The Effects of Role Assignment on the Quality of Creative Outputs

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Abstract

The impact of externally imposed group structures on creativity is a conjecture that the existing body of research on creativity has left largely understudied. The purpose of this working paper is to examine the direct and combined effects of group structure and evaluative pressure on group creativity. Data collected from 32 teams working on an idea generation task (i.e., a five-panel comic strip) is analyzed to test hypotheses about the benefits of functional structures versus non-structured groups on the quality of the creative outcome. Inferences are discussed, as well as possible limitations and directions for future research.

1. Introduction

Research on creativity in organizations has enjoyed a renewed momentum in recent years as concerns for market competitiveness continue to be linked to the potential of organizations to unleash innovative thinking [1-3]. These investigations have moved beyond exploratory studies to more systematic work which uncovers the mechanisms that fuel creativity in different contexts. This study joins this line of research by studying the relationship between structural characteristics of groups and the quality of their creative outcome. More specifically, the study investigates how group creativity is influenced by an externally imposed group structure (the assignment of interdependent, horizontal roles within the group), evaluative pressure, and the interaction between these two factors.

Creativity has been traditionally defined as the production of outputs that are novel and useful [4]. Consistent with this established conceptualization of creativity, this study will focus on creative outcomes that meet the criteria of novelty and usefulness. Past research on creativity has explored several situational factors that link organizational factors to specific aspects of creative acts in organizations. In this tradition, creativity has been related to reward systems, goal-setting, supervisory encouragement, organizational climate, trust, and resources [5-7]. However, only a small minority of studies in this stream have examined directly how creativity may be promoted by structural characteristics of groups, defined here in the more narrow sense of the role assignments that delineate recurrent task-related behaviors for particular positions in a workgroup [8]. In addition, the scarcity of these studies is beset by the ambiguity of the terms used to characterize various types of group structure. For example, among the few studies that have attempted a structurally based theory of creativity, King and Anderson [9] listed group structure as one of the antecedents of creativity, suggesting that the probability of creative outcomes is higher when the group structure is organic rather than mechanistic; however, while these labels denote differences between emergent and explicit role assignments, misunderstandings may arise if they are used without a clear link to the structural elements that they characterize. Similarly, in a related stream of research, Brown and Eisenhardt [10] visited the relationship between organizational structure and innovativeness and found that successful product innovations were associated with semi-structured organizational environments, where change occurs within safe limits from the edges of chaos and order. Again, while the label of semi-structured environment is suggestive of the attributes that may characterize the pattern of relationships among organizational members engaged in creative tasks, the links to specific attributes of group structure sink often in the subtext.

Among the situational factors that affect creativity, the impact of evaluative pressures has been the topic of more numerous investigations than the aforementioned structural factors. Defined as the degree to which salient others are seen as judging rather than enabling one’s performance, evaluative pressures have been generally assumed to prevent creativity. Evaluation apprehension has been identified as one of the explanations for the productivity loss in brainstorming groups because it affects the willingness of group members to state their ideas [11, 12]. Evidence of this has been provided by several laboratory studies showing that the expectation of threatening, highly critical evaluation undermines creativity [13, 14]. However, the idea that a moderate level of evaluative pressure may prompt group members to think more
carefully and more divergently as a consequence of sharing their ideas and being exposed to others’ views [15], has yet to be explored. Indeed, as found by a recent meta-analysis of the relationship between stressors and creative performance [16], there appears to be a curvilinear relationship between evaluative stress and creativity, suggesting that there are further complexities to explore regarding the relationship.

Although group structure and evaluative pressure seem to emerge as important group characteristics, their relationship to creativity is not clear. Moreover, even if their independent effects may have been considered by researchers in this field, it is important to observe how the two factors interact for groups engaged in creative acts. Thus, the approach of this study echoes that of Lee, Edmondson, Thomke and Worline [17], who have drawn attention to the effects of multiple organizational conditions in combination, showing that although normative values and evaluative pressures may have independent effects, more insights could be gained by investigating the impact of their combination on group and individual experimentation.

