

A TEST OF THE SOCIAL FACILITATION
THEORIES OF ZAJONC AND COTTRELL

by

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INTRODUCTION

One of the oldest and most interesting of phenomena within social psychology is the area of social facilitation. This concerns the effects of the presence of other people upon a person's behavior. People may affect behavior by the rewards they give, by direct physical interference, through imitation of their actions, and in other ways. Such influences are studied in other areas of social psychology. A concern of social facilitation studies is the effect upon a person's behavior of just the presence of another person — their mere presence. As such it can be regarded as a fundamental feature of social behavior and deserves further study and empirical testing.

Experimentation in this field is often traced to 1898, when Triplett observed that speed on a simple motor task was greater in the presence of others performing the same task than when performing in isolation. This phenomenon occupied many psychologists between 1898 and the 1930's. Then the interest began to diminish owing to an abundance of conflicting results indicating that performance is sometimes "facilitated" but on other times "impaired" by the presence of others. Today this topic seems to be attracting renewed attention and is generally known as "social facilitation."

In the relatively long history of social facilitation (about 80 years) there appears to have been only two notable attempts at a conceptual integration of the voluminous and contradictory evidence. The first is the work of F. H. Allport (1920-1924) who coined the term "social facilitation." He suggested in 1924 a generalization which, according to Jones and Gerard (1967) has stood the test of time remarkably well. He proposed that the presence of others increases the quantity and vigour of responses. Dashiell (1935), supplemented this suggestion with the argument that the presence of others is not as crucial as the adoption of an attitude of "being observed," which is

independent of the physical presence of other people.

In 1965, Zajonc suggested a fresh approach and stimulated new research efforts. He maintained that the mere presence of others impairs learning but facilitates well-learned responses. This is due to an increase in general arousal level and consequently an increase in the probability of the responses which are dominant in a given situation.

LITERATURE SURVEY

Triplett and Allport

Triplett performed the first social psychological laboratory investigation in 1897. The experiment was conducted on pacemaking and competition. He studied the outcomes of bicycle races and observed that there are three types of races: (a) there are unpaced races in which the cyclist rides alone for a given distance attempting to cover it in the shortest possible time; (b) there are paced races in which the cyclist competes against time; but in which he is provided with a pacer, that is, another vehicle that precedes and makes pace for him (c) there are the "true" races, involving no pacers, where all competitors race against each other at the same time, the winner being the individual who is first to cross the finish line. The pattern that intrigued Triplett was compelling: the best times were always for simultaneous competition; somewhat poorer but still very good times were obtained for paced races against time; and distinctly inferior performances were always made by cyclists racing alone against time. In the 1890's the fastest time for the unpaced mile was 2 min. 3.8 sec. The same man, however, was able to cover the mile-distance in 1 min. 39.6 sec, when following a pacer. Another bicycle star, was able to considerably bring down his time, when following a pacer.

In an effort to account for these dramatic differences between paced and unpaced performance, Triplett examined the following seven theories: (1) The suction theory (2) The shelter theory (3) The encouragement theory (4) the brain-worry theory (5) the theory of hypnotic suggestion (6) the automatic theory while Triplett admitted that all the above theories had some merit, he considered them substantially inferior to the one which he proposed, namely, (7) the theory of Dynamogenesis. His theory in his own words assumed that "the bodily presence of another rider is a stimulus to the racer in arousing competitive instinct; that another can thus be the means of releasing or

freeing nervous energy for him that he cannot of himself release; and further, that the sight of movement in that other is perhaps suggesting a higher rate of speed, is also an inspiration to greater effort." It was the dynamogenetic theory of competition that Triplett tested on children, who were asked by him to wind fishing reels alone and in competition against others.

It was in 1910 that Burnham posed a fundamental question for social psychology, "What is the effect on mental activity of the presence of a group of other persons, if studied objectively like the effect of temperature, barometric pressure, and the like?" Burnham hoped that this problem would be considered by teachers and studied further by investigators. After he wrote, studies were conducted on the effect of the presence of others upon the performance of a single individual in two experimental paradigms: Audience and coaction. In the audience paradigm there is the presence of passive spectators and in the coaction paradigm there is the presence of co-workers who work simultaneously and independently on the same task on which the subject is working.

The audience and coaction studies, however, yielded conflicting results. In some instances the presence of others improved individual performances, while in other studies the reverse occurred. The findings of F.H. Allport's (1924) studies of coaction are typical. The research, and the studies done afterwards, all have one common characteristic—the subjects performed some task alone, and also in the presence of an audience (Gates, 1924, Whittemore, 1924; Travis, 1925; Hurlock, 1927; Farnsworth, 1928; Anderson, 1929; Husband, 1931; Pessin and Husband, 1933; Pessin, 1933; Gurnee, 1939; Mukerji, 1940; Bennett, 1946; Kiesler, 1966; Zajonc and Sales, 1966).

Allport (1924) conducted a series of experiments for studying the effect of social influence on individual performance found that individuals

performed faster in the together situation (working in the presence of others) than when alone on simple tasks. In solving arithmetic problems, his subjects solved more problems in the presence of others than when alone. In another chain-association experiment in which subjects, working either alone or in a group, wrote down a string of associations to several stimulus words. Allport concluded that more associates were produced in the group condition. This increment in the quantity of performance he interpreted as indicative of a "facilitating" effect of social situation on individual behavior. In Allport's own words, "The group stimulates productivity and takes (the subject) out of himself, directing his ideas towards outside objects, and to the actual presence of others. In the group, we become objective rather than egocentric, present rather than retrospective. Two processes account for the accelerating effect of the group upon the facilitation. The movements made by others performing the same task as ourselves serve as contributing stimuli. The second process is rivalry, its occurrence is in direct proportion to the competitive setting of the group occupation, though a certain degree to rivalry seems natural to all coactivity."

Travis and Pessin

The pattern of results that followed the classical experiments of Triplett and of Allport was not quite clear. At times the presence of others was reported as having beneficial effects, but in several experiments the result was an impairment of performance. For instance, Travis (1925) studied the performance of human subjects in a pursuit-rotor task, after undergoing extensive training, his subjects were given several trials in the presence of a small audience. Travis reports that even though the subject had reached asymptotic levels of performance at the end of training, their accuracy still improved when an audience was present. In a study of signal detection, Bergum and Lehr (1963) trained National Guardsmen on the following task: each subject was

confronted with a panel on which 20 lamps were arranged in a circle, a programmed device lit these lamps in succession, 12 revolutions per minute. At random intervals, averaging $2\frac{1}{2}$ minutes, one of the lights failed to go on. It was the National Guardsmen's task to detect these failures. When working alone these subject had an average accuracy of 45%. However, when warned that a Master Sargent or Lieutenant Colonel might observe their performance, they improved by 34%.

Not all research on facilitation reports increments in performance that can be accounted for by the presence of others. Pessin (1933) found that subjects required a significantly greater number of trials to learn a seven-item list of nonsense syllables and made a greater number of errors when working in the presence of an audience than working alone.

Dashiell

Dashiell (1930) was responsible for first advancing the theory of learned drives. It implies that audience effects will be obtained only when the spectators are signs for positive or negative outcomes. In one of his experiments, Dashiell compared four conditions of work: working alone, working in the presence of an audience, and two coaction conditions. In one of the coaction conditions the subjects were told not to compete as their results would never be compared with each other. The instructions in the other coaction condition encouraged rivalry by emphasizing that their scores would be compared at the end of the experiment. The results showed that performance in the non-rivalrous coaction condition was very much similar to that in alone condition. Relative to these conditions, the audience condition and the rivalrous coaction conditions facilitated speed of performing simple multiplications mixed relations, and serial associations.

