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Social Facilitation: The Effects of Audience's Status

On Performances of a Pursuit Rotor Task

(TITLE)

BY

Richard J. Baranowski

THESIS

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF

Master of Arts in Psychology

IN THE GRADUATE SCHOOL, EASTERN ILLINOIS UNIVERSITY
CHARLESTON, ILLINOIS

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Abstract

In a study of social facilitation, 20 college students performed a pursuit rotor task in the presence of an audience of other students or faculty members. The results indicate that subjects performing in the presence of an audience of student peers displayed a significant enhancement in performance when compared to a baseline performance measurement. Subjects performing in the presence of an audience of faculty members displayed a nonsignificant decrement in performance when compared to baseline performance. The results suggest that the status of an audience affects individual performance.

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Introduction

The phenomenon of social facilitation was first studied by Triplett in 1898. Subsequent research continued until the onset of World War II. The failure of researchers to account for contradictory findings led to a cessation of work in this area for approximately 25 years. In 1965, interest in the study of social facilitation was renewed when Robert Zajonc reviewed the previous literature and proposed a theory that integrated previous findings and accounted for previous inconsistencies. Since Zajonc's theory, research has continued and includes the study of evaluative audiences, team sports, and nonhuman animals. Also, this research has prompted the development of new theories to explain social facilitation.

This study was designed to compare the baseline performance of subjects (college students) on a pursuit rotor with their performance while being observed by an audience of the same status (college students) or an audience of higher status (college faculty). Cottrell, Wack, Sekerak and Rittle (1968) suggested that an individual's performance on a task will not be significantly affected by an observer if that observer is of the same status. Results from the current study

are intended to be congruent with that statement. It is hypothesized that the subjects will not display a significant performance effect when observed by other students but will display a significant performance decrement when observed by faculty members. Also it is expected that the differences in performance between the two experimental conditions will be significant in that the subjects performing in the presence of a faculty audience will display a significantly greater amount of errors when compared to subjects performing in the presence of a student audience.

Review of Related Research

Psychological literature is replete with research regarding social facilitation. The study of social facilitation, as defined by Zajonc (1965), "examines the consequences upon behavior that derive from the sheer presence of other individuals".

The earliest research dealing with this phenomenon was conducted by Triplett (1897). Racing cyclists were timed when riding alone and when being paced by another cyclist. The results indicated that the cyclists in the paced condition displayed faster times than the cyclists in the unpaced condition.

In 1924, Allport coined the term "social facilitation". He suggested that the audience and coactive effects that characterize this phenomenon are a function of task complexity. Allport theorized that the presence of an audience or coactor would enhance the performance of an individual on a simple task. However, the presence of the same audience or coactor would degrade performance of the same individual on a complex task.

Research in the 1930's revealed inconsistencies in the existing social facilitation paradigm. Pessin (1933) reported that college students were able to learn lists of nonsense syllables faster and more

accurately when alone than when in the presence of an audience. In comparative research, Gates and Allee (1933) reported that cockroaches ran simple mazes faster individually than when in pairs. The inability of researchers to account for these inconsistencies led to the abandonment of most related research by the onset of World War II (Geen and Gange, 1977).

In 1965, Zajonc reviewed the social facilitation literature and developed a theoretical model that integrated the previous findings. Zajonc's model is divided into two parts as follows:

1) Audience Effects - performance is affected by the mere presence of a passive audience.

2) Coactive Effects - performance is affected by others engaged in the same activity simultaneously.

Zajonc suggested that the presence of an audience or coactor induces a state of arousal in an individual performer. In this state of arousal, adrenocortical chemical output is increased, resulting in an increase in emissions of dominant responses. Zajonc defined dominant responses as previously learned responses that are most likely to be elicited in the performance of a given task. If the task is well-learned, the dominant response is most likely to be correct and an increased occurrence of this response enhances performance. If

the task is being learned, the dominant response is most likely to be incorrect and an increased occurrence of this response is detrimental to performance. Zajonc suggested that this chain of response emissions explains why in some instances social facilitation enhances performance and in other instances it degrades performance. His theory suggests that dominant responses will increase in any condition in which an audience or coactor is present. The important consideration in predicting social facilitation effects is determining if the dominant response being elicited is correct or incorrect relative to a given task.

