Creativity in Teams

LEIGH L. THOMPSON and ELIZABETH RUTH WILSON

Abstract

Organizations want to be more creative, but improving creativity remains an elusive process. We examine the study of creativity in teams and groups beginning with the intuitive assertion that teams are more creative than individuals and review decades of research that suggest otherwise: Individuals are actually *more* creative than their groups. We then focus on the key cognitive and social factors that thwart team creativity, such as conformity pressure, and highlight techniques for improving the creative performance of groups, such as brainwriting (rather than brainstorming), quantity goals (versus quality goals), and rotating (rather than stable) membership. We conclude with paradoxical tactics for and consequences of improving creativity.

The "best practices" for improving team creativity remains an enduring question for researchers and practitioners, and the pursuit of creative teamwork is of monumental concern for companies and organizations. In fact, a perusal through many popular press publications, such as *Fast Company* and *BusinessWeek*, reveals coveted rankings and awards for the most innovative businesses. Such press coverage indicates that, among all the qualities that organizations desire, creativity is highly sought after, yet it proves to be elusive. Indeed, most organizations are keen on two things: teams and innovation. Although companies create environments for innovative teams (e.g., companies organize work spaces and encourage idea-generating sessions for teams), empirical research on creativity suggests that most intuitions about what makes for a creative team are, in fact, not very effective (and may actually be detrimental). Although people believe they would generate more ideas in a team setting than by working alone (Paulus, Dzindolet, Poletes, & Camacho, 1993), a plethora of research has found that teams are decidedly less creative than individuals (Diehl & Stroebe, 1987; Taylor, Berry, & Block, 1958; for reviews, see Paulus & Nijstad, 2003; Thompson, 2013, 2014).

This scientific evidence then poses a question for both researchers and practitioners, which can be starkly stated as, "What should we do?" At the extreme, one answer might be to dispose of teams, something akin to

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"throwing the baby out with the bath water." However, most organizations cannot consider this a viable option. The other extreme might simply be to tolerate mediocre team performance, at least with regard to creativity, given that teams are often much better than individuals with regard to other types of tasks, such as decision making and solving problems that have "demonstrable" solutions. Furthermore, the reality is that teams are necessary in organizations for a lot of reasons; thus, neither of these extremes is acceptable nor should be advised.

A FEW DEFINITIONS

Creativity is the production of novel and useful ideas (ideation), whereas innovation is the realization of actual ideas in the form of products and services (Choi & Thompson, 2005). In this essay, we focus on ideation or creativity. Teams complete a lot of tasks in organizations that do not necessarily involve the production of novel and useful ideas. The question then is how optimal performance can be achieved when organizations and their teams are tasked with generating new ideas. The conclusion is to devise *hybrid* structures or designs that capitalize on the creative strengths of teams and their individual members.

There are many types of creative problems with real-world analogs that have been studied in research. One type is known as the *Eureka!* problem that has a best, "Aha!" answer. Another type of creative problem is the divergent thinking task that does not have a single, best answer and, in fact, encourages many different kinds of responses. This distinction is often referred to as *convergent* versus *divergent thinking* (for reviews, see Paulus & Nijstad, 2003; Thompson, 2013, 2014). Convergent thinking tasks have a demonstrably correct answer, such as Duncker's (1945) candle task and the Remote Associates Test (RAT; Mednick, 1962). Divergent thinking tasks do not have one correct answer, such as the Thumbs problem (e.g., Bouchard & Hare, 1970) in which people brainstorm the implications of everyone having an additional thumb. As with such tasks, many organizational applications of creativity (e.g., launching a new product or service) do not have a demonstrable solution. Our review is thus focused on the generation of novel and useful ideas as well as the predictors and correlates of team creativity in divergent tasks.

To evaluate the performance or productivity of divergent thinking, consider two models or indices: Guilford's (1950) three-factor model and Finke's (1995) quadrant model. Guilford's (1950) model suggests the creative output of a team (or individual) may be evaluated on the basis of three criteria: fluency, flexibility, and originality. *Fluency* refers to the volume of ideas produced and facilitates meaningful comparisons of groups versus individuals.

