not engage in problem construction. Moreover, robust problem construction ability has been consistently linked with creative performance across a number of empirical studies (e.g., Harms et al., 2020; Reiter-Palmon et al., 1997). One recent meta-analysis (Abdulla et al., 2020) revealed that problem construction ability typically displays a stronger relationship with creative problem solving compared with other important mental processes, like intelligence (Kim, 2008). Taken together, the bulk of scientific evidence suggests that teams may benefit from leaders providing structure to ambiguous work demands and situations. Thus, leaders should act to facilitate their

followers' efforts of identifying core elements of the team's presenting problem and the final solution, product, or deliverable.

Figure 1

Core Processes of Creative Problem-Solving and Corresponding Leader Strategies for Success



However, defining the problem space must be done properly to experience benefits. Research suggests that leaders of creative teams must work to facilitate both the individual member's problem construction process, and the team's consensus on problem representations. While team members may individually construct accurate problem representations, such conceptualizations can become disjointed between individuals on a team (Cronin & Weingart, 2007). Empirical research on team problem construction suggests that teams who are unable to integrate individual problem representations into joint understandings experience increased levels of relationship conflict and overall lower creative performance at work (Gish & Clausen, 2013;

Weingart et al., 2008). Cronin and Weingart (2007) refer to such representational disagreements as *representational gaps* (rGaps). rGaps arise from contradictions between members' representations or the lack of a shared understanding regarding problem parameters and products. Empirical work has shown, however, that when rGaps are navigated successfully, disjointed representations become integrated, intrateam coordination increases, and teams produce greater creative products (Weingart et al., 2008).

Leaders hold a key position that allow them to facilitate problem construction while minimizing any negative impacts derived from rGaps (Redmond et al., 1993). Leaders who appropriately emphasize work parameters, requirements, timelines, and available internal/external resources better equip their creative teams to develop accurate cognitive representations of work problems (Holyoak, 1984; Medeiros et al., 2014). To illustrate, research shows that team members with diverse educational backgrounds tend to construct problems differently yet remain largely unaware of the significant variation in their problem conceptualizations (Leonardi, 2011). Such differences may contribute to wider rGaps and could result in lower levels of team creative performance. However, budgeting specific instances within a project's timeline for sensemaking can help reduce differences, ensure the team has achieved consensus regarding their problem construction, and aid in the production of more creative products (Gish & Clausen, 2013).

Additionally, leaders must be cautious of overdefining the work to ensure the application of creative solutions. Empirical research suggests that team creative performance is only facilitated when leaders' guide the problem construction process without outright defining end results or products (Pinto & Prescott, 1988). Guiding creative team problem construction represents a paradox for leaders. The leader must outline a broad view of team goals/products without letting their own personalized perspective diminish their team's creative potential (Hunter et al., 2011). Creative personalities tend to crave autonomy, achievement, and display high levels of dominance in their work approaches (Feist, 1998). Leaders may encroach onto their team members' desire for freedom and experimentation by overly defining presenting problems or directing work processes.

Leader Strategies During the Problem Construction Process

During problem construction, the leader's main focus should be to provide structure to ambiguous and lofty goals, as well as aiding members' development of joint representations. Thus, interventions that facilitate problem construction provide teams with work parameters, foster shared understandings, and increase the amount of information available to the team.

Timeline Management

Resource and timeline management facilitates team problem construction by allowing the leader to budget extra time for problem exploration at the beginning of a

project's life cycle (Katila & Shane, 2005). When problemsolvers have increased time to search for relevant information and explore potential alternatives/resources, the knowledge the team gains facilitates the development of more accurate problem representations (Illies & Reiter-Palmon, 2004). That is, as teams use the initial days or weeks of the project to explore the problem space, they gain important insights regarding the resources they have available, potential strategies they may employ, or any obstacles they must address. Thus, the extra time leaders allocate at the onset of teamwork allows the team to converge on a common way of viewing and understanding the presenting problem, particularly when teams contain interdisciplinary members. Expecting teams to immediately begin the problem-solving process without ample opportunity to converge beforehand may prompt misunderstandings, inefficiencies, and inter team conflict (Reiter-Palmon & Murugavel, 2018).

