Reconsidering Brainstorming

Paul A. Mongeau; Mary Claire Morr

Department of Communication, Miami University, Oxford, Ohio 45056, mongeapa@muohio.edu

Mary Claire Morr
Department of Communication, Arizona State University, P. O. Box 871205, Tempe, Arizona 85287, Mary.Claire.Morr@asu.edu

The term “brainstorming” is used in popular speech, as are trademarked brand names such as “Kleenex,” “Band-Aid,” and “Jello.” Paul Mongeau and Mary Claire Morr remind us that “brainstorming” is also a “brand name” coined by Alex Osborn to refer to the approach he developed for idea generation. Although many people use the term generically, group facilitators should be aware of its specific meaning and the research which demonstrates, contrary to popular belief, that brainstorming is an inferior method of generating ideas! However, their criticism of the research alerts us to some of the more subtle aspects of Osborn’s method and offers some pointed suggestions for facilitating idea generation.

Abstract

Brainstorming is reviewed in face-to-face and electronic contexts. Comparing brainstorming as it was initially defined to how it has been studied reveals several important differences. The accumulated research evidence indicates that face-to-face brainstorming groups produce fewer ideas than nominal groups (i.e., individuals who generate ideas without interacting with other ideators). More recent research indicates that electronic brainstorming groups generate more ideas than do nominal groups. Increasing group size inhibits the performance of face-to-face brainstorming yet facilitates the performance of electronic brainstorming. Process blocking and evaluation apprehension appear to provide the fullest explanation of this phenomenon. Suggestions are made for facilitators who use brainstorming and for future research.

Reconsidering Brainstorming

Decision-making groups frequently face the task of generating ideas (i.e., ideation). Whether these ideas represent solutions to a manufacturing problem or novel ways of selling toilet bowl cleaners, idea generation is an important group task (Gouran & Hirokawa, 1996). Brainstorming (i.e., using a group to generate a large number of ideas) is a preferred method of ideation.

Brainstorming is often used in a generic sense to describe groups who generate ideas. For example, Moran, Talbot, and Benson (1990) defined brainstorming as “a group process in which group members collectively contribute their ideas in a creative atmosphere” (p. 3). Although the term has come into popular use, facilitators should know its precise meaning and history. This paper reviews brainstorming theory and research in several sections. First, we consider the claims made by Osborn (1957; 1963), the father of brainstorming. This discussion includes a critical discussion of the evidence presented supporting brainstorming. Next, we consider Osborn’s view and how it differs from the social science research on brainstorming. Third, we review the social science research on brainstorming in face-to-face, nominal, and electronic contexts. Discussion then centers on explanations for the interesting differences between individuals.
and brainstorming groups in face-to-face and electronic contexts. Finally, this paper provides considerations for group facilitators and suggestions for future research.

**Brainstorming: The Procedure.** Alex Osborn (founder of the Batten, Barton, Durstine, and Osborn advertising firm) expressed frustration at employees’ lack of creativity in problem solving and idea generation. Osborn (1957) argued that the lack of creativity was a function of individuals’ tendency to emphasize judgment (i.e., evaluation of ideas) over originality. Group members who are concerned with potential negative evaluation of their ideas will not achieve high levels of creativity.

In an effort to break mental blocks inhibiting creativity, Osborn (1957) developed an extensive set of procedures intended to free imagination. One central component of these procedures was the separation of judgmental from creative processes, or suspended judgment. Suspended judgment requires that creative processes be entirely separated from judgmental ones. Only when the "jamming" influence of judgmental thoughts are eliminated can creative juices flow optimally. Osborn says "When driving for ideas you can go further if you keep your foot off the brake" (1957).

