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DOI: 10.1177/014616728061021

The online version of this article can be found at:
http://psp.sagepub.com/content/6/1/137
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Evaluation-Apprehension Hypothesis
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The present experiment examined social facilitation among interacting groups and compared Cottrell's evaluation-apprehension hypothesis with Zajonc's mere-presence hypothesis. Subjects worked problems of moderate and high difficulty alone or in two- or four-person groups and were watched by evaluative, nonevaluative, or no observers. Results for the moderately difficult problems supported the facilitation phenomenon both for groups and individuals, and were consistent with the evaluation-apprehension hypothesis. Performance on highly difficult problems was not altered by observers' presence.

The study of social facilitation has been the target of a large number of investigations by social psychologists. Most recent research has been directed to various tests of Zajonc's (1965) summary generalization that the presence of others hinders the acquisition of new responses, whereas it facilitates the performance of previously well-learned responses. According to Zajonc, the mere presence of others produces heightened arousal, a condition which increases the emission of dominant responses. When these dominant responses are correct, the result is facilitation; but when they are incorrect, the outcome is impaired performance. An impressive array of studies has been generated consistent with Zajonc's proposal (see Geen & Gange, 1977).

Despite the large literature on facilitation, nearly all investigations have examined effects of others on the performance of individuals working alone. There have been few attempts to test the phenomenon among interacting groups, even though groups often perform before audiences and frequently are trusted to make important decisions (e.g., athletic teams, musical ensembles, school boards, city councils). One recent study by Laughlin and Jaccard (1975) considered the issue of facilitation among groups. In their experiment, individuals or interacting pairs worked a concept-attainment task alone or before one or two observers. Observers produced the expected decrements in the

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Personality and Social Psychology Bulletin, Vol. 6 No. 1, March 1980 137-142
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performance of individuals relative to unobserved controls, but had no effect on the performance of two-person groups. Although these data suggest that facilitation effects may not generalize to interacting groups, a procedural feature of their study may account for the discrepancy between individual and group performance. In their experiment, observers sat silently behind the subjects. It is possible that while the salience of the observers’ presence was quite high for individuals, it may have been diminished for the interacting pairs. That is, group interaction may have focused attention away from the observers such that their presence was effectively blocked out. Unfortunately, Laughlin and Jaccard (1975) did not report data addressing this possibility. Our experiment provided another test of social facilitation among interacting groups in which observer salience was uniformly high for individuals and groups. It also extended the Laughlin and Jaccard (1975) research by using a wider range of group sizes and a different type of task.

In addition to testing the basic facilitation phenomenon among groups, we also considered the basis for the source of arousal that produces facilitation. While there seems to be general agreement that arousal is the key to eliciting dominant responses, some controversy has arisen regarding its source. Zajone (1965) has argued that the “mere presence” of others serves as the antecedent of the socially induced drive, whereas Cottrell (1968) has asserted that apprehension over being evaluated by others induces this drive. In their review, Geen and Gange (1977) concluded that there was ample support for both points of view, at least for the performance of noninteracting individuals. Our concern was to provide yet another test of the evaluation-apprehension hypothesis and to examine its generality at the group level. Following Geen and Gange’s (1977) criteria for an adequate test, we included an alone condition, a nonevaluative condition, and an evaluative condition. To avoid ceiling effects with the larger groups and still provide a task that group members could actively discuss, we used unfamiliar mystery stories of moderate and high difficulty but omitted easy problems. Pretesting with individuals suggested that the dominant response to these mysteries was an incorrect answer. Thus, we hypothesized that observers would produce heightened arousal leading to a decrement in performance.

**METHOD**

**Subjects and Design**

Participants were 313 female introductory psychology students who received extra course credit for their participation. Subjects were randomly assigned to work either as individuals or in two- or four-person groups. They worked problems of moderate and highly difficulty in the presence of evaluative observers, nonevaluative observers, or no observers.