In particular, per-person fluency is often calculated, such that the overall volume of ideas suggested by a team in a finite period of time is divided by the number of people in the group; this measure allows meaningful comparisons across different-sized groups. *Flexibility* refers to how many different kinds of ideas a group (or individual) generates. For example, responses to the Alternative Uses task (e.g., "Think of as many unusual uses as you can for a cardboard box"; Guilford, 1959) might all be of a given category, such as toy structures (e.g., a toy castle or puppet theater). However, suppose a team generates ideas, such as laundry hamper, flower pot, and basketball net; these alternative uses might be considered three *original* or different types of ideas. *Originality* refers to the uniqueness of ideas; an idea is generally considered original if <5% of a cohort thinks of it. According to Guilford (1950), flexibility is the most important, which seems to contradict many companies' notion that quality is more important than the diversity of ideas generated.

The four-quadrant model (Finke, 1995) is composed of two orthogonal dimensions—creativity (in terms of uniqueness) and structural connectedness (how realistic an idea is)—that give rise to conservative idealism, conservative realism, creative idealism, and creative realism. Creative realism is considered the most desirable quadrant because it represents ideas that are highly linked to structure, albeit highly imaginative.

THE BRAINSTORMING REVOLUTION AND FOUNDATIONAL RESEARCH

The scholarly study of creativity in teams was housed in social psychology for several decades, but as for many other social-organizational topics, the field of organizational behavior has also examined creative teamwork. For both the fields of social psychology and organizational behavior, the publication of a rather innocent-looking business book was pivotal in provoking decades of scientific research.

In 1957, a nonacademic, Alex Osborn, published *Applied Imagination*. In that book, Osborn (1957) proudly touted the remarkable ability of teams and groups when it came to the creative process and, without providing much data, introduced the term *brainstorming* and outlined what later became known as the *four cardinal best practices* for enhancing creativity in groups and teams: welcome free-wheeling, rule out criticism, embrace quantity, and build upon others' ideas.

With the release of *Applied Imagination*, brainstorming was soon embraced as a best practice by companies. On the surface, Osborn's (1957) suggested practices made sense, and he claimed that groups who followed the rules of brainstorming would outperform those who did not follow his guidelines.

Subsequently, empirical research on brainstorming also blossomed, particularly within social psychology. A key research question was whether groups were more creative than individuals, as he had argued. Controlled, scientific studies supported Osborn's (1957) intuition: Teams that used the four brainstorming rules were more effective at idea generation than teams that worked without those rules (Johnson, Parrott, & Stratton, 1968; Meadow, Parnes, & Reese, 1959).

Social scientists (social psychologists in particular) empirically questioned whether groups were indeed more creative than their individual members. A simple, but ingenious, empirical paradigm that allowed a direct comparison of individual and group creativity was devised. This involved creation of a control group, known as a *nominal group*, which is the same number of people who work independently (i.e., they never interact; Taylor *et al*., 1958). The results revealed that nominal groups outperform interactive groups in terms of both quantity and quality of generated ideas (Diehl & Stroebe, 1987; Mullen, Johnson, & Salas, 1991; for reviews, see Paulus & Nijstad, 2003; Thompson, 2013, 2014).

Empirical research on creativity in teams has been conducted in both laboratory and field settings. Examples of brainstorming tasks include the Thumbs Problem (Bouchard & Hare, 1970), the Alternative Uses task (Guilford, 1959), and the University Problem (e.g., "List ways your university could be improved"; Larey, 1994). In each of these tasks, participants are asked to list as many implications, ideas, or responses as possible, setting aside concerns for feasibility. A meta-analysis (Shea & Guzzo, 1987) found that individuals generated significantly more ideas and more high-quality ideas than did groups.

GROUP PROCESSES AND SHORTCOMINGS

Given the overwhelmingly consistent empirical finding that groups fall far short on creativity as compared to individuals, the question of why and what to do about it became a focus of empirical research. Indeed, improving team creativity begins with an understanding of group behaviors that impede their creative process. Research on faulty group processes has centered on conformity (Asch, 1951; Sherif, 1936), motivation loss (Steiner, 1972), production blocking (Diehl & Stroebe, 1987; Lamm & Trommsdorff, 1973), and collaborative fixation (Kohn & Smith, 2011; Smith & Blankenship, 1989). These group shortcomings threaten the ability of groups to make sound choices and maximize their creativity.