Zajonc supported his theory with research (Zajonc & Sales, 1965). Subjects performed a pseudorecognition task and displayed a greater number of dominant responses, correct or incorrect, when coacting than when performing alone.

Hunt and Hillery (1973) conducted research that also supported Zajonc's theory. Subjects learned a complex stylus maze either alone or with a coactor. In this experiment, the subject's dominant responses were most likely to be incorrect due to the fact that the task was being learned and a correct response was not in their previously learned repertoire of responses. The subjects in both the alone and coacting conditions

emitted incorrect dominant responses. The subjects in the coacting condition displayed a significantly greater number of dominant responses when compared to the subjects in the alone condition.

In related research, Cottrel, Wack, Sekerak, and Rittle (1968) reported that the emission of dominant responses was significantly increased in the presence of an audience. Cohen and Davis (1973) also reported a significant increase in dominant response emissions for subjects in the presence of an audience.

Zajonc's theory was also supported by findings from studies of nonhuman animals. A number of researchers reported significant increases in dominant responses for coacting rats performing bar pressing tasks (Levine & Zentall, 1974; Treichler, Graham, & Shweikurt, 1971; Zentall & Levine, 1972). Zajonc, Heingartner, and Herman (1969) reported that cockroaches running away from a light along a straight path ran significantly faster when coacting than when alone.

According to Zajonc's model, the audience effect occurs without the audience giving feedback to or overtly evaluating a given performer. Cottrel (1972) suggests that even in the absence of overt feedback, performers perceive an audience as being evaluative.

A number of studies have been devoted to evaluative audiences or the evaluation/apprehension hypothesis. Carmet and Latchford (1970) studied 96 undergraduate college students. Subjects were divided into four experimental groups: 1) subjects alone with an experimenter observing; 2) subject pairs coacting with an experimenter observing; 3) subjects alone without an observer; and 4) subject pairs coacting without an observer. The subject's task was to move a toggle switch back and forth for 5 minutes. The results indicate that the subjects who were coacting and observed had rates of responding significantly higher than all other groups. The lowest rates of response were for the subjects that coacted without observation. The group in which subjects acted alone with observation displayed higher rates of response than the unobserved coacting group. The results suggested that the audience effect in this study was more powerful than the coactive effect. A possible explanation of these findings is that an observing experimenter was perceived by the subjects as being of higher status than a student coacter. This in turn lead to the subject putting greater value on the experimenter's perceived evaluation and resulted in an increase in the subject's response rates.

In related research, Cohen and Davis (1973) had subjects acquire problem solving sets in order to solve hidden word problems. The stimuli were progressively changed in order to encourage subjects to develop new, more efficient problem solving strategies. The subjects were then divided into two groups. In the first group, subjects were observed while solving the problems. In the second group, in addition to being observed, subjects were given immediate evaluative feedback by the observers. The results suggest that although the acquisition of new problem solving sets was inhibited by the mere presence of an observer, as predicted by Zajonc's model, a significantly greater level of inhibition occurred in the presence of an evaluative observer. In this study, the occurrence of incorrect dominant responses (i.e., previous less efficient problem solving strategies) was facilitated by the presence of an observer. This led to an inhibition of the nondominant response which was the development of new, more efficient problem solving strategies.

In a similar study, Sasfy and Okun (1974) had subjects perform a complex motor task under one of the three following conditions: 1) observed by an "expert" and given immediate performance related feedback; 2)

observed by an "expert" and given delayed performance related feedback; and 3) observed by a nonexpert and not given feedback. The results showed that subjects made significantly more errors in the "expert" observer/immediate feedback condition when compared to the other conditions. The difference in errors between the latter two conditions was not significant. The results indicate that social facilitation effects can be attributed to an interaction between an observer's status and the temporal proximity of feedback to a given response.