Vision-Building

It is the leader's role to build a vision of the product or solution and communicate their vision to the team effectively (Avolio, 1999; Bass, 1985). Leaders should describe the situation facing the team in full. What requirements must a solution/product fulfill? What problem is the team solving? What are the unavoidable constraints facing the team's effort? What effects might a successful outcome cause?What has been tried in the past? By building a shared vision that outlines such key problem elements, leaders facilitate members' problem construction efforts by providing initial direction, structuring the ambiguous problem space, and avoiding stringent micromanaging of the team's understanding of the problem (Reiter-Palmon & Illies, 2004).

Sensemaking and Debriefs

Teams need to integrate the various information they learn during exploration and leader vision building (Baran & Scott, 2010). Given that creative teams should be functionally diverse, members will likely be drawing from separate domains with little cross-over (Somech, 2006). Additionally, an individual's understanding of a given problem will vary based on their expertise and experience (Schunn et al., 2005). Software experts on a team, for example, may be able to create programing that solves efficiency issues. Unfortunately, the requirements of the software may be incompatible with the technology available to the team's hardware engineers. Thus, teams may experience a situation where individual members construct information silos inaccessible to the team as a whole. Fostering sensemaking, or the convergence of various perspectives into a shared understanding, is proposed to alleviate such silos (Reiter-Palmon et al., 2020). During sensemaking, members describe the situation facing them individually. Members can share what they have learned, what challenges they face, what they have already accomplished, and what they need for continued progress.

One important way leaders should foster sense makingis via debriefs or after action reports (AAR). Debriefs and AARs are formal meetings where members reflect

on the team's performance, their own performance, and form a collective understanding of what needs to happen to ensure successful team outcomes (Allen et al., 2018). For leaders of teams, it may be beneficial to include debriefs after project milestones, rather than at the conclusion of teamwork (Salas et al., 2008). Thus, teams have the benefit of learning from more recent events and maintain the flexibility to course-correct during goal pursuit. Leaders should participate during debrief meetings as well. The leader should reflect on their expectations and describe how the team met or missed those benchmarks while providing developmental feedback on improvement (ReiterPalmon et al., 2020). However, it should be noted that the debrief is a time for teams to collectively arrive at shared understandings, rather than an opportunity for leaders to engage in performance evaluation. Leaders should provide feedback only after members have had the opportunity to share their perspectives. When applied properly, debriefs can be a powerful tool to facilitate team performance, as one meta-analysis noted a 20% increase in team effectiveness (Tannenbaum &Cerasoli, 2013).

Second Process: Team Idea Generation

The second core cognitive process of creative problem-solving models, idea generation, broadly refers to instances when team members conceive potential alternative solutions that may, or may not, effectively solve the problem. The emphasis on idea generation in organizations tends to manifest as formal brainstorming sessions, but recent research has highlighted that such techniques are often implemented poorly without expert facilitation (Paulus & Kenworthy, 2019; Zhao & Hou, 2010). However, leaders are well-situated to encourage the formation of social environments that are conducive to the generation of creative ideas. Team members create shared social norms, styles of communication, and shared perceptions of appropriate interactions when they combine their skills and knowledge during goal pursuit (Taggar, 2002). However, positive perceptions of the group environment are not guaranteed to form without the leader's direct intervention.

Researchers examining teams' social climates have identified specific variables that can facilitate team creative performance. For example,Edmondson's (1999) "psychological safety" (p. 351) refers to the shared perception that team members are free to share their opinions, or voice concerns, without being met by punishment or ostracization. In psychologically safe teams, members feel confident taking interpersonal risks, questioning the status quo, and providing direct feedback to other members or leaders. Leaders can foster psychological safety by establishing and enforcing safe expectations for communication. Psychological safety has received much attention in the teams scientific literature; empirical studies suggest that teams high in psychological safety manage conflict more effectively (Bradley et al., 2013), learn more effectively from work experiences (Ortega et al., 2014), and display greater overall levels of team work performance (Edmondson, 1999).