Conformity and Groupthink

Conformity is the tendency of individuals to bring their behavior in line with what they feel will win them acceptance in groups. Beginning with the pioneering research by Asch (1951) and Sherif (1936), empirical studies revealed how the mere presence of groups led individuals to censor their views and fail to speak up. For example, people have slower reaction times in word association tasks (suggesting they edit their thoughts) and make more clichéd responses when working in groups (Diehl & Stroebe, 1987). Research on conformity paved the way for other theories, namely groupthink (Janis, 1972) and group polarization (e.g., Isenberg, 1986; Myers & Lamm, 1976).

Perhaps no other social psychology construct or phenomenon has penetrated the lay public as much as *groupthink* (Janis, 1972), the phenomenon by which individuals forgo independent critical thinking in favor of group thought processes and norms. The desire to agree in a group can become so dominant that it can override the realistic assessment of the best decision for the group. Examples of groupthink fiascos include the Bay of Pigs invasion, in which President Kennedy's administration pursued the invasion despite information that suggested it would be an unsuccessful venture (Janis, 1972), and Ford Motor Company's decision to produce the Edsel (Huseman & Driver, 1979).

A similar phenomenon, known as *group polarization* (Isenberg, 1986; Myers & Lamm, 1976), suggests group members' opinions and points of view can become magnified. Group discussions intensify a group's opinion to the point where more extreme judgment than might be obtained by polling group members individually is created. Group members who are afraid to speak up may be even more prone to conform to the group's opinion. Social psychologists have offered two explanations for why this phenomenon occurs: the need to be right and the need to be liked. Note, however, that group polarization does not occur in nominal groups.

Motivation Loss and Free-Riding

Motivation loss (Steiner, 1972) is another group process that may hinder team creativity. This concept suggests that individuals may work less hard in groups than they would if they worked alone. Stated another way, individuals in groups may free-ride or "ride on the coattails" of their team members. Faulty group coordination thus leads to a suboptimal group outcome. Later work on social loafing (Kerr & Bruun, 1981; Latané, Williams, & Harkins, 1979) offered three reasons driving this process. First, group members may decrease their individual performance in an attempt to maintain an equal division of labor. Alternatively, members may underestimate their

contribution to the group, or members may set a goal below their group's maximum potential.

Production Blocking

Production blocking may also hinder group creative productivity; this occurs when group members cannot express their ideas when another member is speaking (Diehl & Stroebe, 1987; Lamm & Trommsdorff, 1973). Members of teams are prevented from generating new ideas during team discussion because they are distracted by the "give-and-take" of communication. In a group setting, individuals have to balance active listening of other members' ideas with contributing to the group's discussion; in contrast, a person who is working alone can enjoy an uninterrupted thought flow.

Collaborative Fixation

Fixation occurs when something blocks or impedes cognitive processes, such as those used in generating ideas, and may hinder the number and diversity of ideas that a group may generate (Kohn & Smith, 2011; Smith & Blankenship, 1989). In divergent tasks, fixation particularly affects idea diversity; group members may conform to ideas presented by other group members and think of related ideas rather than exploring other categories (e.g., Jansson & Smith, 1991; Smith, Ward, & Schumacher, 1993). For example, in the cardboard box task, members may be anchored by one member's initial idea of using the box to make a toy castle and subsequently think of other toy structures the box can be used for rather than thinking about other categories of ideas.

BEST PRACTICES AND TREATMENTS

A variety of techniques have been introduced with the goal of minimizing these faulty group processes and getting groups to approach the creative performance of nominal groups. Some methods involve training group members in idea generation or idea selection skills. For example, groups that work with a facilitator are more creative than those who do not (Offner, Kramer, & Winter, 1996). Cognitive stimulation via words or pictures and allowing groups to take brief breaks also improve creativity. The techniques we focus on in this essay include additional brainstorming rules, quantity goals, brainwriting, electronic brainstorming (EBS), speedstorming, and rotating membership (for reviews, see Paulus & Nijstad, 2003; Thompson, 2013, 2014).