The success of brainstorming as an ideation technique depends strongly on suspended judgment. According to Osborn (1957), in order to be maximally productive, brainstorming groups should follow four rules:

1. **Criticism is ruled out.** Adverse judgment of ideas must be withheld until later.
2. **"Free-wheeling" is welcomed.** The wilder the idea, the better; it is easier to tame down than to think up.
3. **Quantity is wanted.** The greater the number of ideas, the more the likelihood of winners.
4. **Combination and improvement are sought.** In addition to contributing ideas of their own, participants should suggest how ideas of others can be turned into better ideas; or how two or more ideas can be joined into still another idea. (p. 84)

These rules are designed to generate a large number of ideas (rule 3) by sparking creativity (rules 2 and 4) through suspended judgment (rule 1).

It is the fourth rule that leads to an expectation that groups should generate more ideas than individuals. First, at the group level, Osborn (1957) argues that the nature of group ideation allows for idea generation through the power of association (or what he calls "sparking" or "chain reactions"). Consider a scenario where Member A presents an idea to a group. The power of association implies that A’s original idea might “spark” novel ideas both in Member A and in other group members. When presented to the group these new ideas can spark even more ideas in other group members, further stimulating the brainstorming cycle. Brainstorming, then, depends on the free expression of ideas. If ideas are not expressed orally, they cannot stimulate new ideas in other group members and the group’s effectiveness will suffer.

On the individual level, Osborn (1957) also argued that the “stimulative effect of rivalry” (p. 83) should provide groups with an ideational advantage. He claims that a spirit of friendly rivalry is important in brainstorming groups because it increases motivation to engage in mental work. “Such motivation counts more in ideation than in almost any other mental function because true creativity more largely depends on application of effort” (Osborn, 1957, p. 83). Osborn refers to optimal brainstorming sessions as sort of a friendly game with rivalry where an effort is made to improve on old, and present new and better, ideas. Although rivalry is produced, it is important that the group environment be relaxed, like a picnic, because “a relaxed mood is conducive to successful brainstorming” (Osborn, 1957, p. 240).

**Brainstorming: The Claims.** Osborn (1957) consistently claimed that brainstorming, through the use of suspended judgment, is the most effective means of ideation. The most specific claim that Osborn (1957) makes in comparing groups to individuals is that

In the same length of time, under proper conditions, the average person can think up about twice as many ideas when working with a group than when working alone—unless the individual ideators adhere to the brainstorming principles of suspended judgment (pp. 229-230).

In making this claim, however, the superiority of group over individual ideation is equivocal when both use suspended judgment. If group ideation creates rivalry and associations (i.e., chain reactions), groups should exceed individuals in the number of ideas created even though both use suspended judgment.

The evidence provided supporting the superiority of brainstorming groups, however, is primarily anecdotal (Osborn, 1957). There are many reports of brainstorming groups generating an impressive-sounding number of ideas in a limited period of time. For example, “In 90 minutes, 10 people produced 87 ideas” (Osborn, 1957, p. 86). However, this anecdotal evidence plants seeds of doubt as to the efficiency of group brainstorming. While 87 ideas (and a rate of nearly 1 idea per minute across 90 minutes) sounds impressive, it represents fewer than 9 ideas per group member or one idea per member every 10 minutes.
When put in these terms, brainstorming generates what seems like an impressive number of ideas; however, brainstorming’s efficiency as an ideation technique becomes questionable (Gallupe & Cooper, 1993).

**Brainstorming: What Has Been Tested?** The empirical research comparing brainstorming groups to nominal groups (i.e., groups of individuals who generate ideas without interacting with other ideators) indicates that brainstorming groups are an inefficient means of generating ideas (Mullen, Johnson, & Salas, 1991). There is one important point, however, that must be considered in evaluating this conclusion. The brainstorming procedures used in such comparisons, in both face-to-face and electronic contexts, deviated in important ways from the procedures prescribed by Osborn (Jablin & Seibold, 1978).

The typical experimental brainstorming session involves bringing a number of strangers into the laboratory. They are provided with the four rules governing brainstorming and are told to generate as many ideas on a hypothetical issue as possible in a specified period of time. Often, a warm-up exercise is provided beforehand.