Creative teams research has revealed that psychological safety remains an important antecedent for the generation of high quality and original ideas, products, and

solutions (Newman et al., 2017). The link between psychological safety and team creative problem-solving is hypothesized to operate through an increase in the quality and quantity of information available to the team. When members feel safe sharing their controversial opinions, failed strategies, and radical solutions, teams are better situated to respond to dynamic environments and make informed, effective decisions (Mesmer-Magnus & DeChurch, 2009). Specifically, research shows psychologically-safe teams engage in greater levels of knowledge sharing (Kessel et al., 2012), interpersonal communication (Leroy et al., 2012), team learning (Brueller & Carmeli, 2011), and new knowledge creation (Choo et al., 2007), which in turn facilitates the team's creative performance (Newman et al., 2017).

Similarly, Palanski and Vogelgesang (2011) demonstrated that psychological safety fostered by leaders predicted greater follower confidence in taking risks with their work. A climate that values risk-taking allows members to experiment with solutions or procedures that can lead to greater efficiencies, new market opportunities, and further knowledge creation. Risk-taking should be viewed favorably by leaders of creative teams to ensure solutions, products, or work processes do not become routinized or confined to "proven" or "safe" methods (Dewett, 2007). Although risk-taking does imply the possibility of failure, empirical research supports the link between risk-taking and creative outcomes. For instance, Shin and Eom (2014) demonstrated that a climate of risktaking and proactivity predicted team creative performance across 103 Korean work teams. The study suggested that teams with leaders who encouraged a social norm of taking risks tended to also pursue and implement more creative solutions.

Moreover, Beghetto et al. (2020) showed that risk-taking moderates the positive relationship between one's confidence in creative abilities and the performance of creative behaviors. Interestingly, the study demonstrated that when risk-taking is low the link between confidence and creative behaviors disappears, whereas increased levels of risk-taking strengthens the relationship between confidence and behaviors. The researchers suggest that even if individuals maintain high levels of confidence in their creative abilities, they must still be willing to take risks to generate creative outcomes.

However, there are some social phenomena that can hinder creative efforts. For instance, production blocking (Lamm & Trommsdorff, 1973) refers to the productivity-loss that arises from the social convention of one member speaking at a time. Production blocking may manifest as a disproportionate amount of attention that one member receives when another member dominates a conversation. Indeed, production-blocking negatively impacts idea generation by limiting the number of ideas that are brought up during discussion. Similarly, evaluation apprehension (Collaros & Anderson, 1969) refers to the fear of negative reactions from other team members when contributing ideas. Apprehension often results in members modifying their ideas to fit the team's consensus (i.e., groupthink) or members suppressing radical or risky contributions altogether. Both production blocking and evaluation apprehension diminish the amount of information available to the team during decision-making. Thus, both

prevent meaningful discussion, foster increased levels of conflict, and ultimately hinder creative performance (Girotra et al., 2010; Diehl & Stroebe, 1987).

Leader Strategies During the Idea Generation Process

By promoting psychologically safe environments, leaders of creative teams can reduce the impact of evaluation apprehension and encourage greater team ideation. However, circumventing production blocking is more difficult without technological or professional intervention. Similarly, the leader must navigate the difficult paradox of allowing teams to experiment, learn from mistakes, and take risks while eventually producing successful outcomes. Leaders should budget meeting time dedicated to discussing potential alternatives and set expectations for active participation. However, traditional brainstorming sessions tend to be ineffective (Zhao & Hou, 2010). Instead, leaders should use technology to facilitate meetings or utilize external experts to guide discussions.

Technological Aid

When selecting technology to aid in idea generation, leaders should select for certain features. First, the technology system should allow teams to work simultaneously in a shared virtual space. The system should also allow members to view the contributions of others in real time. Finally, the technology should allow members to submit ideas anonymously.

Research suggests such features prevent production blocking (Nijstad et al., 2003), reduce evaluation apprehension (Connolly et al., 1990), and facilitate idea buildup (Girotra et al., 2010). Buildup refers to the tendency for teams to generate a large number of ideas when members modify features of others' contributions, combine elements of proposed ideas, or generate novel ideas that may not have been conceived prior (Girotra et al., 2010). There are a number of existing platforms available to leaders that host the required functionality. A simple and free solution is that of Google Sheets, as members can log in anonymously and provide responses to questions simultaneously (Heinen et al., 2015). A more advanced, but also more costly, example is Engage's Think Tank. Think Tank is a virtual collaboration tool that allows leaders to build generation prompts and allows groups to provide ideas or solutions in a shared chat box. The software also allows for buildup via comments and upvotes where members can endorse others' ideas and create a text thread of modifications. However, technological aid may require the use of an expert facilitator capable of building virtual spaces and managing team generation.

