Social Facilitation: A Test of Competing Theories[1]

JOSHUA M. FEINBERG[2]
Saint Peter's College

JOHN R. AIELLO
Rutgers University

Evaluation–apprehension and distraction–conflict have typically been treated as alternative explanations for social facilitation. The present study tested both theories under a single design. The study examined (a) whether each explanation predicted social-facilitation performance outcomes and (b) whether combining evaluation and distraction manipulations produced even greater performance outcomes. The present study also explored whether physical presence is necessary to produce social-facilitation effects when evaluation and distraction manipulations are already present. The study found significant facilitation effects on the simple task only in the evaluation–apprehension condition. Significant performance impairment was found for both evaluation and distraction. Combining evaluation with distraction led to greater effects only on the complex task. Furthermore, physical presence does not appear necessary to produce social-facilitation effects.

While there have been several attempts to theoretically integrate evaluation–apprehension and distraction–conflict (e.g., Geen, 1981a), two of social facilitation's more predominant theories, no previous study has varied evaluation and distraction constructs systematically along with presence under a single design. The present study examines the effect of evaluation–apprehension, attention overload (distraction), the combination of these two factors, and presence on simple and complex task performance. The study also examines whether evaluation and distraction have similar effects on performance and whether combining these factors would yield stronger effects.

Furthermore, the study attempts to offer further evidence (for a review, see Aiello & Douthitt, 2001) that physical presence may be sufficient, but it is not necessary to produce social-facilitation effects. The study utilizes a 2 (Task) $\times$ 7 (Condition) mixed-model design in which participants were

[1]Research reported in this article is based in part on a master's thesis by Joshua M. Feinberg under the supervision of John R. Aiello and submitted to the Graduate School at Rutgers University, New Brunswick, NJ.

[2]Correspondence concerning this article should be addressed to Joshua M. Feinberg, Department of Psychology, Saint Peter's College, 2641 Kennedy Boulevard, Jersey City, NJ 07306. E-mail: Jfeinberg@spc.edu

Journal of Applied Social Psychology, 2006, **36**, 5, pp. 1087–1109.

assigned randomly to one of seven conditions: a control condition (no presence, evaluation, or distraction), two evaluation conditions (with and without presence), two distraction conditions (with and without presence), and two evaluation with distraction conditions (with and without presence). All of the participants performed both a simple and a complex word-pair task.

Social Facilitation: Early History

In one of social psychology's first experiments, Triplett (1898) made a fascinating discovery. Triplett noticed that bicycle racers seemed to perform much faster when faced with racing other opponents against the clock, as compared to when racing alone. This observation turned into one of psychology's first experimental studies. Soon, other corroborating reports of social facilitation followed (e.g., Allport, 1920; Meumann, 1904). Social-facilitation studies began branching out to study other species with positive results (e.g., Chen, 1937; Tolman, 1967). Early research on performance enhancement grew in popularity as a result of its widely generalizable results across different species.

Contradictory studies, however, began to cast doubt on social facilitation theory. The effects were not always facilitative; some studies found that social settings led to performance impairment. Pessin (1933), along with other researchers (e.g., Gates & Allee, 1933) found performance impairment in social situations in both humans and animals. As a result of these conflicting results in the data, interest in the topic began to wane. By 1954, Kelley and Thibaut concluded that "these phenomena, which were once thought to be basic to the study of social psychology, do not enjoy much popularity with present investigators" (p. 748).

Social facilitation breathed new life when Zajonc (1965) proposed a parsimonious explanation that could account for both performance gains and losses. Drawing on the learning theories of Hull (1943) and Spence (1956), Zajonc suggested that the mere presence of others increases arousal, which leads to drive-like effects on behavior. The mere presence of others enhances the emission of dominant responses by increasing an individual's level of general drive. If the appropriate responses are dominant, then the presence of others will improve performance. If the appropriate responses are not dominant (subordinate), then performance will be impaired.

Drive Theories

Zajonc's (1965) theory was revolutionary not only for offering a parsimonious explanation of the divergent results, but also for tying social facilitation to arousal. Researchers now began to ask "What are the an-

tecedents to this state of arousal?'' This became the major question of social facilitation over the past 35 years.

Zajonc (1965) believed that the mere presence of others was sufficient to produce the arousal necessary for social facilitation. Zajonc (1980) interpreted drive or arousal as an alertness for the unexpected, a preparedness to respond to others. This arousal can be generated by the presence of any potentially active other, even one who is not competing with the individual, and from whom the individual anticipates no reward or punishment. Thus, the term *mere presence* was coined.

Cottrell, Wack, Seeker, and Rittle (1968) argued that mere presence was not sufficient to produce social facilitation. They claimed that arousal is created through social experience and is not a biological given, as Zajonc claimed. Cottrell et al. (1967) presented a learned drive account of social facilitation, maintaining that people learn to associate certain rewards and punishments with the presence of others. Because of this association, audience members and co-actors elicit arousal in an individual. Weiss and Miller (1971) added that learned drive is an aversive state, an apprehension of others' negative evaluations. Geen and Gange's (1977) research also found that concern over negative, but not positive, evaluation acts as a mediator for social facilitation.