Many inconsistencies can be found between Osborn’s conceptualization of brainstorming and its operationalization in the research. One obvious difference is in the size and composition of the brainstorming group. In discussing the size of a brainstorming group, Osborn claims that “Based on hundreds of experiences, the optimal size is indicated as being about a dozen” (1957, p. 234). This stands in sharp contrast to studies on face-to-face brainstorming that rarely use group sizes of greater than four. The electronic brainstorming research, however, frequently involves groups of 12 or even more members (see, for example, Valacich, Dennis, & Connolly, 1994).

The composition of groups also differs between Osborn and research studies on both face-to-face and electronic brainstorming. Osborn describes the ideal group as being composed of “a leader, an associate leader, about five regular or ‘core’ members and about five guests” (1957, p. 235). The core members are described as having demonstrated their ability in creative problem solving and should serve as the group’s “pace-setters.” The guests should be chosen, according to Osborn, with an eye toward those who have had experience with the issue or topic under consideration (e.g., hunters if the topic is shotguns, sales representatives who travel if the topic is relevant to hotels). In contrast, studies typically use zero-history (and zero-future) groups where members are strangers. Members are not chosen with any concern for their problem-solving ability or experience with the topic under discussion.

Yet another important difference between Osborn’s brainstorming procedures and those operationalized in much of the research is in the role of the group leader. Osborn claims that the leader should stay out of the way and let the group develop its own ideas. When the group’s well begins to run dry, the leader should help by suggesting ideas he or she prepared before the session. Osborn also suggests that the leader should point the group in a new direction or move the group to a previously considered, but not fully explored, set of ideas when the group seems to be spending too much time discussing one particular category of ideas.

Clearly this leadership role is not being followed when, for example, Taylor, Berry, and Block (1958) report that “Actually, for both individuals and groups, appreciable periods of silence appeared between responses near the end of the twelve minutes” (p. 30). Leaders (if there were leaders) did not keep the group going nor did they suggest new ideas and/or the reconsideration of old ideas. An important component of Osborn’s brainstorming procedure was missing.

Also, it is unclear as to what extent this lack of leadership allowed groups to break brainstorming rules (most important, the lack-of-criticism rule). Osborn suggests that whenever a rule is broken, the leader or associate leader should ring an old-fashioned school teacher’s bell. It is not clear from research reports whether or how such rule violations are identified and dealt with (particularly in studies where the experimenter is absent). Presuming that fear of negative evaluation inhibits group ideation (Jablin & Seibold, 1978; Mullen et al., 1991), the extent to which explicit criticism intercedes into discussion could have a drastic negative impact on group productivity.

Perhaps the most important missing ingredient in both face-to-face and electronic brainstorming groups in the research is the training of the leader and/or group members. Osborn spends a great deal of time discussing the need for, and achievement of, suspended judgment in preparing groups for brainstorming. Suspended judgment cannot be achieved by simply listing four rules. The elimination of explicit criticism and the singular concentration on idea generation do not come easily. They take time and effort to achieve (Osborn, 1957). This time and effort is not exerted in studies investigating brainstorming.

Laboratory brainstorming groups typically meet once without training, generate ideas, and then never meet again. Osborn recommends, on the other hand, that the ideal brainstorming format involves three sessions (i.e., individual-group-individual). In particular, group members should be provided with the topic a few days before the brainstorming session. Members are told to consider the issue on their own before meeting with the group. After the group meets, members should be sent a copy of the group’s output so that any ideas that might come to them over the next few days could be forwarded to the leader.
Finally, the brainstorming research (both face-to-face and electronic) tends to use hypothetical issues of little consequence to group members. Two frequently used topics are to persuade more foreign tourists to visit the United States and the consequences of being born with two thumbs on each hand. The lack of involving tasks are a concern for two reasons. First, Osborn (1957) developed brainstorming to tackle issues of consequence to group members. Osborn would see no use for brainstorming on the “thumbs” problem. Second, it is unclear why undergraduate students (the typical participant in brainstorming studies) would be particularly motivated to perform on these tasks. Thus, it is not clear to what extent results from studies can be generalized to brainstorming groups with a history and motivation to tackle the issue at hand. Many of the electronic brainstorming studies, however, avoid this particular criticism by using a problem that is nearly ubiquitous and quite vexing—parking on campus.

