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The medium matters: Mining the long-promised merit of group interaction in creative idea generation tasks in a meta-analysis of the electronic group brainstorming literature

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Abstract

This meta-analysis examines the influence of electronic communication media on group idea generation tasks. Data from the following three areas of the brainstorming literature are synthesized to assess differences across performance variables and group member satisfaction: (1) electronic brainstorming (EBS) groups versus traditional face-to-face (FTF) interacting groups, (2) EBS groups versus nominal groups, and (3) EBS versus electronic nominal (e-nominal) groups. The results of this integration show that EBS groups are more productive and more satisfied with the interaction process than FTF groups. Additionally, large EBS groups outperformed nominal groups, whereas small nominal groups outperformed EBS groups. These findings have important implications for electronic collaboration and teamwork in both academic and organizational settings, especially given the recent proliferation of virtual teamwork.

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1. Introduction

Producing creative solutions to problems is an important outcome variable associated with group interactions in the workplace (Kerr & Tindale, 2004; Vissers & Dankbaar, 2002). Using groups to facilitate creative idea generation has intuitive appeal, because it is widely believed that groups are superior to unaided individuals in such tasks (Faure, 2004; Gallupe, Cooper, Gris , & Bastianutti, 1994; Valacich, Dennis, & Connolly, 1994). Popularizing this notion, Osborn (1957) formulated specific procedures for interacting groups working on creative idea generation tasks, a process dubbed “group brainstorming.” Group brainstorming is widely used in a variety of settings and derivations of this technique are commonplace in organizations. In brainstorming, participants are encouraged to voice or record as many ideas as possible, regardless of the practicality or feasibility of the ideas. Participants are also encouraged to build upon other members’ ideas (Connolly, Routhieaux, & Schneider, 1993; Paulus, Larey, & Ortega, 1995). According to Osborn, brainstorming groups could be expected to outperform individuals in terms of both the quantity and quality of ideas. However, numerous empirical studies have disconfirmed these assertions (see Kerr & Tindale, 2004 for a review).

In traditional laboratory and field studies of group brainstorming, face-to-face (hereafter, FTF) groups of various sizes are compared to nominal groups, which are formed by aggregating the output of a comparable number of individuals working separately. The outcome in nearly all such studies is that nominal groups outperform FTF groups in terms of the production of non-redundant ideas and idea quality (Diehl & Stroebe, 1987). Mullen, Johnson, and Salas (1991) conducted a meta-analysis comparing FTF groups and nominal groups from 1958 to 1990, and found the mean effect sizes from the experimental literature to be large ($r = .57$ for the number of non-redundant ideas; $r = .56$ for idea quality). These results contradict the popular, but poorly substantiated notion that communication among individuals will result in “synergistic” effects (Faure, 2004; Pinsonneault, Barkhi, Gallupe, & Hoppen, 1999a; Tindale & Larson, 1992).

In light of these consistent findings, considerable attention has been paid to electronic brainstorming (EBS), an e-collaboration method that employs networked computer terminals and software designed to allow group members to communicate electronically during idea generation exercises (Connolly et al., 1993; Dennis & Valacich, 1994). The technology and procedure of electronic group brainstorming are thoroughly described elsewhere (Dennis & Valacich, 1993, 1999; Dennis & Williams, 2003; Pinsonneault et al., 1999a), but we shall briefly summarize the process. Participants are presented with a textual description of the brainstorming task on their computer monitors, and when they generate an idea, they simply type it in a designated portion of the screen. Once an idea is entered it becomes available for viewing by other group members in a shared space that appears in a section on the monitor in each workstation. This shared space is also referred to as group memory (Dennis & Valacich, 1993). In some instances, the group space shows all of the cumulative ideas for the session, while a random subset of ideas is displayed in others (Pinsonneault et al., 1999a). Input from each participant is synchronously

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