*Evaluative observers.* The evaluative observers consisted of two female confederates who were introduced as the experimenter’s assistants. Subjects
were told that these assistants would be evaluating their effectiveness as problem solvers. To insure high salience, the assistants faced the subjects and, using behavioral rating sheets on clipboards, pretended to take notes on their performance.

*Nonevaluative observers.* The nonevaluative observers consisted of two confederates who ostensibly had been scheduled as regular subjects for a two-hour experiment. Subjects were told that the experiment was attempting to learn the effects on problem solving of working problems without any experience or of first observing others work problems. The confederates who had been scheduled for two hours were instructed to observe subjects solve problems for the first hour and then presumably solve similar problems the second hour. Actual subjects (who had only been scheduled for one hour) were told they were solving problems “cold.” They were also instructed that the observers were not there to evaluate their performance, but to learn “how” to solve the problems. To increase realism, subjects were asked at the end of the solving period to tell observers what strategies they found most effective.

**Procedure**

Subjects first worked a practice problem to get “warmed up” and to insure they understood experimental procedures. They were then presented with a series of 10 short detective mysteries (presented in two counterbalanced orders) and were allowed three minutes to read and solve each mystery. In group conditions, members were encouraged to engage in free discussion and reach a group solution. Following the problems, subjects answered a questionnaire in which they rated (1) the social atmosphere in which they solved the problems on five 7-point scales; (2) their satisfaction with the number of problems solved (7-point scale), and if observed, (3) the perception of whether observers were evaluating their performance (4-point scale).

**RESULTS**

**Assessment of Manipulations**

Ratings of whether observers were evaluating their performance served as the manipulation check for observer orientation. A Group Size × Observer × Order of Presentation analysis of variance showed a significant main effect only for observer, F(1, 78) = 51.02, p < .001, with the evaluative observers (M = 3.16) rated significantly more evaluative than the nonevaluative observers (M = 2.05). The effectiveness of the difficulty manipulation was verified by a frequency count of correct responses to the problems. The mean proportion of solutions (averaged across group size) was .46 for moderately difficult problems and .27 for highly difficult problems. Interrater reliability for problem scoring was .98.

**Performance Measure**

A Size × Observer (none, nonevaluative, evaluative) × Difficulty (moderate or high) analysis of variance with repeated measures on the last factor
TABLE 1  Group Performance Classified by Observers, Size, and Difficulty

<table>
<thead>
<tr>
<th>Observers/Size</th>
<th>Moderate Difficulty</th>
<th>High Difficulty</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>None</td>
<td>1.6</td>
<td>2.3</td>
</tr>
<tr>
<td>Nonevaluative</td>
<td>1.6</td>
<td>2.4</td>
</tr>
<tr>
<td>Evaluative</td>
<td>1.2</td>
<td>2.1</td>
</tr>
<tr>
<td>Marginal means</td>
<td>1.5</td>
<td>2.3</td>
</tr>
</tbody>
</table>

Note. Entries are mean number of solutions; range = 0 to 5. N = 138.

was performed for problem solutions. Results showed significant main effects for size, \( F(2, 129) = 26.34, p < .001 \), and for difficulty, \( F(1, 129) = 78.46, p < .001 \). In addition, the Difficulty \( \times \) Observer interaction, \( F(2, 129) = 3.73, p < .03 \), and the Size \( \times \) Difficulty interaction, \( F(2, 129) = 5.29, p < .007 \), were significant, but the Size \( \times \) Observer interaction was not, \( F(4, 129) = .33 \) (see Table 1).

The Size \( \times \) Difficulty interaction (see the row marginal means in Table 1) shows the expected linear increase in performance with increasing group size for the moderately difficult problems, but not for the highly difficult problems. For the latter problems, groups of four performed better than pairs or individuals, who did not differ from one another. Apparently the resources of a second person were not sufficient to increase performance over individuals. With four members, however, improvement occurred.