Some researchers have abandoned evaluation–apprehension for a purely cognitive approach. Baron, Moore, and Sanders (1978) attributed the arousal present in social facilitation to an attentional conflict and claimed, ''the crucial feature of audience and co-action treatments is their distracting quality'' (p. 818). Individuals need a certain amount of attention to perform well on a given task. Attention to other people or other tasks, therefore, will conflict with the attention needed for the task at hand. This attentional conflict acts as a source of arousal that produces social-facilitation effects. This theory, dubbed *distraction–conflict theory*, is somewhat counterintuitive. Normally, one might think that distraction would hurt performance. However, distraction acts as a moderator for performance facilitation on simple tasks (and performance impairment on complex tasks). Sanders and Baron (1975) found that by requiring participants to divide their attention by performing in a dual-task environment, social-facilitation effects were produced. Proponents of the theory claim that a dual-task environment and the presence of others can both serve as a source of distraction.

Baron et al. (1978) also found that participants reported feeling more distracted in the presence of an audience. Groff, Baron, and Moore (1983) found social-facilitation effects only when the presence of an audience caused attentional conflict. Based on these findings, distraction–conflict theory holds that it is the distracting nature of other individuals or other tasks that explains social-facilitation effects.

Other Theories

Paulus (1983) attempted to integrate a cognitive explanation with a social learning approach. Paulus' model of social facilitation employed evaluation–apprehension, arousal, and cognitive processing to explain how social presence influences performance. Because of a lack of evidence for increases in physiological arousal (Bond & Titus, 1983), several models of social facilitation have eliminated the notion of drive or arousal. Duval and Wicklund (1972), Carver and Scheier (1981), and Bond (1982) all offered non-drive theories to explain social-facilitation effects.

When Do We Find Social Facilitation?

Tasks. As previously noted, Zajonc (1965) proposed a parsimonious explanation for social facilitation that accounts for both performance enhancement and impairment. While there has been disagreement over when and why social facilitation effects occur, there has been general agreement over which tasks can be applied to social facilitation. Only certain types of tasks fall under the umbrella of social facilitation (for a discussion, see Cottrell, Rittle, & Wack, 1967). Tasks need clear-cut accuracy criteria, must be independently classifiable as either having a correct response in a position of dominance or as eliciting strong incorrect response tendencies, and must be validated independently as behavioral indicators of variations in general drive level.

Participants in the present study completed a word-pair association task. Originally employed by Spence, Farber, and McFann (1956), this task has become a staple of social-facilitation research because it meets the previously mentioned criteria and can be found in studies across different theoretical orientations (e.g., Baron et al., 1978; Cottrell et al., 1967).

Presence. One of the major criticisms of social-facilitation research is that many studies do not have a true alone condition (Guerin, 1993; Schmitt, Gilovich, Goore, & Joseph, 1986). Other studies have an alone condition in which the experimenter may not be present, but other individuals or co-actors are present. For a true alone condition to be met, a participant must perform the task completely alone.

Research has shown that even nonphysical presence is enough to produce social-facilitation effects. Research conducted by Aiello and colleagues (Aiello & Kolb, 1995; Aiello & Svec, 1993; Douthitt & Aiello, 2001) has extended the social-facilitation framework to situations in which there is an "electronic" presence, but no actual physical presence. Aiello and Svec found that participants who were electronically monitored showed performance impairment on a complex task (compared to a control condition)

similar to those participants who were physically monitored in the presence of a supervisor.

Bond and Titus (1983) noted, ''Consistent with social monitoring theory, others who are imperceptible, reliably affect performance accuracy. They may, in fact, have a greater physiological impact on the performer than do others who can be seen'' (p. 284). The present study utilizes a true alone (control) condition in which participants complete the tasks with no others physically or electronically present.

The Present Study

There has been general agreement that social facilitation is characterized by enhanced performance on simple or well-learned tasks, and impaired performance on complex or novel tasks. There has been little agreement regarding the ''why'' and the ''when'' of social facilitation. Both evaluation–apprehension and distraction–conflict theories have strong support in the literature.

Although there have been attempts to integrate the theories theoretically (e.g., Baron, 1986; Moore et al., 1988), neither theory has properly addressed the other in a single experimental design. In many performance situations, individuals can be faced with internal cognitive distractions as well as externally derived evaluative pressure. The present study systematically explores situations in which distraction–conflict and evaluation–apprehension may be present. While there is evidence in independent studies that both evaluation–apprehension and distraction–conflict are sufficient to produce social-facilitation effects, there have been few attempts to integrate the two theories experimentally. The theories typically are viewed as opposing explanations; however, it is possible that both are independently capable of yielding social-facilitation effects.