The aforementioned studies shared a common element in that each of them was predicated upon drive theory. Drive theory explains social facilitation as a function of physiological arousal. Arousal results from external elements such as audiences or coactors. Increased levels of arousal are responsible for subsequent increases in dominant responses. The effect on performance depends on whether a dominant response is correct or incorrect relative to a given task. The arousal/performance relationship is graphically depicted as an inverted U. The level of arousal resulting in optimal performance is at the apex of the inverted U. If the amount of arousal is too great or too small, performance is less than optimal.

The inverted U relationship between anxiety and performance has been studied by Cox (1986) and Gould, Peltchikoff, Simmons, and Vevara (1987). Cox studied 157 female college volleyball players. Players were each given the Competitive State Anxiety Inventory (CSAI) 5-10 minutes before the first game of a best 2 out of 3 match and then again 2 minutes prior to each subsequent game of the match. The results indicated that the inverted U relationship was not present. The subjects displayed linear anxiety/performance relationships. Subjects displaying the lowest anxiety scores on the CSAI displayed the best offensive statistics whereas subjects displaying the highest anxiety scores had the worst offensive statistics.

In a similar study at the University of Illinois Police Training Institute, Gould et al. (1987) studied the pistol shooting performance of 39 cadets. Subjects were each given the CSAI prior to target shooting trails. The results indicate that the inverted U relationship was present for the CSAI somatic anxiety subscale but not for the cognitive anxiety subscale.

A number of researchers have proposed nondrive theories in an attempt to explain social facilitation. These theories suggest that social facilitation effects are attributable to elements within a performer.

Duvall and Wicklund (1972) suggested that social facilitation results from objective self awareness. Objective self awareness is defined as "the state of an individual in which his/her attention is focused entirely upon his/her inward self". This state of self awareness is enhanced by the presence of an audience or coactors, resulting in an increase in motivation, which in turn enhances performance. This theory fails to specify how objective self awareness results in performance decrements.

Liebling and Shaver (1973) have suggested that ego involving instructions are responsible for social facilitation. They studied subjects performing simple motor tasks in one of two conditions: 1) subjects able to view themselves in a mirror while performing the task; or 2) subjects performing the task without a mirror. The results indicate that subjects performing the task with a mirror exhibited performance decrements, whereas subjects performing the task without a mirror did not exhibit performance decrements. Liebling and Shaver suggested that when a mirror was present, subjects displayed a heightened sense of self awareness. This resulted in ego involvement, which caused the subjects to become inattentive to the task and exhibit performance

decrements. Liebling and Shaver did not provide an explanation of how ego involving instructions can account for performance enhancement. It should be noted that Liebling and Shaver's results are inconsistent with the results of an earlier study. Wicklund and Duvall (1971) reported that subjects performed a simple motor task significantly better in front of a mirror than when performing the same task without a mirror.

Baron (1978) proposed a distraction/conflict theory to explain social facilitation. In the study on which he based his theory, Baron had subjects perform a simple motor task while being observed or a complex motor task while being observed. The results indicated that subjects displayed a performance enhancement when observed on the simple task and a performance decrement when observed on the complex task. Baron suggested that social facilitation results from a performer being in conflict with himself/herself concerning whether to attend to a given task or a task irrelevant stimulus such as an audience or coactor.

Researchers have attempted to study social facilitation in a group context. Specifically, research by Shwartz and Barsky (1977) and Greer (1983) have examined the home stadium advantage of sports

teams. In the most comprehensive study of this sort, Shwartz and Barsky examined the home performance of professional and college sports teams in the 1971 sports season. The study included 182 professional football games, 910 college football games, 1880 professional baseball games, and 542 professional hockey games. Also included in the study were the home game statistics of 1485 games of the Big Five college basketball conference from 1952 to 1966. The results were that the home teams won 55% of the time in professional football, 59% in college football, 53% in professional baseball, 53% in professional hockey and 82% in college basketball. The results also show that the offensive statistics of home teams (i.e., touchdowns, hits, home runs, shots on goal, field goals, etc.) were better than for visiting teams. The research also suggests that the home advantage is greatest for basketball and hockey when home winning percentage and offensive statistics are factored together. Shwartz and Barsky suggested that the home stadium advantage in basketball and hockey is due not to sheer crowd size but to crowd density. They suggested that effective crowd densities are achieved more readily in the generally smaller basketball and hockey venues. Shwartz and Barsky summed up the

implications of their research as follows: "The home team's advantage is the most pronounced when the social congregation before which it performs achieves its greatest compactness and intensity, and when it expresses itself in the most sustained way".