**Brainstorming: The Experimental Evidence**

Although Osborn made clear predictions as to the ideational advantage of groups, he left the empirical question unanswered. A large social science literature has since explored the ideational differences between groups and individuals in face-to-face and electronic contexts.

**Face-to-face Brainstorming.** The social science research on “brainstorming” has centered upon the relative effectiveness of interacting groups (i.e., brainstorming) and individuals (i.e., nominal groups) in the production of ideas. (For excellent reviews of this research, see Jablin and Seibold, 1978; Lamm and Trommsdorff, 1973; and Mullen et al., 1991.) The initial brainstorming research (Meadow & Parnes, 1959) performed at the University of Buffalo focused on the effectiveness of a college course on creative problem solving (based on Osborn, 1957) rather than the efficiency of brainstorming as a group ideation technique. Other research in this same series (Meadow, Parnes, & Reese, 1959; Parnes & Meadow, 1959) investigated the effectiveness of brainstorming instructions, but did not answer the question of brainstorming and nominal groups. Therefore, the “Buffalo data,” though consistent with Osborn’s (1957) ideas and predictions, do not investigate both individual and group ideation (see also Parnes, 1961).

The first study comparing group and individual ideation was performed by Taylor et al. (1958). Taylor et al. contended that comparing group and individual ideators was invalid because “the performance of a group should be superior to that of an individual, simply because in the group more individuals are working on the problem” (1958, p. 25). As a consequence, they created what they called nominal groups. In nominal groups, participants work individually and their efforts are pooled. These nominal groups create a performance baseline from which brainstorming groups should be compared. Given Osborn’s (1957) description of group ideation (particularly the power of association and friendly rivalry), one would expect brainstorming groups to produce significantly more and better ideas than nominal groups.

Taylor et al. (1958) compared the performance of 12 brainstorming groups (each with four members) with 12 nominal groups randomly created from 48 participants who worked on the same problems alone. Both brainstorming and nominal groups were given brainstorming instructions. Results indicated that nominal groups generated over 80% more unique ideas than did brainstorming groups.

Thirty-five years of subsequent research on the ideational advantage of nominal versus brainstorming groups are consistent with their results (see also Jablin & Seibold, 1978; Lamm & Trommsdorff, 1973). A vast majority of published studies find that nominal groups exceed brainstorming groups in the number and quality of unique ideas generated. In the Mullen et al. (1991) meta-analysis of 34 studies that assessed the quantity of ideas, 24 reported superior performance in nominal groups; the remaining studies indicated no differences. More to the point, when aggregated across studies, results indicated that nominal groups produced considerably more ideas than did brainstorming groups. Of the nine studies in their meta-analysis that assessed the quality of contributions, seven reported significantly greater performance in nominal groups; the remaining two studies reported no significant difference between group types. In short, the accumulated evidence indicates that nominal groups produce more, and higher quality, ideas than do brainstorming groups.

Mullen et al. (1991) also investigated the influence of moderator variables on the quality and/or quantity of ideas generated. The most relevant variable to the present discussion is group size. Group size significantly influenced nominal groups’ performance advantage over brainstorming groups for both the quality and the quantity of ideas. Specifically, the performance advantage of nominal groups increased strongly as groups became larger. It deserves mention, however, that group size exceeded four in only 3 of the 34 studies in the meta-analysis (Mullen et al., 1991).

In summary, Osborn’s assertion that “the quantitative results of joint ideation are beyond question” (1957, p. 82) is backed only by his own anecdotal evidence. The conclusion of Mullen et al. (1991) is backed by empirical data: “It appears to be particularly difficult to justify brainstorming techniques in terms of any performance
outcomes, and the long-lived popularity of brainstorming techniques is unequivocally and substantively misguided” (p. 18).