A possibility is that one explanation is more likely to elicit performance effects than the other. If a participant is placed in an environment in which evaluation potential is likely, as in the present study, evaluation–apprehension should be fairly automatic since participants have been ''trained'' (Cottrell, 1972) to expect possible rewards or punishment. However, in order for distraction–conflict to elicit performance effects, attentional conflict is needed.

Past research has manipulated nonsocial attentional conflict by either forcing participants to choose between two tasks (high-conflict distractor) or by having the experiment signal on which of the two tasks participants should focus their attention (low-conflict distractor; Groff et al., 1983). If the distractor leads to attentional conflict, then social-facilitation effects are

predicted. However, the process leading to attentional conflict may be tricky to elicit. It is important that the distractor be strong enough to produce attentional overload, but not so strong as to disrupt the processing capacity of the participant.

If evaluation–apprehension and distraction–conflict are capable of producing social-facilitation effect conditions in which both evaluation–apprehension and attentional conflict are present, the two mechanisms might interact with each other to produce stronger effects. If distraction and apprehension lead to a heightened state of arousal, then having both might produce more arousal and, therefore, stronger social-facilitation effects. There have been studies in which one can argue that evaluation and distraction both may have been present (e.g., Baron et al., 1978). However, no comparisons were made to when either distraction or evaluation was present alone.

Another question is as follows: If evaluation–apprehension or distraction–conflict is capable of mediating the effects of social facilitation, is presence necessary then? To examine this issue, some participants will perform in conditions in which there is an evaluative environment, a secondary task distractor, or both; but no other is physically present. Social-facilitation effects that are found under these conditions would imply that physical presence is not a requirement, as Zajonc (1965) argued originally. Previous research has demonstrated that physical presence may not be necessary to yield social-facilitation effects (e.g., Aiello & Svec, 1993). However, the present study goes one step farther by systematically disentangling physical presence from both evaluation and distraction–conflict. No prior studies have examined the necessity for presence in evaluation–apprehension and distraction–conflict under a single design.

Social facilitation is, in a sense, counterintuitive. Why should performance be facilitated under the threat of negative evaluation or in a dual-task environment? There are no definitive explanations as to what are the true mediators of this phenomenon. There are several theories—evaluation–apprehension and distraction–conflict in particular—that have accounted for the data quite well. Can both of these factors yield social-facilitation effects? If so, are the effects relatively equal? The present study will address these issues.

Hypotheses

The following hypotheses are proposed:

> *Hypothesis 1.* Evaluation–apprehension and distraction–conflict will produce different social-facilitation effects.

Whereas evaluation–apprehension is a fairly automatic process in the right environment, distraction–conflict is much trickier to attain. A nonso-

cial distractor must require enough attention that it causes conflict within the participant, but not so much attention as to draw away necessary attention from the primary task (Baron, 1986). The present study utilizes a low-conflict signaled distractor, conceptually similar to that used by Sanders and Baron (1975). The present study examines whether this low-conflict attentional overload is sufficient to yield performance effects identical to the effect of evaluation–apprehension.

> *Hypothesis 2*. The physical presence of the experimenter will not be necessary to produce social-facilitation effects.

Zajonc (1980) believed that the presence of others is the necessary ingredient in producing social-facilitation effects. Several studies (e.g., Aiello & Svec, 1993) have demonstrated that social-facilitation effects could be produced without any physical presence. The present study extends this framework to include evaluation–apprehension and distraction–conflict manipulations.

> *Hypothesis 3*. Combining evaluation–apprehension with distraction–conflict will produce larger social-facilitation effects.

Previous research has tested evaluation–apprehension and distraction–conflict independently as potential factors of social facilitation (e.g., Baron et al., 1978; Good, 1973). Each theory has strong statistical evidence to explain social-facilitation effects. However, a model has yet to be tested that combines both theories in a single study. If evaluation–apprehension and distraction–conflict work independently to produce similar social-facilitation effects, then participants who are made to experience evaluation–apprehension and to perform in a distraction–conflict setting may exhibit stronger social-facilitation effects, as compared to either evaluation–apprehension or distraction–conflict individually.

Method

Participants

Participants were 166 Rutgers University undergraduates (64 male, 102 female), who were recruited from introductory psychology classes for partial fulfillment of a course requirement. There were no gender effects found; thus, gender will not be discussed further. The data of two participants were discarded because they failed to understand the experiment's instructions.

Participants were assigned randomly to one of six experimental groups or to the control group. The study utilized a 2 (Task) $\times$ 7 (Condition) mixed design, with six experimental groups and a control group performing a

simple task and a complex task. Condition sample sizes of the groups ranged from 22 to 25 participants.

Apparatus and Materials

A word-pair association task, similar to those used by Spence et al. (1956), Cottrell et al. (1967), and Baron et al. (1978), was presented to participants on a Power Macintosh™ 7100/66. The word-pair lists were programmed into a psychology experiment software program, Psyscope V2.1.