Greer (1983) studied the audiences of home basketball games at the University of Illinois and Kansas State University. In order to determine if the audience response was resulting in an effect on either the home or visiting team, Greer stipulated that performance measurements would be taken only when the audience engaged in a form of sustained protest for a duration of at least 15 seconds. A sustained protest consisted of any negative verbal outbursts such as booing or shouting obscenities. Research assistants present at the games recorded the crowd behavior during sustained protests and recorded the target of the protest (i.e., the home team, the visiting team, or the referees). Team performance measures including scoring, turnovers, and fouls were monitored for 5 minutes after a sustained protest. In two years the researchers recorded 15 incidents that met the criteria for sustained protests. The results derived from the study of these 15 incidents suggest that although home teams tended to score more and turn over the ball less

in the 5 minutes succeeding a sustained protest, this difference in performance was not statistically significant. The visiting team displayed a significant decrement in performance during the 5 minutes succeeding a sustained outburst. Greer suggested that the home stadium advantage results not from the audience enhancing home team performance but from the audience negatively affecting the visiting team's performance.

In summary, social facilitation effects were first observed and recorded by Triplett in 1898. In 1924, Allport coined the term "social facilitation" and suggested that its effects were a function of task complexity. In the 1930's, inconsistencies in the accepted social facilitation model became apparent (Gates & Allee, 1933; Pessin, 1933). The inability of researchers to assimilate and integrate inconsistent findings into a comprehensive model led to the abandonment of related research for approximately 25 years.

In 1965, Zajonc reviewed the previous social facilitation literature and derived a comprehensive social facilitation model. Researchers such as Cottrel et al. (1968), Hunt and Hillery (1968), and Cohen and Davis (1973), conducted research that supported

Zajonc's model. Studies with nonhuman animals also supported Zajonc's model (Levine & Zentall, 1974; Treichler et al., 1971; Zentall & Levine, 1972).

Researchers such as Carmat and Latchford (1970), Cohen and Davis (1973), and Sasfy and Okun (1974) expanded the social facilitation model beyond "mere presence" effects and studied the effects of interactive audiences.

Zajonc's social facilitation model is predicated upon drive theory, which proposes that there is a curvilinear relationship between arousal and performance that can be depicted graphically as an inverted U. This theoretical relationship between arousal and performance has only been partially supported by research (Gould et al., 1987).

Nondrive theories of social facilitation have been proposed (Baron, 1978; Duvall & Wicklund, 1972; Leibling & Shaver, 1973). These theories attribute social facilitation to internal elements such as objective self awareness, ego involvement, and mental distraction.

Researchers have extrapolated the social facilitation model to include audience effects on team performance (Greer, 1983; Shwartz & Barsky, 1977). The results of research in this area indicate that the home

team wins more often, but this success is attributable to the audience negatively affecting the visiting team rather than positively affecting the home team.

The present study was designed to examine audience effects in the context of social facilitation. The variable being studied is the status of a particular audience and its effect on an individual's performance of a pursuit rotor task. It is predicted that when compared to a baseline measure of performance, there will be no differences for subjects performing in the presence of student audience and that there will be a significant performance decrement for subjects performing in the presence of a faculty audience. Also, it is predicted that the faculty audience subjects will display a significant performance decrement when compared to the student audience subjects.

Method

Subjects

Twenty college students, 13 women and 7 men from Eastern Illinois University participated voluntarily. The students were either not psychology majors or were prospective psychology majors enrolled in their first introductory psychology course. An additional 6 students, (3 men and 3 women) and 4 faculty members (2 women and 2 men) participated as experimental cohorts. The student cohorts were either sophomore, junior, or senior psychology majors. The faculty cohorts were all full time psychology professors.