Dashiell's work on social facilitation is summarized below:

- (1) He suggested using physiological measures such as GSR, respiration ratio etc. for observing evidence of emotional or other excitement in social facilitation research, or any other social study.
- (2) Dashiell realized that the physical presence of others is neither a necessary nor a sufficient condition for obtaining audience effects. According to him "The effect of speed when work is done in the presence of a co-working group over that done in isolation is not clearly indicated. What would seem to be important phase of a social situation are the presence of some of the competition, or else some of the being observed attitude."
- (3) Dashiell strongly stressed the role of individual differences, "consider that the human subjects to be used offer an unlimited variety of individual differences that must be taken into account (age, sex, schooling, occupation and other more external differences as well as differences in psychological traits):"
- (4) He argued that subject should be left to perform completely alone in experimental "alone" conditions. "It is not to be rashly assumed that the experimenter may not influence the subject as much as a spectator does." Up to date many studies still involve experimenter's presence in the "alone" condition (for example, McGhee, 1973; Martens, 1969).
- (5) According to him, coactors and audience may serve as perceptual distractors, differing little, at least in effect, from other sorts of distractors.
- (6) Dashiell suggested that social facilitation is not a unique effect but only a sub-class of stressors generally influencing behavior. "It is only a species coming under the genus of facilitation-by-incidental-stimuli, based no doubt upon earlier conditioning and learning."

(7) Lastly, he suggested that the nature of the audience and coactors should be taken into account also. He mentions factors such as the size of the group, the interpersonal relationships between the members, their prestige etc.

Disinterest with Social Facilitation

Collection of data on social facilitation proceeded at a brisk pace, peaking in the decade from 1925 to 1935. Then the interest in social facilitation started declining, because of an almost total lack of theory with which to explain the large mass of data that had accrued. By 1954, Kelly and Thibaut could conclude that "these phenomena [i.e., audience and coaction effects], which were once thought to be basic to the study of social psychology, do not enjoy much popularity with present investigators." Zajonc (1965) put matters more strongly:

"Until the late 1930's, interest in social facilitation was quite active, but with the outbreak of World War II it suddenly died. And it is truly regrettable that it died, because the basic questions about social facilitation — its dynamics and its causes — which are in effect the basic questions of social psychology, were never solved."

Zajonc's Drive Theory of Social Facilitation

Until 1965, many experiments had been conducted comparing performance alone to performance in the presence of others, but the results were contradictory. Some studies had found a facilitation of performance, with a person performing more quickly or more accurately when an audience was present compared with when a person performed alone, while other studies had found impairment of performance. In 1965, Zajonc published a well known theoretical paper which demonstrated that the previous studies could be organized if one assumed that the presence of others increased in the performer the level of

general drive. Arguing from the Hull-Spence position (Spence, 1956), higher drive should make dominant or well-learned responses more likely to be emitted, and newly acquired responses less likely. This analysis implies that any increase in drive from audience presence will lead to improved performance on simple or well-learned tasks, but to decrement in performance on complex or learning tasks. By interpreting social facilitation within a drive-theoretical framework, Zajonc not only resolved many of the problems inherent in earlier studies but also initiated years of theory and research that has greatly enlarged upon what had previously been known, Zajonc's empirical generalization contributed significantly to our understanding of the phenomenon: the effect of the presence of an audience could be predicted from a knowledge of the task characteristics. According to Geen and Gange (1977), the drive-theory analysis proposed by Zajonc provides the best overall theoretical framework for explaining social facilitation.

Studies that followed upon Zajonc's proposal gave further support to it. Zajonc and Sales (1966), for example, had subject learn nonsense words with different frequencies of exposure, arguing that the more frequently exposed would become better learned and thus dominant in the subject's response hierarchy. When given the opportunity later to emit the responses with no eliciting stimulus present, subjects gave more of the dominant responses when an audience was present than when alone, supporting the drive theory.

Early Tests of Drive Theory

Zajonc's Drive Theory states that the presence of organisms, as either coactors or a passive audience, produces an increment in general arousal which in turn serve as a drive that energizes dominant responses at the expense of subordinate ones in accordance with the Hull-Spence equation, $E = D \times H$. H symbolizes the strength of the habit governing response of an individual. Many of the directing influences on behavior have been

integrated under this term (Habit-strength). What the organism will do when confronted with a particular stimulus depends on what activities have been learned and what activities have been extinguished. D symbolizes general drive level of an individual. A wide variety of conditions, including appetitional needs such as hunger and thirst, and stimuli such as electric shock, cold temperatures, intense light, or loud noises, are assumed to contribute to the organism's general drive level. Also, some individuals are more emotionally responsive than others and therefore are capable of higher levels of general drive. E symbolizes excitatory potential. It is a multiplicative function of the strength of the habit governing the response (H) and general drive level (D).

By linking social facilitation effects (in the generic sense of the term as describing both increments and decrements in performance) to a multiplication of socially induced drive and habit strength, Zajonc was able to suggest a theoretical basis for Allport's (1924) observation that social facilitation seems to occur mainly when task demands are simple. In experiments in which the emission of dominant responses improves performance, the presence of others should be facilitating; in those in which emission of dominant responses would be "incorrect," the reverse of social facilitation should occur. According to Geen and Gange (1977), one of the strongest points of Zajonc's analysis is that it includes both increments and decrements in performance under a single set of theoretical postulates. It is noteworthy for another reason as well. By tying social facilitation to arousal, Zajonc separated the motivational effects of social settings from the non-motivational ones.

Tests of the Zajonc hypothesis required both a set of operations for inducing socially based arousal and the choice of dependent variables that

allowed dominant and subordinate responses to be distinguished. The latter requirement led to the employment of a number of experimental tasks, some of which involve the creation of habit-strength hierarchies and others of which assume that such hierarchies will be reflected in differential levels of performance and across different levels of a particular task. An example of the former was the experiment conducted by Zajonc and Sales (1966), and examples of the latter include studies by Cottrell Rittle, and Wack (1967) and Matlin and Zajonc (1968), all of which supported the drive-theoretical position. Cottrell, Rittle, and Wack (1967) proposed that socially induced drive would multiply with responses to paired-associate lists. By energizing dominant responses at the expense of subordinate ones, audience-produced drive would facilitate the learning of lists characterized by low responses competition, but would hinder the learning of those high in competition. Cottrell found that performance before an audience led to poor performance on high-competition lists, relative to that of subjects who worked alone.

Learning versus Performance

An important feature of Zajonc's drive-theoretical analysis of social facilitation is its distinction between learning and performance effects: A well-learned response will be performed at a higher rate in the presence of others because of response energization due to other's presence, but learning itself will be impeded in the social situation because the dominant responses energized are at the outset "incorrect". According to Green and Gange (1977), one implication of such a hypothesis is that the presence of others should be associated with poor performance on a new task but that on additional trials given after the task has been mastered, a crossover effect should occur and the social setting should lead to better performance than should isolation. Such findings were reported by Hunt and Hillery (1973). Female subjects worked at

a maze-learning task either alone or in coacting groups, with elimination of errors over trials used as the dependent variable. Early in the experiment it was found that individuals working alone were superior to those in groups in that fewer trials were required for elimination of the first half of all possible errors when the subject was isolated. However, elimination of the final half of the possible errors was found to proceed more rapidly among coacting subjects than among isolated ones.

The learning-performance distinction also helps to account for some of the findings that have been cited in the past as evidence against social facilitation, Gates and Allee (1933), for example reported that cockroaches performing in coaction do more poorly in maze running than roaches run individually. However, Gates and Allee used a relatively complex three-alley maze that required the insects to learn to overcome dominant tendencies to run straight forward, away from a light stimulus. Zajonc, Heingartner, and Herman (1969) showed that when roaches are allowed to run from light to a dark goal box along a straight alley they run more when a cross maze is used, in which the insect must learn to make a turn to reach the goal, those in pairs require more time to reach the goal than do individuals.

Another implication, according to Geen and Grange (1977), of the hypothesis concerning social facilitation of performance would be that the socially facilitating effects of the presence of others would vary with the degree of previous practice that the subjects had had at the task. Two experiments by Zentall and Levine have confirmed this expectation. In the first (Zentall and Levine, 1972), rats that had received no previous training in bar pressing were found to bar press for food less often in the presence of an equally inexperienced coactor than did rats performing alone. For such unpracticed animals the bar-pressing response was not dominant in the situation,

so that arousal produced by the coaction situation energized subordinate responses that competed with the bar press. In the second study (Levine and Zentall, 1974), rats were given training with the bar prior to the imposition of treatments, so that bar pressing would be more likely to be dominant than it had been in the previous experiment. Under these conditions social facilitation was found: The animals responded at a higher rate when accompanied by a partner than when alone.

