When the whole is less than the sum of its parts: Individual idea generation outperforms group brainstorming

Francesco Marcatto[1, 2, 3], Gabrio Tognolli[3], Sabrina Plet[1,3], Nicolò Zorzetto[3], & Fabio Del Missier[1]

[1] Department of Life Sciences, Psychology Unit "Gaetano Kanizsa", University of Trieste, Italy; [2] Mindiply Ltd., Bromley, UK; [3] Studio Associato Ergologica, Trieste, Italy

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Brainstorming is the most popular and widely used group creativity technique. This technique consists in gathering a group of people together to solve a problem, following some simple rules: aim for quantity instead of quality, no criticism is allowed, crazy ideas are welcome, and users are encouraged to combine other ideas and to take another person's ideas a step further. Numerous studies, however, have unequivocally demonstrated that individuals produce less ideas when they work in a group than when they work alone, and this seems to be due to production blocking and evaluation apprehension [1-2].

While many studies have investigated the productivity of brainstorming groups in terms of the quantity of idea produced, less is known about idea quality. Brainstorming advocates, indeed, argue that group stimulation leads to the production of better ideas, something that cannot happen in individual idea generation, and so idea generation research should focus on ideas quality instead of quantity [3]. Therefore, in this study we compared the productivity of group brainstorming and individuals working alone, considering both the quantity and the quality of the ideas produced.

Participants taking part in a conference about creativity (N = 38) were randomly divided in two groups, brainstorming (BS) and individual idea generation (IIG), and were asked to generate in 40 minutes the maximum number of possible solutions to the problem: '*How to promote the diffusion of canoeing in Italy*'. Participants in the BS condition were supported by a facilitator that explained them the rules of brainstorming and recorded the group's ideas, while IIG condition's participants had to write their ideas on a booklet.

Two independent raters evaluated each idea along three dimensions, originality, impact, and feasibility, using 5-points scales ranging from 1 (*very low*) to 5 (*very high*). Raters were unaware of the experimental condition. The correlations between raters ranged from .52 to .69, and agreement rates within 1 point on the scale [4] ranged from 79% to 95%. An overall quality score was calculated by the product of the impact and feasibility ratings, so that ideas that fulfilled both criteria received higher scores than ideas that maximised one criterion at the expense of the other [5].

As expected, the IIG group produced a higher number of non-redundant ideas than the BS group (105 *vs*. 41). Mean originality scores were very similar between the two groups (IIG, M = 2.84, SD = 1.49; BS, M = 3.07, SD = 1.42; p = ns), and the mean overall quality score resulted to be significantly higher in the IIG group than in the BS group (IIG, M = 6.98, SD = 3.55; BS, M = 5.78, SD = 2.82; $p < .05$). Since the actual aim of idea generation is to produce high quality solutions, a second evaluation approach was also used: in each group, ideas were

ordered according to their overall quality score and the high-quality ideas (scores > 9) were counted [5]. Using this approach, the difference between the two groups resulted to be even stronger, with the IIG group having generated 42 ideas (quality scores from 10 to 15) and the BS group only 4 (quality scores from 10 to 15).

In conclusion, individual idea generation outperformed traditional group brainstorming not only in terms of the quantity of ideas, but also in terms of their quality, which is the most relevant attribute of creativity and problem solving sessions' output. Working individually seems to be the most useful method to produce many and possibly also high quality ideas, therefore we suggest to share and discuss ideas in group only after a first phase of individual idea generation.

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