2. Group structure and creativity

This study tests how two contextual variables, group structure and evaluative pressures, relate to the quality of the creative output. The first part of the exercise examines the impact of a structural feature which groups engaged in creative tasks may display: whether members have been assigned to a task-related role or not. This structural feature refers to individual sub-task assignments and the horizontal role relationships prescribed for the workgroup, such that work units are grouped on the basis of the similarity of work and assigned to one group member in order to create a narrow, distinctive functional competency. Organizational theorists have referred to this dimension of structure as departamentation [18], and functional structure [19]. For the rest of this study and in the purpose of simplicity, the labels of functional and unstructured groups will be used to denote the presence or absence of an externally imposed role assignment for groups engaged in creative tasks.

When given a task which requires interdependent contributions for a creative outcome, groups which are not prescribed an explicit functional structure have numerous other options to coordinate their creative inputs, and to focus the energy of the group. These options may be understood as emergent sets of norms, values and roles upon which the actions of group members are based. Even if an emergent functional structure would arise as a result of group development, the unstructured nature of the initial interactions and the challenges of negotiating group roles would not guarantee, at least in the short term, the same levels of distinctive competency and sub-task focus as those of groups starting with a functional structure.

Although this study does not address the individual level of analysis, but focuses rather on structuring intra-group interactions instead of mental processes of ideation, it is important to consider the possibility that some benefits of functional structures reside in channeling individuals to focus on a limited number of core elements of the problem, thus minimizing ambiguity and inducing more creativity than conditions that allow teams the freedom to organize themselves. This argument resonates with findings maintaining that free methods of ideation (e.g., brainstorming, lateral thinking, random simulation) are less effective than more structured approaches [20-23].

Structural characteristics of groups tacitly communicate cues about how the task should be done. In groups that display functional structures, each individual accesses different knowledge and navigates the creative challenge in different ways, and then witnesses how his or her individual input is combined with the inputs of others, giving way to additional exploration performed together. By contrast, emergent structures, where there is no pre-established division of labor for the group, facilitate a different dynamic for the creative process by allowing members to engage simultaneously in establishing a group structure and exploring alternatives to the creative output. More concretely, group members who have to negotiate their role are more likely to miss out on the opportunity to explore the creative problem in a unique way, in partial separation from the ideas of other group members, as compared to individuals that are assigned to a role and who may look through different lens at the creative task, shielded by the specificities of their roles.

Recent research building on Diehl and Strobe’s seminal findings that brainstorming groups tend to be less creative than nominal groups [11, 24], hint to why the mechanisms described above may indeed be at work in functional groups. For example, Girotra and colleagues [25] find that individuals in hybrid structures, in which members first work independently and then work together, generate more and better ideas than individuals who brainstorm together for the whole ideation process. The authors maintain that the effects can be explained by the opportunity of individuals in functional groups to explore more broadly (separately and together) than those that work in a team which doesn’t have a clear delimitation of team roles. The same mechanism is put forward in the large-scale empirical study of Singh and Fleming [26] focusing on inventors and the benefits of role diversity in collaborative creativity. They find that inventors working with a team benefit from more efficient
creative processes when co-investors have dissimilar backgrounds. While they don’t label the collaborative groups as “functionally” diverse, the findings suggest that functional structures would allow for the development of a greater variety of opinions and should be less vulnerable to groupthink when assessing the value of a seed idea [27].

**Hypothesis 1**: Creative outcomes achieved by groups under the functional structure condition would be judged as higher in quality than those of groups under the emergent structure condition.

### 3. Evaluative pressure and creativity

Building on arguments developed above, which have focused on how greater delimitation of team roles allows for more effective creative processes, this study proposes group structure as a moderator for the negative impact of group-level evaluative pressure. As a preliminary step in theorizing about this effect, this study draws on research that has considered the effects of evaluative pressure on creative outputs.

When generating ideas, groups and individuals make choices that shape their creative processes. For example, innovation processes include generating and selecting ideas based on implicit or explicit criteria which feed subsequent idea-development processes. Research in this area has converged to the generally accepted model that variation and selective retention processes are fundamental to all inductive achievements [28, p. 380], and that judgmental/evaluation processes are primary components of creative thinking [29].