Some studies involving human subjects have likewise shown that social facilitation varies according to previous practice or proficiency at the task (Kohfeld and Weitzel, 1969; Martens, 1969). In experiments with gymnasts, investigation (Paulas and Cornelius, 1974; Paulus, Shannon, Wilson and Boone, 1972), have found that among novice gymnasts who had previously performed alone, the introduction of an audience failed to influence performance relative to that of subjects for whom no audience was added; among experienced gymnasts, the change from the alone to the audience condition resulted in a decrement in performance. This situation is contrary to Zajonc's theory.

Some investigators have challenged Zajonc's argument that learning cannot be socially facilitated. In a series of studies of food imprinting, Meyer and Frank (Frank and Meyer, 1970, 1974; Meyer and Frank, 1970) found that newly hatched chicks acquired a discriminative response more readily when they were allowed unrestricted social and visual contact with each other than when they were separated by opaque barriers. The explanation given for these findings was that the presence of other chicks supplied each subject with cues that directed behavior toward the appropriate stimulus. Thorpe (1956), has called this process "local enhancement", and has discussed it in terms of a mediating attentional response produced by the behavior of the organism. A similar explanation may account for the finding of Warren, Byrant, Petty, and Byrne (1975) that goldfish acquired a conditioned avoidance response more readily

when run in groups varying in size from 2 to 15 than when run in isolation. Again, the presence of a large number of coactors would increase the probability of any one subject receiving information from the behavior of another organism. Lecker and Franks (1975), using rats as subjects, found that in groups of two to three subjects the presence of an animal experienced in the performance of a maze-running task had a beneficial effect on the rate of learning shown by the naive members.

Physiological Evidence

A number of investigators have tested the hypothesis that the presence of others creates arousal by measuring psychophysiological correlates of autonomic activity. The most commonly reported measure of such activity is palmar sweat (PS), which has been shown to be related generally to the presence of an audience during test situations. Martens (1969) found that PS was clearly greater among subjects who performed a complex motor task in view of a physically present audience than among subjects who worked alone. Cohen and Davis (1973) found no evidence of PS increases in subjects who performed before either a one-way mirror or a television camera but did report that observation via closed circuit television retarded PS decrease. Subjects who were observed by an audience behind a mirror showed substantial PS decrease over the experimental session. Dropleman and McNair (1971) found a gradual build up in PS level among subjects who first anticipated and then delivered a speech into a tape recorder before a single experimenter, but Karst and Most (1973) found a generally opposite result: subjects who gave a speech before two experimenters and a hidden audience showed less PS than did others who gave the speech before the experimenters alone. Karst and Most attributed most of this finding to the reactions of subjects who were low in previously assessed speech anxiety, suggesting that for such low-anxiety subjects the audience may have diverted attention from the situational stress

of public speaking. Subjects who were high in speech anxiety showed a slight PS increase during exposure to an audience. It would seem, therefore, that the evidence for increased PS during performance before a physically present audience is fairly strong, but that PS has not been shown to increase in the presence of a more remote audience that is not directly perceived by the subject.

Evidence from studies involving measures other than palmar sweating has also been generally favorable to an arousal hypothesis. Chapman (1973, 1974) has shown that subjects show higher levels of muscle action potential while listening to a recording in the presense of the experimenter than they did while listening alone, whether the experimenter is physically present or concealed behind a screen. Cardiac acceleration has been reported as a correlate of social arousal in both rats (Latane and Cappell, 1972) and human (Singerman, Borkovec, and Baron 1976). However, Henchy and Glass (1968), reported no changes in either heart rate nor skin conductance as a function of observation by an audience.

Further Evidence

Because the drive theory of social facilitation is usually referred to in the terminology of the Hull-Spence position, most behavioral tests of that theory have consisted of experiments in which socially induced drive is thought of as a response energizer. Drive has been shown to have other effects on behavior, however, and some data have been reported showing that these effects are produced by audiences. For example, several investigators (Mueller, 1976) have proposed that increased drive leads to a narrowing of the change of cues utilized in problem solving. Consistent with the assumption that an audience increases drive, one could predict that subjects working before an audience could, relative to subjects working alone show less decrement in

performance when cues irrelevant to the task are added but also less increment when relevant cues are provided. Data supporting this prediction have been reported by Bruning, Capage, Kozuh, Young, (1968) and by Geen (1976) who also showed that the cue utilization effect was stronger in subjects high in test anxiety than in those scoring low.

Another way in which drive influence behavior has been suggested by Walker and Tarte (1963), who showed that drive induction at the time of a study trial in a paired associate learning experiment led to improved long-term recall but poorer recall over intervals, compared with that shown by control subjects. Extending this experimental paradigm to the study of social facilitation Geen (1973,1974) showed that female subjects who were observed by the experimenter, demonstrated recall of a six-item paired-associate list that was superior to the recall of non-observed subjects when testing came 45 minutes after the study trial. However, when recall was tested 2 minutes after presentation of the list, subjects who had not been observed recalled more of the response terms. These results have been replicated with a male sample by Deffenbacher, Platt and Williams (1974), and later by Walker and Borden. (1976)

The theory is thus supported not only by studies involving the energization of dominant responses by social settings but also by experiments that predict other drive effects and by independent evidence of physiological processes correlated with drive. Geen and Gange (1977) concluded that "drive theory remains the most parsimonious for explaining both increments and decrements in performance in terms of a single set of constructs, and that evidence for the drive theory of social facilitation is impressive."

Cottrell's Evaluation-Apprehension Hypothesis

Zajonc (1965) used the term "mere presence" to distinguish the arousing effects of people is from directive social influences on behavior. This term

initiated the first major elaboration of the drive theory of social facilitation, summarized in Cottrell's (1972) allegation that "the presence of others is a learned source of drive, rather than a source of drive which is innate or wired into the organism, as is tacitly assumed in Zajonc's hypothesis". Cottrell (1968, 1972) did not challenge the view that socially induced arousal is a necessary variable but insisted that the immediate result of such a state is apprehension over being evaluated.

Cottrell, Wack, Sekerak, and Rittle (1968) conducted an experiment that provided a good test of the evaluation-apprehension hypothesis when subjects performed the pseudorecognition task in the presence of two observers they emitted more dominant responses than did subjects who performed alone. Subjects who performed the task in the company of two inattentive and blindfolded persons gave dominant responses at the same rate as did the isolated subjects. In another experiment, Sasfy and Okun (1974) compared performance of subjects working alone on a complex motor task with that of subjects working before observers said to be expert or inexperienced at the same task. They found a greater number of errors, suggesting relatively high drive, among subjects who were observed by experts who also received immediate information as to how well the subject was doing than among subjects who carried out the task alone. Observation by non-experts, or by experts who could not learn how well the subjects were performing, produced no more errors than were found among isolated subjects. Henchy and Gilan (1968), conducted an experiment which provided evidence for support of the notion that evaluation apprehension is the basis for social arousal.

In an experiment designed to provide a direct test of the evaluation-apprehension and mere-presence hypothesis, Cohen and Davis (1973) taught subjects to solve hidden-word problems in such a way that a problem solving set

was acquired. Stimulus items were then changed so that problems could be solved either by recourse to the acquired set or by adoption of a new and more efficient strategy. Persistence of the set-related solution procedure was taken as evidence of habitual responding, which should, according to drive theory, be enhanced by high arousal. Support for both the mere-presence and evaluation-apprehension ideas was found when subjects were observed by an audience through a one-way mirror. Emission of nonset solutions was inhibited in subjects who were observed but not evaluated, relative to nonobserved controls, and was further inhibited when the audience evaluated the subjects performance.

One additional study reported findings that tend to support the notion that evaluation-apprehension is a necessary condition for audience arousal. Paulus and Murdoch (1971) required subjects to write out their responses on the pseudorecognition task so that in one condition they could be observed by an audience ignorant of their performance. Evaluation apprehension was added as a variable through experimental instructions. In addition to reporting an overall effect of evaluation versus no evaluation on the emission of dominant responses and no similar effect for audience versus no audience, Paulus and Murdoch showed that subjects observed by a nonevaluating audience were somewhat less aroused than those working alone. A study has been reported in which Gore and Taylor (1973) claimed to support the notion of evaluation-apprehension against that of mere presence. In a pursuit motor task, subjects were asked to work both alone and under one of the combinations of observer status and expertness at the motor task. The authors found that arousal was higher in the audience condition than the alone, and higher in the presence of experts than non-experts.