Expert Facilitation

Group facilitation refers to a process in which an external person (usually an expert) intervenes during team discussion to improve idea generation processes, task structure, and manages the relationships between team members to contribute toward the attainment of the discussion's goals (Schwartz, 1994). Team research has

demonstrated that expert facilitation increases individual member contributions, sustains task interest and motivation, and helps overcome obstacles during team meetings (Ackermann & Eden, 1994). Additionally, creativity research has shown that the use of facilitators can increase the number of ideas generated during brainstorming (Kramer et al., 2001; Offner et al., 1996). Like technological aid, facilitators help to attenuate the harmful effects of evaluation apprehension by setting explicit standards for communication. However, leader should realize that team norms and culture may undercut facilitators' ability to elicit positive outcomes. Members may not respond to facilitator efforts for fear of repercussions if the leader has not cultivated an atmosphere of psychological safety.

Additionally, in-person facilitators may help slightly lessen the effects of production-blocking by keeping members focused on task or goals during generation meetings. However, the nature of face-to-face interactions implies the team's time is not being used efficiently when only one person can speak at a time. Thus, external facilitators that apply technological interventions (e.g., Think Tank) may reap greater benefits to idea generation than face-to-face facilitation or unfacilitated technological aid.

Third Process: Team Idea Evaluation

Idea evaluation is the process of vetting generated ideas against specific criteria or standards to determine the idea's likelihood of solving the presenting problem. Evaluation is crucial to creative performance because teams must identify the most creative idea from the total set generated. Despite its relevance, idea evaluation has received less attention than other processes of creative problemsolving. Still, the extant literature does suggest that leaders of creative teams may benefit their followers by taking an active role during the evaluation and selection of ideas, products, or solutions. Kennel et al. (2013) demonstrated that teams tend to excel at selecting effective (i.e., high quality) ideas, but struggle to select novel or original solutions from a list of alternatives. Overall, only 20% of the teams studied successfully selected highly creative ideas as rated by experts. The researchers found that teams who were more accurate in rating the creativity of ideas, however, tended to select the most creative solutions. The study suggests that teams may prefer routinized but highly effective solutions, rather than creative (i.e., highly effective, highly original) alternatives. Indeed, such findings have been extended by other research that demonstrated an originality-effectiveness trade-off. That is, teams tend to emphasize effectiveness over originality, but when instructed to select original ideas teams select highly-original, but low-quality ideas as opposed to truly creative ideas (Rietzschel et al., 2006). Recent research has also found that idea evaluation tends to be underemphasized by teams. Using a qualitative design, Leone (2021) found that approximately 14% of students' intrateam interactions reflect idea evaluation cognition, compared with 33% reflecting idea generation, and 53% indicating problem construction.

Although the extant research suggests teams struggle with idea evaluation, researchers have found that situational variables may impact teams' evaluation and selection ability. Mumford et al. (2001) compared the idea selection of individuals to that of teams. The researchers found that social processes (e.g., production blocking) limited teams' ability to accurately evaluate a large number of ideas, resulting in individuals outperforming teams in a selection task. However, team performance was facilitated when the teams evaluated a smaller number of highly creative ideas, rather than many moderately-creative ideas. The timing of evaluation has received some attention as well, as research on individuals has demonstrated that early evaluation of progress results in greater creative production than evaluation occurring later in task cycles (Lubart, 1994). At the team level, Harvey and Kou (2013) found that creative teams may not engage in evaluation at all or display discrete sequences of idea generation and evaluation despite working on the same task within the same industry. Specifically, teams were observed to generate ideas without evaluation, generate a single idea and evaluate it, generate and evaluate multiple ideas simultaneously, or evaluate several ideas at the same time.