**Electronic Brainstorming.** Motivated in part by the disappointing results of brainstorming in face-to-face settings, several scholars have investigated electronic brainstorming (Gallupe & Cooper, 1993). Electronic brainstorming combines computer technology with brainstorming rules and procedures. Following instructions typical of face-to-face brainstorming groups (i.e., criticism should be withheld and quantity is preferred), electronic ideators type their ideas using a computer keyboard, instead of presenting their ideas orally. “In electronic brainstorming, group members can simultaneously type ideas into a computer that then distributes the ideas to the screens of other group members” (Gallupe et al., 1992, p. 352). Ideas generated by members of electronic brainstorming groups are distributed to the entire group as they enter the system. In electronic nominal groups, members enter their ideas into a computer, however, see only their own ideas.

Research on electronic brainstorming compared the number of ideas generated by electronic brainstorming groups to the number of ideas created by other types of groups: nonelectronic nominal groups (Dennis & Valacich, 1993), electronic nominal groups (Roy, Gauvin, & Limayem, 1996; Valacich et al., 1994), and face-to-face brainstorming groups (Gallupe et al., 1992). Although the comparisons differ across studies, electronic brainstorming groups typically (though not always) generate more ideas than do other types of groups.

Not all studies indicated that electronic brainstorming is superior to other forms of ideation. For example, Gallupe, Bastianutti, and Cooper (1991) compared the effectiveness of brainstorming (i.e., interacting) and nominal (i.e., noninteracting) groups in both electronic and nonelectronic settings. While the researchers found a significant main effect for technology (i.e., electronic groups, regardless of their type, generated more ideas than did nonelectronic groups), electronic brainstorming groups’ productivity did not exceed that generated by electronic nominal groups.

One reason why electronic brainstorming groups are not consistently superior in idea generation is that group size also moderates the performance of these groups. Specifically, when groups are small (i.e., four or fewer) electronic brainstorming groups exhibit no performance advantage over electronic nominal groups. In larger groups (i.e., six or more), electronic brainstorming groups outperform the other groups. Put another way, as groups become larger, the superiority of electronic brainstorming groups increases (Dennis & Valacich, 1993; Gallupe et al., 1992; Valacich et al., 1994). For example, Valacich et al. (1994) report that as the size of electronic brainstorming groups increases from 3 to 9 to 18, the number of unique ideas generated increased monotonically. Moreover, electronic brainstorming groups exhibited no performance advantage over electronic nominal groups at group size 3. At group sizes 9 and 18, on the other hand, electronic brainstorming groups outperformed electronic nominal groups. Finally, the advantage of electronic brainstorming groups over electronic nominal groups was greater at group size 18 when compared to group size 9.

**Brainstorming: The Explanations**

The preceding literature review leads to several very interesting conclusions. First, untrained, ad-hoc, face-to-face brainstorming groups fail to generate the number and quality of ideas generated by the same number of individuals working alone. Second, the inferiority of such groups increases as group size becomes larger. On the other hand, untrained, ad-hoc, electronic brainstorming groups tend to generate a greater number of ideas than do nominal groups (whether electronic or not) or face-to-face brainstorming groups. Group size moderates this effect as well, but in the opposite direction. As group size increases, the superiority of electronic brainstorming increases.

Many explanations for the inferiority of face-to-face brainstorming groups have been generated (Jablin & Seibold, 1978), however, no single explanation fully explained the experimental data (Bond & Van Leeuwen, 1991; Mullen et al., 1991; and Stroebe & Diehl, 1991). The contrasting results from electronic and face-to-face brainstorming literatures, however, bring two of the previously developed explanations to the forefront—evaluation apprehension (or social inhibition) and process blocking. While many explanations can fit the face-to-face brainstorming research, these two explanations fit the combined results from both the face-to-face and electronic brainstorming studies.