Participants were presented with each of two word-pair lists: a noncompetitional list (simple task), and a competitional list (complex task). The stimulus and response words on the competitional list are not highly associated, but there is a high association between the stimulus words of various pairs (i.e., high between-pair association). Examples of word pairs on the competitional list include "arid–grouchy" and "desert–leading." The noncompetitional list has associations within pairs but not between pairs. Examples of word pairs on the noncompetitional list include "adept–skillful" and "barren–fruitless." The word-pair association was validated independently as being drive-sensitive (Spence et al., 1956). In the present study, the noncompetitional task is referred to as the *simple task* because, consistent with Zajonc's (1965) original interpretation, the dominant response is the correct response; whereas the competitional list is referred to as the *complex task* because the dominant response is often an incorrect response.

A series of pre-task and post-task questions was programmed onto the computer also. The pre-task questions were designed to assess participant expectancies. The post-task questions were used to assess participant mood, perception of the task, as well as other manipulation checks. Several filler items were included to mask the true purpose of the present study.

Procedure

Participants were recruited for a study entitled "Word-Pair Tasks." Each participant was run individually (i.e., no co-action conditions). After the participant was seated in front of the computer, the experimenter read one of two introductions, an evaluation–apprehension introduction or a control introduction.

The instructions differ on several dimensions. First, in the evaluation instructions, the participant was told that the experimenter is a university instructor, as opposed to a research assistant. The instructor should be viewed as having more expertise on the experiment and on psychology in general, as compared to the research assistant. Prior studies have shown that stronger social-facilitation effects are produced in the presence of an expert audience, as opposed to a novice one (Baron, 1986).

Second, the evaluation instructions focus more on the participants and their performance, whereas the control instructions focus more on the task. In the evaluation instructions, participants were led to believe that the task predicts higher grade-point average and intelligence, which are areas of interest and concern for the participant. The control instructions focus on linguistics and on the general nature of the task. If the task has more personal relevance, as it should in the evaluation condition, it should serve to produce greater evaluation–apprehension than the less personally relevant task.

Third, participants in the evaluation instructions were led to believe that their performance would be evaluated at the end of the experimental session, whereas control participants were led to believe that their results would not be processed for several weeks. Those who believe that their results will be evaluated immediately should feel more accountable for their performance and, therefore, should feel more apprehensive.

Presence. Participants were then given a brief explanation by the experimenter of the word-pair association task. More thorough details were presented to the participant via the computer monitor after the completion of the experimenter's introduction. The experimenter then either left the participant alone to complete the remainder of the experiment or sat in a chair approximately 1.2 m. to the left and slightly behind the participant (a similar setup to that used by Baron et al., 1978). The experiment was completely automated; therefore, assistance by the experimenter was unnecessary to complete the experiment. In the "presence" conditions, participants were instructed not to interact with the experimenter.

Distraction. Participants also were assigned randomly to a distraction condition. Participants performed in a dual-task environment. The experimenter instructed participants that a second, less important task also needed to be completed. The task was a number comparison task in which participants needed to indicate which of two numbers is of greater value using greater-than, less-than, or equal signs. This task was presented as being of secondary importance compared to the word-pair association task.

During the course of the recall task, participants were directed via instructions on the screen to stop the word-pair task and to complete 10 items on the secondary task. These instructions appeared randomly five times per task (not including the practice task). Each participant in the distraction conditions completed the same number of trials on the numerical task. Participants were not penalized on the word-pair task for time spent working on the secondary numerical task. After working on the secondary task, participants were instructed to return to the word-pair association task.

The distraction task served as a cognitive distraction to the participant. The participant's attention was drawn by the distraction task, thereby potentially producing attention overload and social-facilitation effects. Several

studies have employed a dual-task environment to show social-facilitation effects (e.g., Groff et al., 1983). The present distractor is analogous to the low-conflict distractor utilized by Sanders and Baron (1975).

After the experimenter was either seated or left the room, participants read the instructions on the monitor and were asked to answer six pre-task questions designed to assess participant expectancies (e.g., "How do you expect to perform today?"). No between-group differences were found for expectancies. After completing the pre-task questions, participants completed three word-pair tasks in the following order: a short practice list (designed solely to familiarize participants with the task), the noncompetitional list, and the competitional list.

Task. Participants were presented with the word-pair list on the computer monitor. The practice list consisted of six pairs and was designed to familiarize participants with the task and the computer program. The noncompetitional list and the competitional list consisted of 18 word pairs each. Participants were given a specific amount of time to study each list before they completed each of the three tasks (20 s for the practice list, 90 s for the noncompetitional list, and 120 s for the competitional list).

Participants were asked to study and recall the word pairs separately for each task. Once time expired, a blank screen appeared for 2 s, followed by the written task. Participants were presented with a single stimulus word from the list of word pairs. Participants were then required to write down the appropriate response word and then hit the spacebar to move to the next item. For each list, participants were presented with 30 stimulus words and recorded all of their answers on the task sheets.