Chapman (1973-1974), however, has conducted two studies that appeared to

support the mere presence hypothesis. In the first (1973), children listened to recorded humorous material either alone or in the presence of another child who in one condition could also hear the humorous passage and in another could not. Chapman reasoned that evaluation apprehension was not involved in the case of the child listening privately because the subject was at no time required to make a response that could be evaluated by the other child. The results showed that children who heard the humor in the presence of the other, in both the public and private auditions, laughed more than children who listened alone. In a subsequent experiment, Chapman (1974) showed that the adult subject who listened to a recorded story in the presence of an experimenter who could not hear the story showed higher levels of muscle action potential than did others who listened alone. Again, Chapman assumed that evaluation apprehension would not occur in such a passive situation. Thus, the results may indicate that the mere presence of the experimenter raised the subject's arousal level.

Criticisms of the Evaluation Apprehension Hypothesis

Zajonc has, on a number of empirical and theoretical grounds, criticized the hypothesis that the presence of others affects behavior solely through evaluation apprehension. He noted that "no evidence has been presented of subjects doing anything in audience settings instrumental to the enhancement of the evaluation that they would ostensibly receive." On the contrary, subjects in an experiment by Zajonc and Crandall (1972) traversed a stylus maze more rapidly in the presence of a spectator than did subject working alone, even though all subjects were instructed to run the maze carefully and to minimize errors. Zajonc also called attention to experiments in which lower species such as cockroaches and rats have shown social facilitation effects similar to those found in humans, in which evaluation apprehension is

inconceivable. Finally, he called attention to experiments in which socially facilitated dominant responses are personal choices that cannot be said as either good or bad and hence are irrelevant to evaluative judgments (e.g. Zajonc, Wolosin, and Loh, 1970).

In preference to the evaluation apprehension hypothesis, Zajonc has proposed that the presence of people augments a subject's drive level by creating uncertainty. "In the presence of other", he wrote, "Some degree of alertness or preparedness for the unexpected is generated... because one never knows, so to speak, what sort of responses—perhaps even novel and unique—might be required of the individual in the next few seconds." A related notion has been expressed by Sanders and Baron (1975), who showed that subjects who were distracted by a task-irrelevant stimulus showed behavior indicative of increased drive, compared with that of subjects who were not distracted. Thus, both Zajonc and Sanders and Barons points of view include a state of the person (either uncertainty or distractedness) that is drive inducing but does not involve evaluation apprehension.

Antecedents of Evaluation Apprehension

According to Cottrell (1972), the presence of others is a learned source of drive that acquires its arousal potential by serving as a stimulus for the anticipation of positive and negative outcomes. Cottrell has described the developmental history of the process: "Various aversive and gratifying events that serve to increase the general drive level occur through out the individual's life. Many of these events are spatially and temporally contiguous with the presence of others... with an increasing number of such encounters, the stimuli from the mere presence of others gradually lose their neutral quality and become, through classical conditioning, sufficient to increase the individual's drive level. Through experience the individual learns to anticipate

subsequent positive or negative outcomes whenever others are merely present and not overtly doing anything that has motivational significance for him. It is these anticipation's elicited by the presence of others, that increase the individual's drive level."

Cottrell defends his hypothesis against Zajonc's in the following words, "The assumption that the presence of others is a learned source of drive has greater explanatory power than the proposal of Zajonc that the presence of others is a source of drive regardless of learning history. Either view can account for evidence that audience and coaction condition's nonselectively energize task performance. The learned drive view, however, may be able to account for findings which the proposal of Zajonc cannot."

The learned drive view implies that audience effects will be obtained only when the spectators are signs for positive or negative outcomes and that audience and coaction effects are contingent upon the amount and kind of that individual's social experience. The individual must learn that other persons are signs for positive and negative outcomes. A study from the animal literature on the social facilitation of eating is relevant here. James and Gilbert (1955) have found that equally deprived animals eat more together than alone. This effect has been termed "The social facilitation of eating (Tolman)." Other investigators have also found that social facilitation of eating is contingent upon the amount of social experience the animal has had prior to testing (Harlow, 1932; James, 1960; Platt and James, 1966). A learned drive interpretation of these results, according to Cottrell, is that for the socially experienced animal, the sight of species-mates in the feeding situation elicits anticipations of the frustration of sequences of approaching and consuming food. The presence of coacting species-mates does not energize eating responses if the animal has not previously learned to

anticipate positive or negative outcomes when other animals are present.

Weiss and Miller's theory

Cottrell's point of view has been criticized by Weiss and Miller (1971), who have tried to limit evaluation apprehension to situations in which only anticipation of negative outcomes is involved. Their reasoning is based on the assumption (Brown and Farber, 1968) that only aversive primary drive serve as the basis for learned drives: "Drive induced by audience observation is not as appetitive drive like hunger or thirst, but an aversive one like frustration or anxiety... Since the evidence is abundant that learned drives are based on primary drives like pain...and frustration... and cannot be based on appetitive drives." Weiss and Miller therefore concluded that apprehension over evaluation experienced in audience settings is not conditioned incentive but learned fear, anxiety, anticipatory frustration, or some such negative emotional condition.

In an experiment designed to test the possibility of incentive motivation in social facilitation, Good (1973) informed some subjects that their performance on a word association task would be evaluated immediately by the experimenter and informed others that the evaluation would be delayed. In addition, half the subjects were led to believe that they would do well on the task, and half that they would do poorly. Social facilitation of performance was inferred from response speed and commonality of associations. Good found that subjects who were led to believe that their performance would be judged immediately showed effects of social facilitation when they were also told they would do well at the task but not when they were informed that they would do poorly. This finding suggests that anticipation of a positive outcome may produce evaluation apprehension and subsequent drive increase. However, it fails to provide evidence that expectation of a negative outcome have the same influence on behavior. Good demonstrated that expectancy of success makes

subjects more apprehensive over evaluation than does expectancy of failure, because as pointed out by Good, the possibility of failure was always present, despite the experimenter's instructions to the contrary. In contrast, subjects who had been told to expect failure may have taken a more resigned and fatalistic attitude toward the impending evaluation.

The results of other studies tend to support the Weiss and Miller contention that socially induced drive is based on negative expectancies. In a study involving children, Clark and Fouts (1973) found that response intensity on a motor task was lower when the subject performed in the presence of an adult with whom he had a previous positive experience than in the presence of an adult with whom the prior experience had been either neutral or negative. Children who performed alone showed no such response differences as a function of the nature of the previous social encounter.

Geen's theory of negative emotion and anxiety

Geen (1977), conducted experiments on the basis of which he concluded that evaluation apprehension in audience settings is due to a negative emotional state associated with fear of failure or embarrassment. In one of his experiments (1976) subjects were evaluated by a potentially helpful experimenter showed better learning of a list characterized by high competition than did those who were merely evaluated, but poorer learning of a list that was low in competition. Geen (1976, 1977) also found that the presence of an audience produced performance decrements on a difficult task to a greater degree among subjects high in test anxiety than among those low in this variable. In addition, the provision of a promise of future help from the audience improved performance for the highly test anxious, relative to performance of those who were evaluated without such a promise, but had no comparable effect on the less test anxious.

Some investigators (e.g. Kiesler, 1966; Shaver and Liebling, 1976; Epley, 1974) have noted that the drive theory of social facilitation appears to conflict with evidence that under certain conditions the presence of organisms leads to reduced anxiety (Schachter, 1969, Wrightsman, 1960). Several explanations have been offered for this paradox in the data. Kiesler (1966) found that when the subject was originally in a state of high drive produced by fear, the introduction of a companion led to behavior indicative of drive, but that when the subject was originally in a relatively low state of fear, behavior in the presence of the companions suggested increased arousal. Epley (1974) has also advanced the idea that what appears to be anxiety reduction in social settings may simply be the result of distraction by the organism which interferes with attention to the fear-provoking stimulus. The anxiety-reducing effects of the presence of others, according to Geen and Gange (1977), may also be accounted for in terms of the blocking of fear by the elicitation of competing emotional responses. Decreased arousal may occur during stressful situations as a result of the presence of others because the persons present are conditioned stimuli for emotions that are incompatible with fear, anxiety, anticipatory frustration, or other such negative states. A study by Davidson and Kelly (1973) supports this point of view.