**Evaluation Apprehension.** In an effort to explain their experimental data, Taylor et al. (1958) posited that despite instructions prohibiting explicit criticism, members of brainstorming groups may feel less free from criticism than members of nominal groups. Criticism in brainstorming groups could be implicit (e.g., a frown or rolling of the eyes) or explicit (e.g., a group member saying “that’s a stupid idea”). As a consequence, face-to-face brainstorming group members may withhold ideas that might be considered strange or bizarre (Lamm & Trommsdorff, 1973). This “social inhibition” (Jablin & Seibold, 1978) may hinder both the quality and quantity of ideas, because the idea that seems bizarre at the beginning
may actually be the creative spark the group has been looking for. Moreover, increasing group size may exacerbate evaluation apprehension in face-to-face brainstorming groups. The larger the group, the greater the opportunity for (or fear of) explicit or implicit criticism.

Osborn (1957) acknowledges the negative impact of evaluation apprehension (though not in so many words) in describing a brainstorming session where the “big boss” sat in on his subordinates’ brainstorming session. While the boss was present, ideas came very slowly. Once the boss left the room, however, group members generated considerably more ideas.

The electronic brainstorming research is consistent with this evaluation apprehension explanation. One unique aspect of the computer interface used in electronic brainstorming is that ideas can be presented anonymously (i.e., the idea, and not who sent it, is provided to other group members). Given that contributions are anonymous, participants should feel less inhibited to send seemingly bizarre ideas to the group.

Evaluation apprehension is also relevant to the impact that group size has on effectiveness of brainstorming groups in electronic settings. Smaller electronic brainstorming groups tend to do equally well (or worse) than individuals. This may be because in smaller electronic brainstorming groups, group members might feel that their contribution is relatively identifiable. Put another way, in a two person electronic brainstorming group, there is no anonymity (Gallupe et al., 1992). As electronic brainstorming groups become larger, members are likely to feel greater anonymity and, consequently, less evaluation apprehension.

Process Blocking. The second explanation that effectively fits results from the face-to-face and electronic brainstorming research is process blocking. Lamm and Trommsdorff (1973), after reviewing the face-to-face nominal versus brainstorming group research, concluded that interacting groups are inferior because of “the operation of the implicit rule that only one group member speaks at a time” (p. 380). This explanation presumes that while one member speaks, the others must remain silent. That only 1/n group members (where n is group size) can speak at a time inhibits the total number of ideas that can be presented by the group. Moreover, as group size increases, the problem of process blocking becomes more critical. In large groups, a single person talking precludes a greater number of people from presenting their ideas. Group members may not present their ideas as they may be forgotten or the focus of the ideas may shift, making an earlier idea irrelevant.

Unlike their face-to-face counterparts, members in an electronic brainstorming group can present ideas simultaneously. In fact, Gallupe et al. (1991) reported that electronic brainstorming group members would spend time generating their own ideas and look at the group contributions only when their own well of ideas ran out. In this case, simultaneous presentation of ideas is utilized in an advantageous fashion. Not looking at the group’s ideas may also minimize the impact of criticisms as a critical remark may not be noticed by group members.

Brainwriting: An Ideational Alternative. Research investigating the technique of brainwriting supports both evaluation apprehension and process blocking explanations. Brainwriting as an ideation technique (originally described by Geschka, Schaufel, and Schlicksupp, 1973) that eliminates “negative effects of group meetings such as the influence of opinion-leaders, and restraints against free speaking” (VanGundy, 1995, p. 92). In their formulation of brainwriting, the Brainwriting Pool (i.e., group) includes six to eight participants. The leader prepares a list of ideas prior to the meeting and places it in the center of the table. After problem description, each group member writes down solutions on a sheet of paper. The first member to run out of ideas exchanges his or her list with the list in the middle of the table, and the other members do the same when they need inspiration. In the last 25 years, many variations of brainwriting have been developed (Goodman, 1995; Zemke, 1993), all of which eliminate the oral sharing of ideas.