After the noncompetitional and competitional tasks, participants answered a series of post-task questions. The questions included several manipulation checks, as well as several filler items.

Dependent Measures

The primary dependent variable was participants' performance.[3] The number of incorrect responses (including blank items) was calculated separately for each task (competitional and noncompetitional). All items in the

[3]Participants' reaction times on the simple task also were analyzed. Reaction-time data, therefore, were analyzed using number of errors as a covariate. A one-way ANCOVA yielded statistically significant differences in reaction times, $F(6, 133) = 2.73$, $p < .025$. Those in the evaluation–apprehension condition had the fastest reaction times. However, this was only marginally significant from the control condition ($p < .10$). An ANCOVA looking at presence yielded significant results, $F(1, 138) = 5.32$, $p < .025$. Individuals who performed the simple task with the experimenter present had faster reaction times than did individuals who performed alone ($M_{\text{difference}} = 32.23$ s). Analyses of reaction times on the complex task yielded no significant differences ($p > .10$).

competitional list were treated as competitional. All participants across each of the conditions had the same number of competitional and noncompetitional word pairs within the complex task. All other dependent measures were contained in questionnaire items. Participants answered pre-task and post-task questionnaire measures using both 7-point and 5-point Likert scales.

Results

Manipulation Checks

Task difficulty. Participants should have perceived the complex task as more difficult than the simple task. Participants were asked to rate the difficulty of the task on a 7-point scale ranging from 1 (*difficult*) to 7 (*not difficult*). The mean response for the simple task was 4.76, and the mean response for the complex task was 4.02, $t(163) = 6.18$, $p < .001$.

The results were only moderately successful. Participants rated the difficult task as being somewhat neutral (i.e., at the midpoint of the 7-point scale), as opposed to being difficult. However, they did rate the difficult task as significantly more difficult than the simple task (see Table 1). Participants also rated the word pairs on the competitional list ($M = 4.57$) as being more difficult than the noncompetitional list ($M = 5.19$), $t(163) = 5.19$, $p < .001$. In addition, participants felt more frustrated by the complex task, felt that they knew the word pairs less well on the complex task, were more stressed, and were more uptight ($ps < .01$).

Participants' performance also indicated that the complex task was more difficult. Although participants' self-report measures did not rate the complex task as being overly difficult, frustrating, or stressful, their performance indicated that the complex task was, in fact, complex. Participants were accurate on only 47.5% of the word pairs on the complex task. The mean number of errors on the simple task was 10.23, compared to 15.73 on the complex task, $t(163) = 12.11$, $p < .001$. Participants' performance coupled with the self-report measures indicates that there was a significant distinction between the simple and complex tasks.

Presence. Participants correctly perceived the physical presence of the experimenter as they were performing the task. Participants were asked after each task "Was there someone present in the room while you were completing the tasks?" (1 = *Yes*, 2 = *No*). The data indicated that 96% of participants in the presence conditions correctly identified that there was someone present as they completed the tasks. In addition, 97% of participants in the non-presence conditions correctly identified that they were alone as they completed the tasks.

Table 1

Participants' Self-Report and Performance Differences Between the Simple and the Complex Task

	Simple task		Complex task		
	M	*SD*	*M*	*SD*	*t*
Word difficulty[a]	5.19	1.37	4.57	1.51	5.19**
Task difficulty[a]	4.76	1.36	4.02	1.41	6.18**
Stress[a]	4.19	4.58	3.90	1.55	2.31*
Uptight[a]	4.30	1.53	3.95	1.50	2.75**
Frustrated[a]	4.49	1.59	3.81	1.62	5.64**
Word knowledge[b]	4.44	1.48	3.65	1.53	6.92**
Performance[c]	10.23	6.15	15.73	5.63	12.08**

Note. All questionnaire items were reported post-task.
*$p < .05$. **$p < .01$.
[a]Lower number indicates higher rating. [b]Higher number indicates higher rating. [c]Number of incorrect responses.

Evaluation and Distraction

Analyses of the post-task questionnaire items reveal only marginal differences in self-reported distraction ($ps < .10$) for those in the distraction condition, and nonsignificant results for evaluation–apprehension ($ps > .10$) for those in the evaluation condition. Baron (1986) suggested that mediators of social-facilitation effects may be hard to assess because of the insensitivity of direct measures. Therefore, physiological measures may be more appropriate in detecting differences in arousal caused by distraction or evaluation–apprehension. Furthermore, it may have been difficult for participants to recall their psychological states accurately once they had completed the task and had been removed from the task environment.

Performance Accuracy

A 2 (Task: simple vs. complex; within-subject) × 7 (Condition; between-subject) mixed-model ANOVA yields a significant task by condition interaction on the number of errors that participants made, $F(6, 157) = 6.40$, $p < .001$. Errors include all incorrect responses, including nonresponses (i.e.,

items left blank).[4] Follow-up contrast analyses tested the specific hypotheses of the present study.