Nondrive Approaches to Social Facilitation

As an alternative to the drive-theoretical explanation's of social facilitation, Duval and Wicklund (1972) have offered an interpretation based on their theory of objective self-awareness, defined as a state of the person in which attention is focused entirely inward upon the self. The result of such inward focusing is most often the realization of a discrepancy between the ideal and the actual self (Wicklund, 1975); the objectively self-aware person

is likely, for example, to be dissatisfied with his level of performance on a task because he perceives that he could, ideally, be doing better. Applied to social facilitation, the theory would predict that the presence of coactors or an audience, by enhancing objective self-awareness in the performer, would stimulate a motivational increment that would result in improved performance.

Wicklund and Duval (1972) did not study audience or coaction effects directly but reasoned instead that the presence of others would influence performance in the same way as the subject's image of himself in a mirror, also a stimulus for objective self-awareness. Their data showed that observation of oneself in a mirror was accompanied by performance of a motor task superior to that of subjects who worked without a mirror. These findings were expanded upon by Liebling and Shaver (1973), who found that the addition of high levels of ego-involvement, prevented the incremental effect shown by Wicklund and Duval. Subjects who had been given ego-involving instructions were found to perform more poorly on a copying task before a mirror than they did with no mirror present. Only under relatively neutral instructions was the inclusion of the mirror found to be associated with improved performance. Liebling and Shaver proposed that objective self-awareness induced by the mirror caused ego-involved subjects to become so self-centered that they become inattentive to task demands.

Liebling, Seiler, and Shaver (1975) carried out a study in which smokers engaged in cigarette smoking either with or without a mirror present. The investigators assumed that smoking was not a desirable behavior to the subjects, that is, not consistent with the ideal self, so that increased self-awareness should inhibit smoking. To the contrary, it was found that subjects engaged in more smoking behaviors (in terms of puffing, time holding a cigarette, and ashflicking) before a mirror than when the mirror was absent. These findings

suggest that observation of oneself in a mirror may be drive inducing, with the end result being energization of dominant smoking responses. Pennebaker and Lightner (1980) have found that individuals respond to competing attentional demands by shifting attention to one source at the expense of another. They found that the presence of external cues can cause a shift in attention away from internal states (such as fatigue) and enhance a simple task like running.

Social Facilitation in Coaction

Theoretical analyses of social facilitation in coaction have not been as common as discussions of audience effects, even though drive theory accounts for coaction effects equally well. Zajonc (1965) made no distinction between arousal produced by the audience setting and that arising in coaction, attributing arousal in both cases to the mere presence of others. Viewed in context of the evaluation apprehension theory, it is necessary to specify the antecedents of such a negative emotional state in the coaction setting. According to Geen and Gange (1977), the most obvious one is a perception of competition on the subject's part, with the coactors regarded either explicitly or implicitly as rivals for available social rewards such as praise or the esteem of the experimenter. According to this notion, the perception of oneself as being in competition with others produces fear of defeat and failure. It is this fear that produces increased drive and thereby forms the counterpart to fear of embarrassment over failure in the audience setting.

Mere presence versus Competition

The results of several studies tend to support the idea that coaction increased drive by enhancing perceptions of competition. Martens and Landers (1969) tested muscle endurance in young males who were run either alone, in

dyads, or in groups of four. Subjects run in groups of four showed significantly greater endurance than those run alone or in pairs. More direct empirical support of the notion that coaction effects are mediated by feelings of competition have been reported by Carment and his associates. Carment (1970) ran subjects on a simple motor task, with half performing alone and half accompanied by a coactor. In addition, half of all subjects were given instructions to increase competitive motivation and half were not. The two variables were found to interact, such that subjects operating under competitive instructions in the presence of a coactor made a larger number of responses than those in the noncompetitive-coaction conditions. Subjects performing alone made fewer responses under competitive conditions than under noncompetitive ones. In another study, Carment and Latchford (1970) required subjects to perform the motor task alone or in coaction, and in addition, to do so either in the presence or absence of the experimenter. Social facilitation in the form of a high response rate, was found in the coaction setting only when the experimenter was present; when the experimenter was absent, isolated subject performed slightly more rapidly than did coactors. The authors argued that the presence of the experimenter, a highly visible source of social reinforcement, produced feelings of rivalry among coactors that were not otherwise experienced.

Wanckel (1972) attempted to assess the effects of rivalry on reaction time independently of coaction by means of an experiment that included three variables: audience, coaction and rivalry. In all groups in which instructions specifically produced feeling of rivalry between the subject and another person, reaction time was shorter than in conditions not stressing competition. An important finding for the drive theory of social facilitation was that rivalry was the only one of three variables associated with a sustained high

level of heart rate over the course of the experiment. Wankel concluded that "Coaction cannot affect performance in a manner distinct from rivalry; however, it may help to intensify feelings of rivalry and thus may indirectly influence performance."

Several investigators have attempted to distinguish between mere coaction in which coactors have no knowledge of either their own or their partner's performance, and the situation in which information on performance is provided. Klinger (1969) reported data showing that subjects who received feedback of their own and a coactors errors on a signal detection task made fewer errors in coaction than alone, whereas subjects who had visual contact with their partner but no information concerning errors performed at a level no better than that attained in isolation. In another experiment, Martens and Landers (1972) found that subjects who received feedback of results and who also maintained visual contact with the coactor showed poorer performance on a difficult motor task than subjects who received neither knowledge of results nor visual contact. Subjects who were in visual contact without knowing how they or the coactor were performing were no worse than those who received feedback of results only, indicating that visual contact may be an important variable in social facilitation under coaction conditions.

Distraction-conflict Theory

The distraction-conflict theory proposed by Sanders, Barons and Moore (1977) attempts to explain why the physical presence of others produces drive like effects on behavior, i.e. facilitation of dominant responses and impairment of subordinate responses. According to this theory the drive effects in social facilitation research are caused by species mates distracting the organism from ongoing task activity thereby creating conflict between attending

to the task and attending to the distractor. By distraction it is meant any stimuli or response requirement that is irrelevant to the subject's primary task. This distraction may be social or nonsocial, an external stimulus or an internal thought, imposed by a second party or created by the subject himself. "conflict" means a desire or obligation to make two mutually exclusive responses either simultaneously or with inadequate times for both. This type of "conflict" has been stated to be a source of drive by a number of writers (e.g. Kimble, 1961). In addition, nonsocial distraction has increased drive effects as measured by several different indicators e.g., Pessin (1933) found a series of light and buzzers produced drive effects. Similarly, Sanders and Baron (1975) found that inducing subjects to shift their attention while working on copying tasks, produced drive effects. Several other studies show that a variety of auditory distractions either enhance performance on simple tasks (e.g., O'Malley and Poplawsky, 1971) or impair performance on complex tasks (e.g., Glass and Singer, 1972; Woodhead, 1965).

Distraction-conflict theory assumes that when simple tasks are involved, the facilitating effects of drive have outweighed any disruptive effects of the distraction, although the authors concede that some distractions are so disruptive that they impair both simple and complex performances. However, studies make it apparent that many distractors produce effects associated with elevated drive. Several studies (e.g., Helper, 1957) have shown that physiological responses associated with drive and that these responses do not occur when task activity is not required.

Sanders, Baron and Moore (1977) explain why the presence of other people should cause distraction: "We feel that while any type of distraction presented during a task might give rise to drive effects, in most social facilitation/impairment research, other people distract the subject in large part because

the subject is interested in obtaining social comparison information regarding the adequacy of his or her performance. This could involve comparing one's own performance to that of coactors or it could involve comparing one's own opinion of one's performance to the opinion held by an audience. In both cases, comparison could involve nonverbal behaviors such as examination of facial expressions, etc..."