Among studies that examined effects of evaluative pressure and creativity, a number of them showed that such pressures had detrimental effects on creativity [13, 14, 30]. For example, Amabile (1979) found evidence that subjects working on a creative task who expected external evaluation produced artworks significantly lower on judged creativity than did subjects who did not have such expectations. Similarly, Bartis and colleagues (1988) asked subjects to generate alternative uses for a common object. They found that the creativity of uses generated by participants without evaluation expectations was greater than that of the uses generated by participants under evaluative pressures.

However, the body of research on evaluative pressures and creativity is far from conclusive; inconsistent results still exist. In contrast to the studies reviewed above, other researchers found positive effects of evaluative pressures on creativity. For example, using a task of generating solutions to human resource management problems, Shalley [31] found that the participants who had a creativity goal and worked alone under external evaluative pressure also exhibited the highest creativity. This current state of research is partially due to our insufficient understanding of the contextual factors that underpin the relationship between evaluative pressure and creative idea production [32].

The present study will attempt to contribute to this debate by testing the differential effects of evaluative pressures when the group interactions display different structures. Namely, it is expected that group configurations which allow members to work alone on part of the creative idea prior to integrating the various inputs, would benefit from evaluative pressure more than groups who do not benefit from such a division of labor. For example, groups with an externally imposed functional structure can avoid the anxiety associated with negotiating the group roles and coordinating the contributions of the members. Moreover, the tendencies for criticism from someone who exhibits a different functional role are less likely to occur as opposed to a group member who works with contributors whose roles are as undefined as hers. Finally, lower interpersonal threats associated with role negotiation and criticisms would allow individual contributors more freedom to ideate and explore between both their own roles and the creative space. Based on these considerations, the following hypothesis is presented:

**Hypothesis 2**: The negative impact of evaluative pressure on group creativity is lower for groups under the functional structure condition than for unstructured groups.

### 4. Methods

To test the hypotheses specified above, the following are required:
- A task where creative performance can be appraised;
- Two task conditions: one in which the individual contributions to the creative output are delimited, identifiable and interdependent; and one in which no predetermined division of labor is imposed;
- Three process-intervention conditions: one in which a norm fostering overt evaluation of seed ideas is created (i.e., high evaluative pressure); one in which a norm inhibiting evaluation of seed ideas is created (i.e., low evaluative pressure); and a control condition in which there is no intervention on the evaluative pressures.
4.1. Structure in comic strip production

Comic strip design is a form of cultural production which is ideally suited as a task for an experiment on group creativity. As both a visual and textual form of expression, the activity of designing comic strips consists of distinct creative acts which are in many cases performed by different artists and integrated to produce outputs with aesthetic appeal. This can be particularly noticeable in the production of illustrated novels which have currently come under considerable scrutiny as part of the landscape of visual arts [33, 34]. Drawing on insights describing the organization of production for American comic books and Francophone bandes desinee, and the their codes of visual representation (Miller 2007, p.77-102) it is possible to identify distinct elements that enter in the composition of a comic strip and which, through various integrative techniques subsumed under the broader category of montage, can be combined to produce an artistic representation. These codes are particularly useful in structuring the task for part of the groups involved in the experiment, by assigning the three major creative acts (i.e., panel flow and layout, drawing of panel content, and narration) as job roles to individual group members.

4.2. Subjects

At the time the version of this paper was completed, the experiment had just been completed, allowing for some preliminary analysis of the data. The experiment involved 96 undergraduate students enrolled in a course of organizational behavior at University College London. The subjects were randomly assigned to groups of three and those assigned to the structured-task condition (i.e. functional groups) were also randomly assigned to one of the three job roles associated with comic strip production described above.

4.3. Apparatus and procedure

The three members of each group worked around a single rectangular table. A set of standard tools (pencils, erasers, rulers) and a supply of paper had been provided for each work area. The work areas also contained printed lists of comic strip elements and manipulations that can be performed as part of the creative process; all the elements were listed in a random order for the emergent structure condition and, for the functional structure condition, were grouped and printed separately under headings corresponding to the specific job roles: “Panel Manager,” “Illustrator” and “Story-teller.” As manipulation checks, identification tags showing the job role performed by the wearer were used for the functional structure condition.