Given that research shows teams with greater ability to evaluate ideas tend to generate more creative products, leaders should work to ensure effective evaluation of important work deliverables (Basadur, Runco, & Vega, 2000; Runco, 1991). Because teams may struggle with idea evaluation, leaders of creative teams should be selected on the basis of their expertise in the respective domain (Hemlin & Olsson, 2011). Domain expertise of leaders is an important antecedent for the creative outputs of teams (Mouly & Sankaran, 1999; Tierney et al., 1999). Experts are well-situated to understand the potential effectiveness (i.e., quality) of a given idea and maintain enough domain-relevant knowledge and experience to recognize novel, rather than commonplace, solutions. Indeed, one classic study by Andrews and Farris (1967) found that leader expertise was a stronger predictor of team creative outputs than teams' motivation level, teams' cohesion, and the amount of autonomy the teams experienced at work. Thus, expert leaders should hold the key role as primary evaluator of proposed alternatives during team discussions.

However, leaders should be aware that expertise can create pitfalls that must be navigated carefully. Crilly (2015) interviewed expert designers in a professional practice and found that experts tend to become fixated on reliable, but routinized ideas, procedures, and solutions. The concept of idea fixation has also been referred to as "cognitive entrenchment" (Dane, 2010), which is described as a lack of flexibility during idea generation that hinders creative efforts. Although experts are bestsuited as evaluators because of their extensive training or experience, such factors also make experts more susceptible to entrenchment (Jansson & Smith, 1991). Although fixation typically implies the emphasis of high-quality "tried-andtrue" approaches, fixated leaders may fail to adapt to dynamic situations, dismiss emerging technologies, or embrace inefficiencies based on past success.

Leaders serving as evaluators may also experience issues arising from unclear evaluation criteria. That is, teams generating solutions or products benefit from explicit requirements that must be fulfilled to achieve success (Reiter-Palmon & Illies, 2004; Runco & Okuda, 1991). Teams use such criteria to assess the extent to which an alternative solution or product should be pursued. Thus, teams will endorse different solutions or products to fulfill work requirements when different success criteria are established. If evaluation criteria are lacking altogether, team members may rely on criteria they construct themselves based on previous work experiences rather than the presenting problem (Farris, 1972). Similarly, underdeveloped problem construction occurring earlier in the creative process may obfuscate effective criteria selection by the leader.

Leader Strategies During the Idea Evaluation Process

When a leader is an expert in their teams' problem domain, the leader is a better evaluator of relevant proposed ideas (Mumford et al., 2002). Expert leaders are situated to determine the potential effectiveness and novelty of ideas as well as orient the team toward implementing the best proposed alternative. Realistically, not all leaders of creative teams will be experts in the relevant domain. In such situations, nonexpert leaders can still work to facilitate the team's evaluation and selection of ideas, solutions, or products. Nonexpert leaders need to work closely with the team during evaluation because the team as a unit becomes responsible for fulfilling the evaluator role. Specifically, nonexpert leaders should focus on evaluation criteria definition, and can implement practices to avoid cognitive entrenchment.

Criteria Definition

Prior to any evaluation efforts, the leader must establish the basis by which ideas/solutions will be assessed. Non-expert leaders accomplish this by first determining the desired impact or outcome of their team's work and communicating those requirements throughout the team during problem construction. The team should also be made aware of any features or elements of an idea that must be included in the final product, as determined by realistic constraints or situational demands (see Team Problem Construction). During a formal evaluation meeting, evaluation criteria is constructed by integrating the requirements arising from both necessary features and the desired outcomes.

Then, the leader and team together discuss the potential implications that arise from implementing each alternative (Reiter-Palmon & Illies, 2004). This forecasting process allows the team to determine both the positive and negative consequences of each idea (Mumford et al., 2002). The consequences of each idea are compared against the established criteria, and the best-fitting idea/product is selected. However, it is important to note that nonexpert leaders may need to recruit external perspectives to aid in forecasting. Nonexperts are not as well situated to predict positive/negative outcomes or anticipate long-term versus short-term consequences (Farris, 1972).

Moreover, research has shown that individuals tend to inaccurately evaluate the originality of highly novel and complex ideas, but evaluation inaccuracy is less pronounced when ideas are presented in a simple way (Licuanan et al., 2007). Thus, nonexpert leaders may require external talent to help teams access the core attributes of ideas during evaluation and reduce bias resulting from complexity (Goodall & Bäker, 2015).