Sanders, Baron and Moore state that although it seems clear that distraction in task settings can produce drive effect, it has yet to be demonstrated (a) that audience and/or are distracting when social facilitation/impairment effects occur or (b) that a desire for social comparison is a major reason why subjects are distracted by coactors and audiences in social facilitation/impairment studies.

The Attentional Conflict Theory

In a recent study Sanders (1980), attempted to examine the status of the three major explanations for socially facilitated behavior, and suggested a integration of the three approaches. According to him, weaknesses exist in the propositions that the mere presence of others elicits a reflexive alertness or preparedness response (Mere Presence) and that the presence of others increases drive through classically conditioned anticipation's of positive and negative outcomes (Learned Drive). He, however, defended the Distraction-conflict hypothesis.

Integration of these theories is proposed to be accomplished by modifying the "Mere Presence" and "Learned Drive" positions. Sanders explains "With respect to the MP (Mere Presence) position, the proposed modification involves changing the assumption of a drive-inducing alertness reflex to that of a drive-neutral orienting reflex. This modified MP position states that the presence of others is always potentially significant, and thus attracts

attention. Yet the orienting reflex does not in itself increase drive, Instead, it provides the basis for continuing attention when the orientation suggests the availability of meaningful information. If attention is continued, and if it conflicts with task activity, then social facilitation results. If the orientation suggests that no meaningful information is available, attention is discontinued, and no conflict or increased drive results. With respect to the LD (Learned Drive), position, the proposed modification involves changing the assumption of a drive-inducing anticipation of rewards and punishments to a drive-neutral learned motivation for attending to others. This modified LD position states that due to a social conditioning history, contexts involving evaluation or competition suggest that meaningful information concerning the quality and success of one's activities can be obtained from attending to others. Yet the evaluative or competitive cues do not in themselves increase drive. Instead, they direct attention toward others and away from the task. If others are not actually present, or if other contextual cues suggest that no meaningful information can be obtained from them no attentional conflict and no increase in drive results." In the proposed integration, then, the MP and LD positions serve to specify two antecedents for the arousal of attentional conflict, which in turn leads to social facilitation in the manner specified by the Distraction-conflict position.

Social Facilitation of Animal Behavior and Implications For Human Behavior

Man has long noted and put to his use many seemingly basic patterns of behavior: the schooling behavior of fish, the added impetus of a strong competitor in a race, the deterrent effects upon others of punishment, and the developments of attitudes and skills through the example of others.

The increase of research in these areas has resulted in experimentations

in a number of different, but possibly related areas under an even greater number of terms: social facilitation, imitative behavior, observational learning, and many more. Subjects in these studies have been humans as well as animals.

A lot of experimentation has been done in the past with animals, particularly concerning imitative behavior. It is the sort of behavior commonly seen in flocks of birds, schools of fish, herds of ungulates, and troops of primates. It has been defined as the behavior in which two or more individuals do the same thing at the same time, with some degree of mutual stimulation (Scott, 1958). Synonyms are "contagious behavior", "infectious behavior", and various special terms applied to particular kinds of animals, such as "flocking" in birds and "schooling" in fishes. Imitative behavior is defined by Walters as being that behavior of the subject which approximates the behavior of the model, but which is not displayed by control subjects who lack the model.

In his 1927 book, "Social life in the Animal World," Alverdes recorded the following observations:

"Some actions are performed with much greater energy when they are carried out by a group of individuals; this is notoriously true of singing and dancing, both among men and beasts. It is also true of gregarious animals when they are feeding: farmers know that some beasts, e.g., horses and pigs, especially when young, eat more if fed with their companions. I have heard a human mother say that it was better for her children to have a table-companion as otherwise they ate too little. In all these cases we observe the working of that instinct which lies at the root of the pleasure banqueting and other social entertainments."

Observation and reports indicate that most people obtain a positive pleasure from coordinated group activities, such as group singing, playing in

orchestras, group dancing, team sports, etc. It is also probably no coincidence that so much of routine human activity occurs in groups, from children's learning in school to adults working in factories.

According to Milton (1967), imitative behavior, observational learning could best be regarded as sub-classes of social facilitation. If social facilitation is the generic concept, then principles which explain facilitation effects should apply to the subordinate concepts as well. However, principles specific to the latter concept might not generalize to social facilitation. It could be inferred from this that experiments and data derived from animal studies could not be applied towards humans.

In his article, "Social facilitation and imitative behavior," Scott made the following observations:

"There is considerable evidence that an emotional and motivational system connected with imitative behavior exists in human being as well as in dogs. According to Bayley (1932), human infants begin crying as a result of being brought into a strange situation at about the age of two months, and this is increased by the absence of the mother. By six or seven months most babies show an active fear of strangers, which again is particularly evident in the mothers absence. Like the puppy, the human infant should soon learn that unpleasant emotions are associated with unfamiliar objects and people, and that these emotions are relieved by returning to familiar places and individuals. As he grows older and more mobile he should also learn that the way to avoid unpleasant emotional states is to stay with the group and do what they do. Correlated with this, in the older and cruder methods of child discipline, isolation was advocated as a very effective form of punishment, and in prisons the ultimate punishment is solitary confinement."

Scott concludes that a major part of the social facilitation that takes

place in practical work situations among human beings is due to the imitative motivational system. He further states that the existence of this motivational system has broad implications for the understanding and organization of human group activities.

Summary of Literature Survey

A review of the literature in social facilitation led to the following observations:

1. Despite at least one attempt to account for social facilitation in non-drive terms (the notion of self-awareness proposed by Duval and Wicklund, 1972), drive theory remains the most effective for explaining both increments and decrements in performance in terms of a single set of constructs.
2. There is strong evidence that evaluation apprehension is an immediate antecedent of socially induced drive, however, there is also evidence to show that audience settings may increase drive without producing such learned fear.
3. When evaluation apprehension does occur in social settings, it arises primarily from the subjects anticipation of negative, not positive, outcomes.
4. There is considerable evidence to show that task-irrelevant stimuli that interfere with attention to the task can produce drivelike effects.

Finally, the review can be summed up in the words of Sanders," Integration of the social facilitation literature is by no means an incomparably simple endeavor, given that the diversity and superficial contradictions in the data pool rival those of any body of social psychological inquiry."

PROBLEM

Zajonc's work has stimulated renewed interest in the area of social facilitation by explaining facilitating and interfering effects of social stimulation as a general drive phenomenon. He made no distinction between arousal produced by an audience setting and that arising in coaction, attributing arousal in both cases to the mere presence of others. Cottrell finds support for this interpretation but he also finds support for an alternative evaluation-apprehension explanation which leads him to suggest a modification of the Zajonc's hypothesis. Cottrell suggested that the presence of others in the audience paradigm will enhance the emission of dominant responses only when the individual perceives the spectator as assuming the role of an evaluator. The purpose of this study is to test the theories put forward by Zajonc and Cottrell.

Several studies have been undertaken to distinguish between the mere presence and Evaluation-apprehension hypothesis, but not all have been adequately designed to permit firm conclusions. A properly designed study would require three conditions: one in which the subject worked alone, one in which he performed before an audience that was physically present but not regarded as a source of evaluation (Mere-presence condition), and one in which the audience was both present and evaluative (Evaluation condition). The Mere-presence hypothesis would predict higher arousal in both the Evaluation and Mere-presence conditions than in the alone condition, the evaluation-apprehension hypothesis would predict greater arousal only when the audience served a judgment function.

The following hypotheses were tested:

1. According to Zajonc social facilitation effects are induced in subjects performing either in the "mere presence" of others or in the presence of

an evaluative audience. This performance is facilitated if the task is simple, and impaired if the task is complex.

2. According to Cottrell social facilitation effects are obtained only when the present other assumes the role of an evaluative audience. Performance of subjects is facilitated on simple tasks and impaired if the task is complex.

METHOD

The subjects were 21 students enrolled in an undergraduate management course in the Industrial Engineering Department at Kansas State University. For participation in the study, the students, all volunteers received extra credit points counting toward their final grade in the course. There were 12 males and nine females of ages between 19 and 24 years.