4.4. Experimental manipulations

After participants had indicated that they were comfortable using the tools and that they understood the task, the instructor acted out one of the two performances prepared to exhort the adoption or delay of evaluative behaviors. The performance intended to induce high evaluative pressure praised the merits of overt generation and evaluation of two seed ideas would increase the chance that the group will implement the most creative idea. The performance encouraging participants to delay evaluative behaviors cautioned participants against spending excessive time in idea generation and evaluation, and persuaded them to follow their artistic instinct, shed all inhibitions, and start drawing as soon as possible. Aside from the uniform exhortation to enjoy the creative process and to manage their group interactions as they see fit, no specific instructions were given to the control condition. For all task conditions and interventions, the instructor tried to release participants from potential concerns of external evaluation by stating that “it is the process of the group interaction and not the output that represents the greatest importance for the experiment”, and that the participants’ reflections on the group dynamics will be an important source of data.

4.5. Measures

Group creativity was measured based on the creativity scores given by two external judges to each comic strip. The judges are experienced consumers of comic books and illustrated novels and were blind to the experimental condition. The questionnaire for the judges contained to items. The first item instructed them to rate the quality of the comic strip on a scale from 1 to 9, by assessing the novelty of the ideas expressed in the comic strip and its statistically unique features. An additional item in the questionnaire asked the judges to rate how much a broader audience would enjoy reading the comic strip. The second item was aimed at measuring the usefulness of each idea and employed a scale from 1 to 9, but the analysis for this dependent measure has yet to be performed. The judges were unaware of the other’s scores and their inter-rater correlation for the first item, which is a measure of the quality of the creative outcome, was 74%.
The degree of engagement in evaluative behaviors was measured through two items employing scales from 1 to 5. These items were among other questions listed on a questionnaire which was administered after each group completed their comic strip. The first item asked the participants to rate how fast they started working on the actual comic strip (i.e. for the purpose of the analysis, this measure was reverse-coded and re-labeled “delay to start”). The second item asked participants to rate the extent to which participants engaged in planning what to draw (i.e. the measure was labeled as “amount of deliberations”). A number of other questionnaire items assessed other attributes of group processes and member reactions as well as individual differences among participants, in the event that future analyses may call for refinements.

5. Results

5.1. Manipulation checks

ANOVA results showed that the manipulations for high and low evaluative pressure were successful. In the high evaluation pressure sessions, participants reported significantly higher levels of “time spent on team deliberations” and “time delay before actual drawing” than participants in sessions where low evaluation pressure was induced (Table 1).

5.2. Hypothesis testing

With regard to the structuring of team interactions, Hypothesis 1 predicted that functional groups would generate higher quality comic strips than unstructured groups, and Hypothesis 2 predicted that the negative impact of evaluative pressure on the quality of the comic strip will be weaker for functional groups. In Table 1, an inspection of the means reveals that groups with functional structures (i.e., groups 4, 5 and 6 combined, with average creativity score = 5.53 and standard deviation = 1.34) generated higher quality ideas than groups who did not have a functional group structure (i.e., groups 1, 2 and 3 combined, with average creativity score = 4.35 and standard deviation = 1.45). The t-value for the means comparison is t = -2.37, with a significance at the 5% level, thus providing support for Hypothesis 1.

To test both hypotheses, analyses of covariance were performed (factorial ANOVA) with comic strip creativity as the dependent variable. As shown in Table 2, the presence of a functional structure had a significant main effect on the quality of the comic strip creativity (p < .05, effect size =0.16), providing support for Hypothesis 2. To test whether there is an interaction effect between group structure and evaluative pressure, idea creativity must be higher for group 5 than any other three experimental groups. However, the results of ANOVA in Table 2 did not reveal a significant main effect of the interaction between structure and evaluative pressure on creativity.

As noted in Table 2, evaluative pressure alone does not seem to carry a significant negative effect on creativity scores, and neither does its interaction with the functional structure – which is a test for Hypothesis 2. Despite of the lack of evidence for the hypothesis that group structure moderates the negative impact of evaluative pressure, which is likely to be due to measurement error, this study suggests that a more careful investigation of evaluative pressure is warranted. More specifically, a more effective method of manipulating evaluative pressure emerges as a key challenge and would provide a basis for observing the interaction with group structure with greater precision.