Additional Rules

Paulus, Nakui, Putman, and Brown (2006) took to heart the findings suggesting that groups that follow brainstorming rules outperform those that do not (Johnson *et al*., 1968; Meadow *et al*., 1959) and questioned whether additional rules might lead groups to be even more effective. In their empirical investigation, some groups were instructed to follow Osborn's (1957) original four rules, and other groups were instructed to follow those rules in addition to four new rules: not telling stories, encouraging those not making a contribution to speak, not elaborating on ideas, and returning to previous categories. Groups that followed these new rules were significantly more creative than those simply following Osborn's (1957) cardinal rules, thereby supporting the belief that rules and structure serve groups well in the creative process (Paulus *et al*., 2006).

Quantity Goals

A hallmark of effective team creativity is the quality of ideas produced. Therefore, it would seem sacrilegious to suggest that teams should eschew quality in favor of quantity, but research suggests otherwise. One study gave groups one of four goals in a divergent brainstorming task: quantity only, quality only, quantity plus quality, or a control group with no defined goal (Paulus, Kohn, & Arditti, 2011). Apparently, groups that focused on quality spent too much time self-censoring ideas that were not regarded as novel or interesting enough to list although their very presence could have provided a catalyst for a truly interesting idea. Instead, groups that had a quantity goal were more likely to freewheel and, in turn, outperformed all other groups in terms of both quantity and quality of ideas produced.

Brainwriting

Among all of the best practices and interventions that attempt to get groups to approach nominal groups' productivity, brainwriting has been the most impactful. One problem with brainstorming is that only one person can speak at a time in a group, and the person who has the floor effectively impedes other members' idea generation (i.e., production blocking; Diehl & Stroebe, 1987; Lamm & Trommsdorff, 1973).

Brainwriting is instead the simultaneous generation of written ideas by people in a group (Geschka, Schaude, & Schlicksupp, 1973). Simultaneous writing eliminates the problems of production blocking because group members do not have to wait for their turn to generate ideas. Groups that engage in brainwriting consistently generate more and better quality ideas than groups that engage in brainstorming. Even if groups stop all talking for brief pauses, this improves their creativity.

Electronic Brainstorming

Closely related to the concept of brainwriting is cyberstorming or EBS (Ziegler, Diehl, & Zijlstra, 2000). With the advent of virtual spaces, this technique uses computers to allow group members to interact and exchange ideas at the same time. In EBS, members are typically anonymous; this anonymity helps curb some conformity pressure and members' tendency to hold back in expressing their ideas. Participants can view all or some of the ideas generated by other team members, and a facilitator usually guides the idea generation and decision-making processes (Nunamaker, Briggs, & Mittleman, 1995).

Speedstorming and Rotating Membership

Speedstorming is a relatively new technique that is analogous to speed dating. In speedstorming, pairs of group members generate ideas in a similar one-on-one manner for a few, high-intensity moments before switching to generate ideas with a different group member. This process allows participants to generate ideas with several other people and quickly identify potential collaborators (Joyce, Jennings, Hey, Grossman, & Kalil, 2010).

Speedstorming suggests that change (during idea generation) may enhance a group's creative performance; a similar technique in line with this premise is rotating membership (i.e., having new members cycle in and out of the team). One study found that teams that had porous or open borders in which people came and went were more creative than teams that stayed perfectly intact (Choi & Thompson, 2005). Specifically, the presence of new team members stimulated new ideas in existing team members.

EMERGING METHODS AND RESEARCH QUESTIONS

Emerging methods for increasing the creativity of groups span a wide range of methods including training people to use techniques such as brainwriting and rotating membership; social scientists are also using less traditional research methods more frequently, such as field studies, to understand better how group creativity may be improved.

Field Studies

Most of the research on creativity and brainstorming (and brainwriting) has been conducted in controlled laboratory settings, but some field studies have also analyzed group creativity. As an example, Dunbar (1997) studied microbiology laboratories in the United Kingdom and United States to analyze which labs filed more patents over time; this number and the

diversity of patents filed provided measures of creativity. Some laboratories followed homogeneous hiring practices and had little diversity in terms of professional training and expertise, while other laboratories instead followed heterogeneous hiring practices and hired people with different degrees, backgrounds, and scientific training. The teams with more diversity had more conflict and debate among the scientists; this also led them to have more creativity.