Brainwriting avoids the pitfalls of face-to-face brainstorming because all members can simultaneously produce ideas in a relatively anonymous environment. Experimental tests of brainwriting have shown that elimination of process blocking and the relative anonymity of the technique generally lead to a greater number of ideas. Gryskiewicz (1988) compared interacting and nominal group versions of brainstorming and brainwriting. The experiment involved real problems in the tea packing industry and used corporate managers from both the U.S. and the United Kingdom. Gryskiewicz found that, within the U.S. sample (but not in the U.K. sample), interacting brainwriting groups produced more and higher quality ideas than nominal brainwriting groups.

In another study reported briefly by VanGundy (1995), brainwriting groups produced more ideas than either brainstorming or nominal groups. Gryskiewicz reported similar results, but only when the groups were considering a problem requiring adaptation (“doing things better” within existing structures, as defined by Kirton, 1976, p. 622). When groups considered problems requiring innovation (“doing things differently,” i.e., challenging existing structures, as defined by Kirton, 1976, p. 622), brainstorming groups were more successful than brainwriting.
Reconsidering Brainstorming

Brainstorming: Suggestions for Facilitators and Future Research

There are two important conclusions that should be drawn from this review. First and foremost, considerable research clearly and consistently shows that untrained, ad-hoc, face-to-face brainstorming groups are inferior to nominal groups in the production of the quantity and quality of ideas. Their inferiority increases with group size. Furthermore, electronic brainstorming groups tend to produce more ideas than either face-to-face brainstorming groups or nominal groups (whether electronic or manual). The superiority of electronic brainstorming groups increases with group size.

Second, the research performed on both face-to-face and electronic brainstorming differs in important ways from what Osborn (1957) called suspended judgment and/or brainstorming. There are many important differences between Osborn’s description of the spirit, structure, and functioning of brainstorming groups and the way in which groups were formed, trained, and expected to generate ideas. In short, although considerable research has been performed on brainstorming, little of this research is a valid test of Osborn’s ideas.

Suggestions for Facilitators. The brainstorming research provides facilitators with several suggestions concerning how to most successfully run brainstorming sessions. Facilitators can do several things to ensure that ideation sessions (even face-to-face sessions) are as fruitful as possible. First, it appears as though process loss (i.e., that only one person can talk at a time) is an important detriment to ideation in face-to-face groups. As a consequence, facilitators should take adequate time to ensure that every idea has a chance to be presented. In addition, each group member should have the ability to jot down ideas if they are unable to present them during a heated portion of the session. Facilitators should also prepare group members before the session. As Osborn suggests, group members should receive the ideation task before the session begins so they can come to the session armed with ideas to present.

Facilitators can also take steps to inhibit evaluation apprehension. Most important, facilitators should enforce the no-criticism rule. Separating creative from judgmental processes should be stressed before, and enforced during, the session. Osborn (1957) suggested both direct and indirect means of dealing with those members who criticize ideas. In addition, facilitators should guard against one group member dominating the session. If one person presents a majority of ideas, it may reduce other members’ opportunities and/or motivation to present ideas.

Finally, unlike experimenters, facilitators may have considerable control over the composition of their groups.

As Osborn (1957) suggested, group members should be chosen carefully. Members who have proven their creative ability in group contexts would be prime candidates for ideation groups. Individuals who may not have brainstorming experience but have experience with topics under consideration would also be prime candidates for such groups.

Suggestions for Future Research. Future research is warranted in three areas. First, research is needed to assess the possible alternative (i.e., social) benefits of brainstorming beyond the quality and quantity of ideas generated. Does brainstorming lead to increased cohesiveness, satisfaction with, or commitment to the final outcome?

Second, empirical research into Osborn’s (1957; 1963) original conception of brainstorming may lend support to his claims that is currently unavailable in the social science research. Research on brainstorming clearly needs to be performed in real groups discussing real topics of relevance to group members.

Finally, additional investigation on process loss and evaluation apprehension in face-to-face and electronically brainstorming groups is necessary. If anonymity is truly the reason for the superior performance of electronic brainstorming groups, then non-electronic methods for ensuring anonymity (e.g., brainwriting, Gryskiewicz, 1988) should prove equally advantageous.

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References