Simple Task

Analyses[5] were conducted to test whether cross-group differences existed. A 1×7 ANOVA looking at the number of simple errors made across conditions yields significant results, $F(6, 157) = 2.38$, $p < .05$. Planned comparisons were performed to test the specific hypotheses of the study. There was not a significant difference between the experimental groups overall and the control group ($p > .30$). Further analyses were conducted to test if any of the manipulations yielded performance effects on the simple task and will be discussed shortly.

Is presence necessary to produce social-facilitation effects? A contrast between the control condition and the experimental conditions without experimenter presence was conducted. Facilitation effects were found even without the physical presence of the experimenter. Participants in the experimenter-absent conditions ($M = 8.49$) made significantly fewer errors than did participants in the control condition ($M = 12.00$), $t(157) = 2.46$, $p < .01$, one-tailed (see Table 2).

Physical presence does not appear to be necessary to produce social-facilitation effects on the simple task. Interestingly, the presence conditions did not significantly differ from the control condition (merely a trend). It is often difficult to attain performance facilitation, and the effects are often quite small (Bond & Titus, 1983).

Was there a difference in predicting social-facilitation effects between evaluation–apprehension and distraction–conflict conditions? Planned comparisons were performed on the total number of errors, comparing the control and evaluation condition and the control and distraction condition. The data suggest that the evaluation–apprehension manipulation may do a better job of producing facilitation effects than the distraction manipulation.

Statistically significant contrasts were conducted comparing participants in the evaluation condition to those in the control condition, $t(157) = 2.21$, $p < .025$, one-tailed. A contrast between the means of the distraction condition

[4]There were participants who left answers blank. Studies (e.g., Bond, Atoum, & VanLeeuwen, 1996) have examined nonresponses as a distinct type of response. However, in the present study, participants were encouraged to guess, even if they did not know the answer. Thus, it would be difficult to distinguish nonresponses from random guesses. Therefore, all noncorrect responses, including blanks, were treated equally as incorrect responses.

[5]One-tailed tests are used when social-facilitation theory makes specific predictions of the results (e.g., facilitation effects on the simple task and impairment on the complex task). Analyses using a one-tailed test will be indicated as such. All other analyses were two-tailed.

and the control condition detected a trend toward facilitation effects, but this trend was not significant, $t(157) = 1.04$, *ns*. There was no significant difference in performance between the evaluation–apprehension condition and the distraction–conflict condition. There do appear to be differences between the evaluation–apprehension and distraction–conflict conditions. On the simple task, there were significant facilitative effects in the evaluation–apprehension condition, but not in the distraction–conflict condition. This may be a result, in part, of the nature of the task or the nature of the manipulation.

Was there a greater effect, additive or otherwise, when combining the evaluation manipulation and the distraction manipulation? Although there was a trend toward facilitation effects, the results were not significant ($p > .10$). The combined evaluation with distraction manipulation had smaller facilitation effects than did either of the manipulations individually (the comparison was not statistically significant). The data did not support the hypothesis that the combination of manipulations would create greater facilitation for the simple task.

Complex Task

Analyses were conducted to test whether cross-group differences existed. There were a total of seven conditions: one control, two evaluation (with and without presence), two distraction (with and without presence), and two evaluation with distraction (with and without presence; see Table 3). A 1×7

Table 2

Simple Task Performance

Condition	*M*	*SD*
Evaluation		
Experimenter present	9.74	6.08
Experimenter absent	7.63	6.62
Distraction		
Experimenter present	11.57	6.93
Experimenter absent	9.27	5.29
Evaluation/Distraction		
Experimenter present	12.71	6.58
Experimenter absent	8.63	5.78
Control	12.00	4.22

Note. Values indicate number of incorrect responses. Maximum score = 30.

ANOVA looking at the number of errors on the complex task made across conditions yielded significant results, $F(6, 157) = 2.58$, $p = .02$.

Planned comparisons were conducted to test the study's specific hypotheses. A planned comparison detected performance impairment in the experimental conditions ($M = 16.22$) compared to the control condition ($M = 12.83$), $t(157) = -2.78$, $p < .01$.

Is presence necessary to produce performance impairment? A contrast was performed between the control group ($M = 12.83$) and the experimental groups without the experimenter's physical presence ($M = 15.9$). The results show significant performance impairment, $t(157) = -2.34$, $p = .01$, one-tailed. Again, physical presence does not appear to be necessary to produce social-facilitation effects. Unlike on the simple task, those in the presence conditions differed significantly from the control group, $t(157) = -2.86$, $p < .01$.