Another study compared the effectiveness of using two different types of subgroups on idea generation (de Vreede, Briggs, & Reiter-Palmon, 2010). One approach involved using multiple subgroups that completed the entire problem-solving process and then combined results at the end (parallel mode), and the other approach involved subgroups building on other subgroups' work throughout the entire process (serial mode). Serial subgroups engaged in more elaboration and in-depth thinking, but parallel groups generated more unique ideas.

Paradoxes in Improving Team Creativity

Some of the emerging research has also explored new research questions and suggests some paradoxes in what has traditionally been regarded to be conducive for team ideation. For example, one study found that people desire creativity but reject creative ideas (Mueller, Melwani, & Goncalo, 2012). Groups may also not know when to stop or cease the brainstorming process (Nijstad, Stroebe, & Lodewijkx, 1999). Under some conditions, distrust in others increases creativity (Mayer & Mussweiler, 2011); and, thinking creatively may lead to more dishonesty (Gino & Ariely, 2012). Pro-self (as opposed to pro-social) motivation may also lead to greater creativity. In one study, pro-self groups showed greater dedication and performed better on divergent thinking tasks after completing a negotiation than did pro-social groups (Beersma & De Dreu, 2005).

KEY ISSUES FOR FUTURE RESEARCH

Laboratory studies of creativity have focused primarily on how teams generate ideas, irrespective of how those ideas are made into products and services; and, field studies and applied research have concerned themselves more with product launch and execution. An important consideration for future research is to refine the linkage between those two processes. Furthermore, most social psychological research has focused on the factors that lead to greater group ideation, but a ripe area of research is how creative ideation might affect the performance of individuals and teams in other pursuits, such as conflict management.

Given the explosion of global connectivity and the need for organizations to respond quickly to threats and challenges, it is worthwhile outlining some seemingly far-fetched implications for creative teamwork. One area concerns the composition and processes of "flash teams," or (our term for) companies that assemble teams of people from all over the world once a client has approached them with a problem or job. For example, Kiva is a nonprofit organization that allows people to lend money over the Internet to low-income entrepreneurs around the world. As part of its marketing efforts, however, Kiva promotes companies to start their own "Kiva Lending Team" to encourage their employees and customers to get involved with microlending. For example, Hewlett-Packard (HP) started its own lending team in 2013. As of April 2014, HP's Lending Team included over 90,000 members; and the team had loaned over $2.5 million to entrepreneurs and other individuals in need. Future research might consider how such global teams assemble to complete creative teamwork and, conversely, how creative teams use virtual platforms to interact with stakeholders and consumers (e.g., using crowdfunding sites such as Kickstarter and Indiegogo).

Given that companies are spending more time interacting virtually as opposed to physically, a related consideration is how idea generation occurs in groups via web conferencing applications and video services, such as GoToMeeting. Research on EBS (Ziegler *et al.*, 2000) might suggest that computer-mediated communication would enhance group creativity, yet future research should consider how technology has evolved since seminal work on creativity and virtual groups, the implications for distance teamwork, and best practices for maximizing idea generation in virtual teams.

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LEIGH L. THOMPSON SHORT BIOGRAPHY

Leigh L. Thompson joined the Kellogg School of Management in 1995. She is the J. Jay Gerber Distinguished Professor of Dispute Resolution and Organizations. She is the director of the Kellogg Team and Groups Research Center and directs the Leading High Impact Teams, Constructive Collaboration, and Negotiation Strategies executive programs. An active scholar and researcher, she has published over 110 research articles and chapters and has authored 10 books, including *Creative Conspiracy* (HBS press), *The Truth about Negotiation* (Financial Times press), *The Mind and Heart of the Negotiator* (6th edition), *Making the Team* (5th edition), *Creativity in Organizations*, *Shared Knowledge in Organizations, Negotiation: Theory and Research*, *The social psychology of organizational behavior: Essential reading*, *Organizational behavior today, and Conflict in organizational teams*.

Thompson has worked with private and public organizations in the United States, Latin America, Canada, Europe, and the Middle East. Her teaching style combines experiential learning with theory-driven best practices.

For more information about Leigh Thompson's teaching and research, please visit:

www.LeighThompson.com.

ELIZABETH RUTH WILSON SHORT BIOGRAPHY

Elizabeth Ruth Wilson is a doctoral candidate in Management and Organizations at the Kellogg School of Management. Her research focuses on developing high-performance teams and examines the consequences of both creativity and decision making.

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