Tasks

The task performed by the subjects was a jigsaw puzzle assembly task. Four different puzzles were provided. One of the puzzles was relatively difficult. It consisted of 42 small size pieces. The other three puzzles were relatively simple. Each of them consisted of 24 large size pieces. The puzzles were selected such that the total time to assemble the three simple puzzles was about the same as the time taken to assemble the complex puzzle.

Procedure

All subjects were tested in a room (15' x 20') furnished with one large table at which the subject worked. This room was used as a visual simulation laboratory. It had in addition to the table and chairs a lighting booth, a model of a car, and filing cabinets.

Subjects were randomly assigned to one of the three basic conditions: Alone, Mere-presence, Evaluative audience. Each subject was greeted by the experimenter, brought to the experimental room and seated at one end of the table. The experimenter began the instruction with a very brief statement about puzzles. This was followed by an explanation of the task. In addition to this each subject was given a written instruction. After the subject had read the instructions, he was questioned by the experimenter to find out if he had properly understood the procedure. At this time the subject was asked to sign the "Informed consent" sheet (see Appendix A). The experimenter left the room

after this.

Alone condition

In this condition a written instruction, as shown in Figure 1, was shown to each of the subjects. No one, including, the experimenter was present in the room. After completing each puzzle he was to inform the experimenter standing outside so that he could come in and record his time.

Mere presence condition

In this condition a confederate sat in front of the subject performing a pegboard assembly task. Each subject was given instructions (Figure 2) that the room was being used for another experiment, and the person present would not attempt to communicate with them or disturb them in any manner. The experimenter left the room after this.

Evaluative audience

In this condition, a confederate was presented as an expert in puzzles, and immediately after the experimenter gave each subject the written instruction's (Figure 3). While in the room, the confederate sat at the opposite end of the table about four to five feet from the subjects facing in a direction parallel to the subjects direct line of sight. Thus the confederate was in a position to make direct eye contact. He was asked not to initiate any conversation, and to politely decline answering any of the subjects questions.

INSTRUCTIONS

I am trying to find out how well people solve jigsaw puzzles. The goal of the task is to complete the puzzle as quickly as possible by systematically organizing your movements and effectively utilizing the cues provided by the puzzles.

You are provided with four different puzzles. After you complete each puzzle, please stop the stopwatch and inform the experimenter so that he notes down your time.

There will be no discomfort or risk in this experiment. However, you are free to stop your participation at any time. Naturally I would prefer that you continue until the end so that I can get all of the needed data. If you have any questions now or later feel free to ask.

Thank you very much for being a subject for this study.

FIGURE 1. Instructions for Alone Condition

INSTRUCTIONS

I am trying to find out how well people solve jigsaw puzzles. The goal of the task is to complete the puzzle as quickly as possible by systematically organizing your movements and effectively utilizing the cues provided by the puzzles.

You are provided with four different puzzles. After you complete each puzzle, please stop the stopwatch and inform the experimenter so that he notes down your time.

Before you start the experiment, I should tell you that at this moment this room is being used for another experiment. The other person present in the room is a subject for that experiment. Of course, he won't disturb you in any way.

There will be no discomfort or risk in this experiment. However, you are free to stop your participation at any time. Naturally I would prefer that you continue until the end so that I can get all of the needed data. If you have any questions, now or later feel free to ask.

Thank you very much for being a subject for this study.

FIGURE 2. Instructions for Mere Presence Condition

INSTRUCTIONS

I am trying to find out how well people solve jigsaw puzzles. The goal of the task is to complete the puzzle as quickly as possible by systematically organizing your movements and effectively utilizing the cues provided by the puzzles.

You are provided with four different puzzles. After you complete each puzzle, please stop the stopwatch and inform the experimenter so that he notes down your time.

Before you start the experiment, I should tell you that a graduate student of the Industrial Engineering Department here, will be sitting in our experimental today. He is currently researching in this area. He will be making systematic observations of you during the experiment, and will evaluate your performance. Of course, he won't interrupt or disturb you in any way.

There will be no discomfort or risk in this experiment. However, you are free to stop your participation at any time. Naturally, I would prefer that you continue until the end so that I can get all of the needed data. If you have any questions now or later feel free to ask.

FIGURE 3. Instructions for Evaluation Condition

RESULTS

The times taken for the subjects to assemble the puzzles for each condition, along with the mean times for each type of puzzle are given in Table 1. An analysis of variance was carried out on the total time taken to assemble the simple puzzles and the time for the complex puzzle. The treatments, subjects, difficulty of the puzzles and interaction between the difficulty and treatments were included as independent variables (Table 2). The hypotheses were tested at a 5% significance level. The results of the analysis indicate that there was a significant difference among the Alone, Mere presence and Evaluation conditions. Further analysis was carried out using Duncan's multiple range test (Table 3). The following results were found:

1. There was a significant difference between the Mere-presence and Alone conditions.
2. There was no significant difference between the Evaluation and Alone conditions.
3. There was no significant difference between the Evaluation and Mere-presence conditions.

Duncan's multiple range test was carried out on the total time taken to assemble the simple puzzles and time taken to assemble the complex puzzles (Table 4). No statistical significance was indicated as expected.

TABLE 1

Times for assembly of the puzzles in minutes

		SIMPLE PUZZLE			COMPLEX PUZZLE	
SUBJECTS		1	2	3	TOTAL TIME FOR SIMPLE PUZZLE	4
ALONE	1	7	5.8	6	18.8	13
	2	5.3	6.9	5.14	17.34	22.10
	3	6.2	4.5	4.50	15.20	14.24
	4	6.92	4.74	5.72	17.38	18.38
	5	4.40	5.54	4.16	14.10	11.04
	6	4.10	4.24	4.30	12.64	18.04
	7	7.22	8.52	6.20	21.94	24.66
MERE PRESENCE	8	5.82	4.40	5.02	15.24	20.24
	9	5.84	6.60	6.80	19.24	21.40
	10	6.38	6.56	6.30	19.24	22.30
	11	7.00	10.30	7.00	24.30	31.00
	12	4.86	4.08	6.00	14.94	18.00
	13	9.40	8.94	11.42	29.76	17.50
	14	5.00	5.20	5.02	15.22	15.14
EVALUATION	15	6.54	5.94	7.48	19.96	30.34
	16	5.22	5.88	5.62	16.72	14.92
	17	5.68	4.22	5.64	15.54	16.22
	18	7.60	4.94	4.56	17.10	25.60
	19	8.00	6.00	6.40	20.40	17.58
	20	5.56	5.44	6.04	17.04	23.08
	21	6.00	7.02	7.04	20.06	20.78

CONDITION	MEAN TIME IN MINUTES FOR ASSEMBLY OF PUZZLES		
	SIMPLE	COMPLEX	
ALONE	16.771	17.494	17.133
MERE-PRESENCE	19.70	20.797	20.251
EVALUATION	18.117	21.217	19.667
	18.198	19.836	19.017

TABLE 2

Analysis of variance for condition differences

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR>F
MODEL	25	696.83005714	17.87320229	2.68	0.0222
ERROR	16	166.30960000	10.39435000		ROOT MSE
CORRECTED TOTAL	41	863.13965713			3.22402698

SOURCE	D.F.	ANOVA SS	F VALUE	PR>F
TRT	2	76.95091429	3.70	0.0477
SUB	20	580.24605714	2.79	0.0209
TASK	1	28.17523810	2.71	0.1192
TRT*TASK	2	11.45784762	0.55	0.5868

TABLE 3

Duncan's multiple range test for condition difference

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT

ALPHA = 0.05 DF = 16 MSE = 10.3943

		MEAN (MINUTES)	N	TRT
	A	20.251	14	Mere presence
	A			
B	A	19.667	14	Evaluation
B				
B		17.133	14	Alone

TABLE 4

Means for total time taken to assemble simple and complex puzzles under the three conditions

MEAN	N	PUZZLE
19.836 min.	21	COMPLEX
18.198 min.	21	SIMPLE

DISCUSSION

The results of the study show a significant difference between the Mere presence and Alone conditions only. No significant difference was found among the Mere presence and Evaluation conditions, and also no significant differences were found among the Evaluation and Alone conditions. No interaction was indicated for the task complexity (Table 3). Therefore, the present study fails to provide support for Zajonc or Cottrell's theories of social facilitation. However, as the mean time for assembling the puzzles was highest in the case of the Mere presence condition compared to the Alone and Evaluation conditions (Table 5). This would suggest support for Zajonc's contention of impairment of performance, if it is assumed that the simple puzzles were actually also complex, since Zajonc had predicted an impairment of performance on complex tasks only.