Apparatus

A Lafayette Company model #300013 pursuit rotor was used for the experimental task. In order to simplify the task and facilitate learning, a circular template was used on the rotor. The rotor sensitivity was set at 10 and the RPM's were set at 15. The settings were arbitrarily judged to be facilitative to task simplicity while allowing an accurate measure of performance.

Procedure

The subjects were verbally instructed to use the pursuit rotor. The subjects each performed a 2-minute

practice trial then were given a 1-minute rest before performing three 3-minute trials without an audience present. The subjects were allowed a 1-minute rest between each trial. The results of the three trials for each subject were averaged, with each subject's mean serving as a performance baseline.

The subjects were then randomly assigned to one of two experimental conditions. In the first condition, 9 subjects (7 women, 2 men) each performed a 3-minute trial in the presence of an audience consisting of 2 students (1 man, 1 woman). In the second condition, 11 subjects (6 women, 5 men) performed a 3-minute trial in the presence of an audience consisting of 2 members of the psychology faculty (1 man, 1 woman).

The student cohorts were attired in dress representative of current undergraduate fashion preferences. They were introduced to the subjects as undergraduate psychology majors before each experimental trial. The faculty members were attired in dress that was appropriate for their respective occupations. They were introduced to the subjects as professors of psychology before the beginning of each experimental trial.

Results

A correlated groups t-test was used to compare the subject's errors for the baseline trials to the subject's errors in the experimental trials. The subjects in Group 1 (student audience) made significantly fewer errors ($M=82.588$, $SD=42.6$) when compared to their baseline errors ($M=109.911$, $SD=26.4$) $t(8)=2.45$ $p<.05$. The subjects in Group 2 (faculty audience) displayed a greater, although not significant, number of errors ($M=113.727$, $SD=34.8$) when compared to their baseline errors ($M=102.027$, $SD=30.8$), $t(10)=1.058$ $p>.05$.

An independent t-test was used to compare the baseline performance of Group 1 ($M=109.0$, $SD=26.4$) to the baseline performance of group 2 ($M=102$, $SD=30.8$). There was not a significant difference between the performance of the baseline groups, $t(19)=0.60$ $p<.05$.

The baseline analysis established that there were no performance differences that would invalidate the comparison of the subjects' performances in the experimental conditions. An independent t-test was used to compare the errors of Group 1 ($M=82.6$, $SD=42.6$) to the errors of Group 2 ($M=113.7$, $SD=34.8$). Group 2 had a significantly greater number of errors compared to Group 1, $t(19)=1.8$ $p<.05$.

Discussion

The results partly supported the hypothesis. Contrary to expectations, when compared to their baseline performances, subjects displayed significantly fewer errors when being observed by an audience of students, but, as expected subjects displayed more errors when being observed by an audience of faculty members, although the increase in errors was not significant. The comparison of the experimental conditions was consistent with expectations in that the subjects in the faculty audience condition displayed a significantly greater number of errors when compared to the subjects in the student audience condition.

These results are partly consistent with previous studies of social facilitation. Zajonc (1965) suggested that the "mere presence" of an audience was enough to cause a significant effect on performance. According to Zajonc, the subjects in both conditions should have displayed significant effects. More specifically, it would be predicted that the performance of subjects in both audience conditions would be enhanced because the subjects were given practice trials to ensure that the task was well learned and that the subject's dominant responses would be correct. Apparently, the "mere presence" effect was

not a factor when the faculty audience condition was compared to the baseline condition. This may have been due to the interaction of a status effect with the "mere presence" effect in that these conflicting effects canceled each other out and no significant enhancement or decrement in performance was displayed.

The results are also inconsistent with findings by Cottrell et al. (1968). Cottrell's findings indicated that the mere presence of an audience of the same status would not result in a significant effect on an individual's performance. It was suggested that apprehension due to the perception of being evaluated by an audience results in performance effects. The researchers also suggested that the apprehension elicited by an audience of the same status as a performer is not great enough to affect performance. Contrary to these suggestions, the results of the current study indicate that an audience of the same status significantly enhanced the subject's performance.