Additionally, leaders should recognize that paradoxical tensions can arise when focusing on a product's criteria and impact. Although daunting, research shows creative ideas that integrate paradoxical elements can overcome perceived incompatible demands (Miron-Spektor et al., 2011). To illustrate, Acar et al. (2019) provide the exemplar of GE Health care, who recognized the issue of many rural health care systems lacking crucial, but expensive and difficult to transport, electrocardiograph (ECG) machines. ECG technology was, at the time, stationary, cost $5.4 million dollars to develop, and weighed 15–25 pounds. GE engineers faced the paradoxical task of developing an upgraded, portable, lightweight, alternative with full ECG capabilities that also cost less than current models, all while operating within a development budget of only $500,000. ECG engineers typically reduce the size of units by applying smaller, yet more expensive processors, or other modern technology that increases cost. GE engineers reportedly integrated paradoxical demands during the development of the MAC 400 ECG scanner, which revolutionized rural health care. For example, the engineers creatively designed a novel chassis that required less heavy-duty plastic, thus reducing costs and weight simultaneously. Portability was further increased by implementing smaller (thus, lower cost) LCD screens. In sum, GE engineers met their criteria for successful implementation by creatively implementing solutions that addressed multiple, yet seemingly incompatible, demands.

Fixation Reflection

Even in the situation of an expert leader ,there are pitfalls arising during idea evaluation that can limit teams' creative productions. One of the chief cognitive biases facing both expert leaders and expert members is the fixation on methodology, solutions, and procedures that have consistently resulted in past success (Jansson & Smith, 1991). Because expert leaders fulfill the evaluator role during idea evaluation, fixation biases the leader toward gatekeeping truly creative ideas in favor of routinized, but effective, solutions. That is, expert leaders may consider noncreative ideas to be more feasible or effective during evaluation due to their fixation on tried-but-true past solutions. However, leaders are also well situated to lead efforts against functional fixation, or cognitive entrenchment. Ezzat et al. (2017) propose that leaders can function as "defixators" (p. 7) by applying defixation methods.

Defixation is the process by which individuals expand the problem frame to incorporate seemingly irrelevant domains, extreme approaches, or obscure methods used in niche situations. One defixation method that has received some empirical attention is the expansive path approach where problemsolvers are provided with

radical or fantastical examples solutions. Agogué et al. (2014) demonstrated that teams exposed to expansive examples before a problem-solving task generate more original solutions than teams provided with restrictive (i.e., typical/routinized) examples. Expansive examples help to reframe potential solutions and emphasize varied methods to legitimize creative alternatives during evaluation. One way leaders can implement expansivity in their teams is by asking the team what the product/solution would entail if there were no constraints on their work (Smith, 2003). That is, if the team did not have to worry about time, resources, or knowledge constraints, which alternative would they prefer? Aiming for similar features of the expansive example, teams are better situated to choose alternatives or solutions that remove barriers, reduce inefficiencies, and implement ideas despite limited resources. Similarly, Berg (2019) demonstrated that creative problem-solvers who forecast the creativity of ideas at a higher construal level (i.e., use more abstract, constraint-free forecasting) are better long-term evaluators than those who employ low-level (i.e., concrete, bounded by reality) thinking. Thus, leaders who employ the expansive path approach may simultaneously encourage greater abstraction during the forecasting of an idea's creativity and attenuate the effects of cognitive entrenchment.

Conclusion

Creative problem-solving skills are, and will remain, a crucial component for organizational success. With an understanding of the cognitive processes of (a) problem construction, (b) idea generation, and (c) idea evaluation, leaders can apply scientific findings to improve the creative performance of their teams. We have described each process and provided specific practices leaders can implement with their own teams when solving complex work problems. In sum, leaders who actively define problem constraints, manage projecttimelines, promote psychological safety, define criteria, and reduce cognitive fixation situate their teams to focus on the production of creative ideas, solutions, or products. We hope the interventions and recommendations discussed herein can provide leaders with a set of tools to improve their teams' creative problem-solving performance.

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