For the Observer \( \times \) Difficulty interaction (see the column marginals in Table 1), Newman-Keuls tests showed that performance on the moderate problems was significantly worse with evaluative observers than with non-evaluative or no observers which did not differ from one another. For the highly difficult problems, performance was unaffected by observers.

**Questionnaire Responses**

The unit of analysis for questionnaire data was the average response of individuals within each group. Measures of social atmosphere (a) and satisfaction (s) showed parallel effects for group size (p's < .001) and for observers, \( p(a) < .001, p(s) < .05 \). Ratings became more positive as size increased from individuals, \( M(a) = 24.26, M(s) = 2.94 \), to pairs, \( M(a) = 27.71, M(s) = 3.58 \), to fours, \( M(a) = 30.73, M(s) = 4.55 \). Observer ratings were most positive with no observers, \( M(a) = 29.02, M(s) = 4.02 \), less positive with non-evaluative observers, \( M(a) = 27.55, M(s) = 3.68 \), and least positive with evaluative observers, \( M(a) = 25.84, M(s) = 3.26 \). Duncan's tests showed that only the no-observer and evaluative observer conditions differed significantly.
DISCUSSION

The present experiment extends the work on social facilitation by showing that (on the moderate problems) the phenomenon operates among interacting groups in much the same manner as among individuals. That is, individuals and groups showed a similar pattern of results (indicated by the nonsignificant Size \times Observer interaction) consistent with theoretical predictions. These results contrast with those of Laughlin and Jaccard (1975) who found no observer effects for groups. One explanation for the different findings concerns the salience and evaluative orientation of the audience. Laughlin and Jaccard’s (1975) procedure of having the observers sit behind the subjects likely produced differential salience for individuals and groups. Since interacting pairs had to focus their attention both on the task and their partner’s comments, it is likely that the observers became less salient for them than for individuals working alone. In contrast by facing the subjects with clipboards, our evaluative observers were highly salient both for individuals and groups. Group interaction was less likely to reduce this salience since the observer’s visual presence made it difficult to ignore them.

Our results, then, suggest that the performance of interacting groups will likely be altered by highly evaluative audiences. Thus, at a band contest, a musical ensemble should perform their concert piece better than during rehearsals, whereas their sight-reading performance of new music should be worse. Similarly, all other things being equal (e.g., the skill of the opposing team, field conditions), well-learned plays by a football team should execute more smoothly at a game than in practice. Conversely, attempts during a game to alter practice patterns that require the execution of unfamiliar responses (e.g., difficult defensive adjustments, position shifts due to injury) will be more detrimental than during practice.

The pattern of results for the moderate problems provides some support for the evaluation-apprehension hypothesis over the mere-presence hypothesis; performance was significantly poorer with evaluative observers than it was with nonevaluative or no observers. Despite these results, support for the former hypothesis must be considered tentative. The manipulation check indicated that there was a moderate amount of apprehension in the nonevaluative condition. Similarly, subjects in the alone condition also apparently experienced some evaluation apprehension (see the atmosphere and satisfaction ratings). While the source of this apprehension may lie more in the subjects’ awareness of participation in a laboratory experiment than in the observers per se, the fact that such apprehension existed suggests caution in weighing the merits of the two hypotheses.

The facilitation phenomenon was observed only for the moderately difficult problems. For the highly difficult problems, observers did not affect performance. The explanation for this finding is unclear, but may reside in the fact that the highly difficult problems produced a rather restricted range of re-
Response possibilities. Averaging over group size, the mean performance score was only 1.4 problems correct. An additional analysis omitting the easiest problem from the difficult set (39% of the groups answered it correctly) resulted in a mean performance score of .94. Such a highly skewed distribution may simply have prevented observer effects from emerging.

In conclusion, our data show the facilitation phenomenon operating among interacting groups consistent with predictions based on noninteracting individuals and offer tentative support for the evaluation-apprehension hypothesis over the mere-presence hypothesis.

REFERENCES

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Roger Sugarman is a doctoral student in social psychology at University of Kentucky. His research interests center around social cognition, particularly the role of induction in the attribution process.