In a related study, Sasfy and Okun (1974) found that the presence of expert observers resulted in heightened levels of arousal in an individual performer. The manifestation of this arousal is an increase in the number of performance errors. Assuming

that faculty members are perceived as experts by students, it would be predicted that subjects in the faculty audience condition would display a significantly greater number of performance errors. The results only partly support the findings of Sasfy and Okun (1974) in that the subjects did display a significantly greater number of errors when observed by faculty members and compared to subjects observed by students. However the subjects observed by faculty members did not display a significantly greater number of errors when compared to their baseline performance.

Carmet and Latchford (1970) also found that the presence of "expert" observers resulted in a performer becoming apprehensive due to a perception of being evaluated. They suggested that the manifestation of the performer's apprehension is an increase in rates of responding. In the present study, the increase in errors for the subjects in the faculty audience condition may be indicative of an increase in the rates of response, in that the performers attempted to make more adjustments when pursuing the target and these adjustments resulted in errors. The results of this study are not fully supported by the research of Carmet and Latchford in that there was not a significant

increase in errors for subjects being observed by an "expert", when compared to baseline performance.

Overall, the results of the present study are inconsistent with the previous findings in two respects. First, the findings that the "mere presence" of an audience would result in a significant performance effect (Zajonc, 1965; Cottrell et al., 1968) were not substantiated. Zajonc's notion of a "mere presence" effect was refuted in that no significant effect was displayed when a faculty audience was present and subjects' performance was compared to their baseline performance. In regard to Cottrell et al., the "mere presence" of a same status audience resulted in a significant effect.

Secondly, the presence of "experts" (i.e., faculty members) did not result in subjects displaying significant performance effects when compared to baseline performance. As previously stated, this contradicts the research of Carmet and Latchford (1970) and Sasfy and Okun (1974) which suggests that the presence of "experts" significantly affects performance.

The results of this study indicate that the status of an audience does have an effect on an individual's performance of a given task. In regards to the faculty

audience condition, the results are somewhat consistent with previous research. Cohen and Davis (1973) reported that subjects' acquisition of strategies to solve hidden word problems was inhibited by the presence of an evaluative observer. Although there was not a significant effect in the present study when subjects' performance was compared to their baseline performance, the subjects did display a significant performance decrement when compared to subjects performing in the presence of a student audience.

Regarding the student audience condition, a possible explanation for the inconsistencies between what was predicted by previous research and the current findings is that there was an interaction between the effects noted in the previous studies. For example, Zajonc's (1965) finding that the "mere presence" of an audience enhances an individual's performance may have been substantiated, but the effect was only apparent in the student audience condition. The "mere presence" effect might have been attenuated in the faculty audience condition by an "expert" observer effect (Carmet & Latchford, 1970; Sasfy & Okun, 1974), which resulted in a slight decrement in performance. This research supports the notion that the status of an audience affects the performance of individuals. It

generates additional questions regarding the validity of the "mere presence" hypothesis, the relative magnitude of arousal generated by "experts", and the ability to replicate social facilitation effects from setting to setting.

For future research, an integrative model of social facilitation must be developed. This model should incorporate elements of the present study as well as pertinent elements from previous research. Relevant inclusions to this model could be the use of "expert" evaluative audiences giving either immediate or delayed feedback (Carmet & Latchford, 1970; Sasfy & Okun, 1974); conditions with audiences of varying status (Cottrell et al., 1968); using a variety of tasks ranging from simple to complex (Allport, 1924); having a condition in which subjects are coacting (Carmet & Latchford, 1970; Zajonc, 1965); and using anxiety inventories such as the CSAI to determine arousal levels for each subject (Cox, 1986; Gould et al., 1987).

In summary, the results indicate that the status of an audience does affect an individual's performance. College student subjects displayed a significant performance enhancement in the presence of an audience of college students. Although subjects in the faculty

audience condition displayed a nonsignificant performance decrement when compared to baseline performance, these subjects displayed a significant performance decrement when compared to subjects observed by an audience of students.

In order to thoroughly study social facilitation, a comprehensive research model must be developed to address a number of pertinent questions raised by previous studies. The results of subsequent studies may be of value in providing insights into issues such as test anxiety, job performance and sports performance.

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