Was there a difference in predicting social-facilitation effects between evaluation–apprehension and distraction–conflict conditions? A planned comparison reveals no significant differences between the evaluation–apprehension condition ($M = 15.47$) and the distraction–conflict condition ($M = 15.69$). Performance impairment was detected comparing the distraction condition ($M = 15.69$) and the control condition ($M = 12.83$), $t(157) = -2.04$, $p < .05$.A planned comparison also detected performance impairment in the evaluation condition ($M = 15.90$) compared to the control condition, $t(157) = -1.93$, $p < .05$, one-tailed. It appears as though the evaluation ma-

Table 3

Complex Task Performance

Condition	*M*	*SD*
Evaluation		
Experimenter present	16.17	5.33
Experimenter absent	14.79	6.62
Distraction		
Experimenter present	16.83	4.73
Experimenter absent	14.50	5.64
Evaluation/Distraction		
Experimenter present	16.63	5.37
Experimenter absent	18.29	4.83
Control	12.83	5.56

Note. Values indicate number of incorrect responses. Maximum score = 30.

nipulation and the dual-task distractor yielded statistically equivalent impairment effects. That is, both evaluation and distraction led to similar performance impairment when compared to the alone condition.

Was there a greater effect, additive or otherwise, when combining the evaluation manipulation and the distraction manipulation? A planned comparison detected performance impairment in the evaluation with distraction condition ($M = 17.46$) compared to the control condition ($M = 12.83$), $t(157) = -3.38$, $p < .001$, one-tailed. Unlike the simple task performance, the data suggest that there may be greater social-facilitation effects when combining the two manipulations.

There was stronger performance impairment in the evaluation with distraction condition compared to each manipulation individually. A contrast between evaluation with distraction and each manipulation individually yielded significant results, $t(157) = -1.93$ $p < .05$, one-tailed.

Summary of Results

On both the simple and the complex task, presence was not a necessary condition to produce social-facilitation effects. Participants in the experimental conditions, without experimenter presence, showed significant performance effects. On the simple task, participants in the evaluation–apprehension condition showed significant performance facilitation, whereas participants in the distraction–conflict condition showed a nonsignificant trend in that direction. There was also no evidence for increased performance facilitation when both manipulations were combined.

On the complex task, there was significant performance impairment in the experimental conditions. Participants in both the distraction–conflict condition and evaluation–apprehension condition showed equally significant performance impairment. In addition, there was evidence of increased performance impairment when the two manipulations were combined. Participants in the evaluation with distraction condition showed significant performance impairment compared to the control group, and showed greater impairment compared to each manipulation individually.

Discussion

Evaluation–apprehension and distraction–conflict are two of the more predominant theories explaining social-facilitation effects. The literature on social-facilitation has presented the theories as competing explanations for social-facilitation effects. Prior research has failed to examine both theories under a single design to examine whether an evaluation manipulation and a distraction manipulation could both yield performance in the same methodological design.

Important differences and similarities between the two theories were found. Participants in the evaluation–apprehension condition showed significant performance facilitation on the simple task and significant performance impairment on the complex task. However, participants in the distraction–conflict condition did not show significant performance facilitation on the simple task, but showed significant performance impairment on the complex task. The impairment effect was statistically identical for the evaluation manipulation and the distraction manipulation.

The relative effects of evaluation and distraction have never been compared directly. Further investigation is needed (additional studies or a meta-analysis) to determine whether the effects found in the present study will hold true. The relative effects of each manipulation may give insight on their underlying processes, which are still empirically unclear (for a discussion, see Geen, 1981b; Markus, 1981; Sanders, 1981).

Was Presence Necessary to Produce Social-Facilitation Effects?

When Zajonc (1965) offered an explanation for the apparently inconsistent findings in the social-facilitation literature, he posited that it was mere presence that mediated social-facilitation effects. Research by Aiello and colleagues (Aiello & Kolb, 1995; Aiello & Svec, 1993) on electronic performance monitoring provides evidence that physical presence is not, in fact, necessary to produce social-facilitation effects.

Consistent with this research, the effects of physical presence were tested. Overall, the present study supported the idea that physical presence is not needed to produce social-facilitation effects. Performance facilitation was found on the simple task, and performance impairment was found on the complex task without experimenter presence. Interestingly, participants performed significantly better on the simple task in the conditions without physical presence. While unexpected, this is not entirely inconsistent with social-facilitation theory. Although participants performed alone, they were still subjected to the experimental manipulations. It is these manipulations, theorists would argue, that are the underlying causes of social-facilitation effects. Therefore, we would expect to find social-facilitation effects, even without physical presence.

Does Combining Evaluation–Apprehension and Distraction–Conflict Manipulations Produce Stronger Social-Facilitation Effects?

If each manipulation has been shown to be sufficient to produce social facilitation, then one might predict that combining the manipulations would produce greater effects, additive or otherwise. On the simple task, no sig-

nificant facilitation effects were found in the combination condition. On the simple task, only the evaluation manipulation produced significant facilitation effects.