6. Discussion

The results of this study showed that externally imposed functional structures allowed groups to achieve creative outputs that were significantly higher in quality than those of groups who were not imposed a structure. Because the evaluative pressure generated within groups have been linked to creative processes, the effects of idea evaluation are likely to be sensitive to the structure of the groups engaged in creative processes. Although the study did not find evidence of an interaction effect between functional structure and evaluative pressure, this is not to be taken as conclusive evidence as measurement error is believed to have biased the preliminary results of this study.

Some limitations of this study are to be acknowledged. First, there are two concerns about the manipulations for evaluative pressure: the appropriateness of the experimental design for this treatment, and the need for objective manipulation checks in addition to post-treatment questionnaire items. Future iterations of this experiment should refine and reformulate the intervention strategies necessary to induce evaluative pressure within the groups. Secondly, this study considers a somewhat narrow aspect of group structure as a contextual factor. Whether the results concerning functional structures can be generalized to other group configurations such as pooled, sequential and reciprocally interdependent group structures, remains to be investigated.

A broader issue of generalizability is also worth noting. As an experiment involving undergraduate
Table 1: Experimental conditions and comparison of means for creativity scores and manipulation checks

<table>
<thead>
<tr>
<th>Functional structure (FS)</th>
<th>Evaluative (N=6)</th>
<th>Non-evaluative (N=5)</th>
<th>Control (N=3)</th>
<th>Planned comparisons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delay to start (data from questionnaires)</td>
<td>4.08 (1)</td>
<td>2.27 (2)</td>
<td>2.66 (3)</td>
<td>(1+4) vs (2+3+5+6) t = -2.83** Pr(T &lt; t) = 0.004</td>
</tr>
<tr>
<td>Amount of deliberations (data from questionnaires)</td>
<td>3.55</td>
<td>3.33</td>
<td>3.89</td>
<td>(1+4) vs (2+3+5+6) t = -3.40** Pr(T &lt; t) = 0.001</td>
</tr>
<tr>
<td>Output creativity (data from judges)</td>
<td>4.50</td>
<td>4.60</td>
<td>5.33</td>
<td>(1+2+3) vs (4+5+6) t = -2.37** Pr(T &lt; t) = 0.012</td>
</tr>
</tbody>
</table>

Note: N = number of groups in the specified condition; **p < .01 and *p<.05.

Table 2: Analysis of Variance for Output Creativity

<table>
<thead>
<tr>
<th>Variable</th>
<th>df</th>
<th>MS</th>
<th>F(1, 32)</th>
<th>Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functional structure (FS)</td>
<td>1</td>
<td>12.84</td>
<td>6.63*</td>
<td>0.16</td>
</tr>
<tr>
<td>Evaluative pressure (EP)</td>
<td>1</td>
<td>.49</td>
<td>.25</td>
<td>- 0.03</td>
</tr>
<tr>
<td>EF x EP</td>
<td>1</td>
<td>.40</td>
<td>.21</td>
<td>- 0.02</td>
</tr>
</tbody>
</table>

Note: df = degrees of freedom; MS = mean square between groups; **p < .01 and *p<.05
students working on a creative task during class time, this study yielded results which are yet to be investigated in field settings where employees performing creative tasks within functional structures are expecting evaluative pressures. Moreover, in reality, people are surrounded by a multifaceted environment where multiple contextual factors may interact to affect creative idea production. Future research is needed to examine how multiple contextual factors interact to influence creative processes within groups.

7. Conclusions

Rarely does a term like creativity emerge from so wide a conceptual field: conferences, conventions, design workshops, blogs, newsletter, and magazines debate various theories of what makes creativity happen in teams and organizations. They ask questions like: What makes an idea more creative than other idea? Can design, be it team or task design, be a recipe for creativity? Does discipline drive out creativity? While many of these questions tempt us to engage in long-running debates, this study does not intend to argue for a theory of creativity. Instead, this study aims to elaborate on a call for research to explore the intersection between organizational design and creativity. In contrast to the commonly held view that due process and accountability might not go well with designer stubble and artistic panache, this study shows that externally imposed functional structures benefit the creative outcomes of groups more than groups that are given the freedom to self-organize. The findings have implications for the nascent field of systematic innovation and the creative performances of groups operating in creative industries.

8. References


[34] Miller, A.: ‘Reading bande dessinee: Critical approaches to french-language comic strip (paperback)’, 2009