There was no evidence to support Cottrell's theory of social facilitation. Although the mean time for assembling the puzzles in the presence of an Evaluative audience was higher than in the Alone condition, it was not higher than in the Mere presence condition (Table 5). This despite the fact that the task employed in this study was one in which the performance could be evaluated by the subjects as well as by anyone able to observe the subjects, and also the presentation of a confederate to the subjects both verbally and by means of a written instruction (Figure 3), as an expert evaluating his performance. It is also possible that the subjects did not believe that the confederate was really an expert evaluating his performance.

As noted no significant effect was found for the interaction between the difficulty of puzzles and the treatments (Table 2). This suggests that any changes in performance of the subjects could be attributed to the social treatments only and not to the type of puzzle. As no measure was employed of determining the complexity of the puzzles, it is quite possible that the simple

puzzles were complex also.

There are numerous studies in which the presence of others failed to produce social facilitation effects. No Mere presence effects were reported in some experiments designed to test this phenomena (Carment and Latchford, 1970; Hartensand and Landers, 1969; Sasfy and Okun, 1974; Markus, 1978). Also some studies have failed to find evidence of social facilitation in the Evaluation condition (Carment, 1970; Cohen and Davis, 1973; Van Tuinen and McNeel, 1975).

Future research needs to be directed towards the subjects perception of the task demands, individual differences, nature of task and a criterion for distinction between simple and complex tasks.

The study of social facilitation is useful to the understanding of human behavior in any situation in which people work in the presence of others. In a typical industrial situation in which workers perform some activities on a conveyor line in the presence of coworkers and/or supervisor. In such a situation it may be of interest to determine how each worker perceives the supervisor and what influence his presence has on the workers performance. Similarly social facilitation studies may need to be conducted to find the effect on performance of workers in a coaction situation. Another implication of social facilitation studies could be seen in an office environment, where many people work in the company of others. Viewed from the context of the drive theories it would be advantageous to have people work in the presence of others on tasks of routine office procedures e.g. filing, typing, maintenance of records and inventories etc. This could be accomplished by keeping people together in a big workspace, not separated by any partitions. On the other hand people who do work requiring intense mental activity and decision making e.g. researchers, management people should be kept in separate rooms. By

understanding how the various variables of social facilitation effect a person's performance it might be possible to devise a work situation in which workers perform at an optimum or near optimum level.

TABLE 5

Mean times for assembly of puzzles in minutes

CONDITION	MEAN TIME IN MINUTES FOR ASSEMBLY OF PUZZLES		
	SIMPLE	COMPLEX	
Alone	16.8	17.5	17.1
Mere Presence	19.7	20.8	20.2
Evaluation	18.2	21.2	19.6
	18.2	19.8	19.0

REFERENCES

- Blank, T. O., Staff, I., and Shaver, P. Social facilitations of word associations: Further questions. Journal of Personality and Social Psychology, 1976, 34, 725-733.
- Cohen, J. L. Social facilitation: Audience versus Evaluation apprehension effects. Motivation and Emotion, 1980, 4, 21-33.
- Green, R. G. Effects of being observed on persistence at an insoluble task. British Journal of Social Psychology, 1981, 20, 211-216.
- Gore, W. V., and Taylor, D. A. The nature of the audience as it effects social imitation. Representative Research on Social Psychology, 1973, 4, 18-27.
- Guerin, B., and Innes, J. M. Social facilitation and Social Monitoring: A new look at Zajonc's mere presence hypothesis. British Journal of Social Psychology, 1982, 21, F-18.
- Innes, J. M. and Young, R. F. The effect of presence of an audience, Evaluation apprehension and objective self-awareness on learning. Journal of Experimental Social Psychology, 1975, 11, 35-42.
- Kenneth, S. Behavior theory and conditioning. New Haven: Yale University Press, 1956.
- Kumar, P., and Kriplani, N. D. A study of differential effects of social situations on individual behavior. Indian Journal of Experimental Psychology, 1972, 6, 78-80.
- Kushnir, T. The importance of familiarization with the history of experimental social psychology: A tribute to J. F. Dashiell. European Journal of Social Psychology, 1978, 8, 407-411.
- Liebling, B. A., and Shavers, P. Social facilitation and social comparison processes. Proceedings of the 81st Annual Convention of the American Psychological Association, 1973, 8, 327-328.
- Markus H. The effect of mere presence on social facilitation: An unobtrusive test. Journal of Experimental Social Psychology, 1978, 14, 389-397.
- Manstead, A.S.R., and Semin, G. R. Social facilitation effects: Mere enhancement of dominant responses. British Journal of Social and Clinical Psychology, 1980, 19, 119-136.
- McClintock, C. G. Experimental social psychology. New York: Holt, Rinehart and Winston, 1972.
- Rittle, R. H., and Bernard, N. Enhancement of response rate by the mere physical presence of the experimenter. Personality and Social Psychology Bulletin, 1977, 3, 127-130.

- Sanders, G. S., and Baron, R. S., and Moore, D. L. Distraction and social comparison as mediators of social facilitation effects. Journal of Experimental Social Psychology, 1978, 14, 291-303.
- Sanders, G. S. Driven by distraction: An integrative review of social facilitation theory and research. Journal of Experimental Social Psychology, 1981, 17, 227-251.
- Sasfy, J., and Okun, M. Form of evaluation and audience expertness: Determinants of audience effects. Journal of Experimental Social Psychology, 1974, 10, 461-467.
- Strube, M. J., Miles, M.E., and Finch, W. H. The social facilitation of a simple task: Field tests of alternative explanations. Personality and Social Psychology Bulletin, 1981, 7, 701-707.
- Van Tuinen, M., and McNeill, S.P. A test of the social facilitation theories of Cottrell and Zajonc in a coercion situation. Personality and Social Psychology Bulletin, 1975, 1, 604-607.
- Zajonc, R. B. Social facilitation. Science, 1965, 149, 269-274.
- Zajonc, R. B. Social psychology: An experimental approach. Belmont, California: Wadsworth, 1966.
- Zajonc, R. B., Heingartner, A., and Herman, E. M. Social enhancement and impairment of performance in the cockroach. Journal of Personality and Social Psychology, 1969, 13, 92.
- Zajonc, R. B., and Sales, S. M. Social facilitation of dominant and subordinate responses. Journal of experimental and Social Psychology, 1966, 2, 160-168.

APPENDIX

Informed Consent Statement

Having read the instructions, I hereby freely agree to be a subject in this experiment.

S.S. #SignatureAgeSex (M/F)

A TEST OF THE SOCIAL FACILITATION
THEORIES OF ZAJONC AND COTTRELL

by

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B.E. University of Peshawar, Pakistan, 1977

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ABSTRACT

An experiment was conducted to test the social facilitation theories of Zajonc and Cottrell. Social facilitation concerns the effect of the presence and behavior of other people upon an individual's performance. The study was designed to find out whether the "mere-presence" of another person or the presence of a potentially evaluative audience is a sufficient condition for social facilitation effects on subjects. "Mere presence" was defined as the physical presence of a confederate seated in front of the subjects, ostensibly performing a pegboard assembly task. In the "Evaluation" condition the subject was asked to perform in the presence of a confederate, seated directly in front of the subject and presented to him as a researcher evaluating his performance. The subjects performance was tested on three simple puzzles and one relatively difficult puzzle. A total of 21 subjects participated in this study. The confederates were all graduate students in the Industrial Engineering Department of Kansas State University. Subjects were randomly allocated to one of the three experimental conditions (Alone, Mere presence, Evaluation).

The present study does not provide evidence to support either Zajonc or Cottrell's theories of social facilitation. More research needs to be done to test the effect of cognitive factors, individual differences, and nature of task on social facilitation.