One possible explanation is that since distraction–conflict did not produce facilitative effects on the simple task, it may have diluted the potential facilitative effects of the evaluation manipulation. The distraction manipulation may have distracted the participant from the evaluation manipulation, thereby making the evaluation, which alone produced facilitation effects, less salient. In other words, the distraction task may have focused participants' attention toward the task and away from the evaluative components of the experiment.

Another potential explanation is that presenting participants with both evaluative pressure and a secondary task may have produced an amount of attentional overload that counteracted any potential facilitative effects. Sanders and Baron (1975) suggested previously that too much distraction or attentional overload may not yield predicted facilitation effects.

On the complex task, there was evidence of stronger impairment effects when the two manipulations were combined. On the complex task, both manipulations were significant; therefore, combining them may have led to even greater impairment effects.

It is possible that varying the strength of the manipulation (in this case, combining evaluation–apprehension and distraction–conflict) may have unique social-facilitation effects depending on the task type and the strength of the individual manipulations. This finding is consistent with the work of Seta and colleagues (Seta, Wang, Crisson, & Seta, 1989), which found that performance impairment and anxiety increased as additional evaluative elements were added.

There are several important issues regarding the distraction manipulation. Tests of distraction–conflict theory have used several types of distractors requiring differing amounts of attentional conflict. The present study utilized a low-conflict distractor. Participants were prompted when to attend to the second task; therefore, there was no conflict over which task to attend. The distractor required attentional processing that may have led to a state of attentional overload, the core of distraction–conflict theory.

It is important to note that the present study tested just one of several possible roots of distraction–conflict. There are several important issues surrounding the present study's choice of a distractor. First, was the distraction manipulation too distracting? While the number-comparison task probably required only a minimal amount of processing, this may have been enough to overcome any facilitation effects. However, it is still interesting to note that participants in the distraction condition did not perform worse than those in the control condition. Therefore, the processing needed for the

number-comparison test was not great enough to produce impairment effects. Further replication is needed to test how varying the number of distractions might affect performance.

Second, did the number-comparison task require enough attentional conflict? The procedure used in the present study parallels the low-conflict condition used in Groff et al. (1983) that yielded relatively weak social-facilitation effects. Therefore, it is possible that a higher attentional conflict may have produced larger effects in the distraction condition. However, the evaluation condition also may have benefited from stronger manipulations (e.g., completing the task in front of a more self-relevant individual); therefore, a delicate balance is needed.

The issue of "How much distraction is too much?" still needs further clarification in future research. Furthermore, it is important to note that although the present study distinguished between evaluation and distraction, it has been suggested (e.g., Baron, 1986; Geen, 1981a; Moore et al., 1988) that evaluation–apprehension itself can be considered a form of distraction. An evaluative other may be a source of attentional conflict that distracts participants away from the task. Thus, some may argue that the conceptual distinction between evaluation–apprehension and distraction may not be so clear-cut.

Finally, one of the criticisms of distraction–conflict theory has been that when performance effects are not found, it is impossible to tell whether it is because (a) the theory did not hold true, (b) there was not enough attentional conflict, or (c) there was too much attentional conflict. Some have argued (e.g., Geen, 1981a) that distraction–conflict theory may not be falsifiable because of the potential explanations listed previously and, therefore, may have less utility as a predictive explanation.

The present study was careful to include a task that has been validated previously as drive-sensitive. Drive theories of social facilitation are predicated on the fact that increases in levels of drive/arousal will lead to increases in the dominant response. Tasks, therefore, need to demonstrate a clear response hierarchy and to identify a dominant response. In the present study, one issue is whether the simple task was, in fact, simple. Although participants rated the simple task as being less difficult than the complex task, the task was not rated as particularly simple. Participants made, on average, over 10 errors on the simple task. If the simple task was not all that simple, then it is possible that the facilitation effects might be quite larger with a simpler task.

On the other hand, although the simple task was not rated as overly simple, participants consistently rated the simple task more favorably than the complex task (see Table 1 for summary). Therefore, this may be more of a psychometric issue than a theoretical one. However, by traditional Hull–Spence criteria (Hunt & Hillery, 1973; Spence, 1956), if a response is emitted

more than 50% of the time, we can infer that it must have been dominant. The simple task yielded a correct response rate of over 65%.

The present study offers a preliminary examination into how evaluation and distraction manipulations may affect one's performance differentially. Individuals working on tasks that fall under social facilitation may need to be extra mindful of their working environment. For example, subjecting participants to both evaluation and distraction led to increased performance impairment on a complex task. Therefore, when working on a complex task, we may be equally concerned over evaluative factors and potential distractors. Similarly, on a simple task, we may want to pay more careful attention to evaluative factors. Further examination into the relative effects of each construct may offer important information to our understanding of the social-facilitation phenomena.

This study provides an important first step in consolidating two of the most compelling explanations for social-facilitation effects and sheds light on several key questions that have been unanswered in previous research. Further investigation is still needed regarding one of social psychology's oldest phenomena.

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