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Social Facilitation From Triplett to Electronic Performance Monitoring

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This article reviews the origins and development of social facilitation theory beginning with N. Triplett's (1898) early work during the late 1800s. Early studies of the phenomenon focused on individual performance enhancement when others were present. Performance impairments were observed but not explained until R. B. Zajonc's (1965) integration of previous work that provided a coherent explanation for earlier inconsistencies. Beginning with his drive theory, the authors describe various social, physiological, behavioral, and cognitive explanations for social facilitation that have been advanced over the years and discuss their origins in some of the earliest social psychological research. Finally, the authors present their own framework for examining social facilitation phenomena and highlight problems and opportunities for advancing the theory.

Social facilitation theory deals with the impact of social presence on individual performance. It is one of the oldest social psychology theories in the history of the field. The theory focuses on changes in performance that occur when individuals perform in the presence of others versus alone. The term *facilitation* refers to the early observations that performance was enhanced when others were present. Subsequent research has found the relationship between social presence and individual performance to be complicated. Task complexity, evaluation context, and type of presence are some of the factors that researchers have demonstrated moderate the impact of presence on performance. Social facilitation theory now refers not only to performance enhancements, but also to impairments.

Efforts to explain the social facilitation effect have generated a number of potential mediators. These include drive, evaluation apprehension, cognitive processes, and others. Although a large body of research has been generated over more than 100 years, the development of social facilitation theory has been fragmented. No single theory has emerged that can effectively and parsimoniously account for this phenomenon. The utility of social facilitation theory is currently impaired by the lack of integration among the numerous theories that attempt to account for social presence effects. Yet the theory could be increasingly useful for addressing new kinds of presence in the 21st century, as exemplified by virtual teams and computer performance monitoring. Social facilitation theory may have the potential to generate increased understanding of the implications of these new kinds of presence.

In this article, we attempt to accomplish five goals. First, we provide a brief history of the field by highlighting early research that has helped to shape and develop social facilitation theory. Second, we describe the predominant explanations for social facilitation in an effort to show where current theory stands today. Third, we present a critique of the current theory and describe problems and issues that need future research attention. Fourth, we describe a framework for future research that includes a broad range of factors relevant to organizations. The intention of the framework is not to hypothesize or propose specific relationships but rather to suggest a range of possible relationships that are important to social facilitation research. Finally,

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we present some examples from the electronic performance monitoring literature that have extended social facilitation theory development and applied it to issues relevant in the workplace today.

Development of Social Facilitation Theory

The study of phenomena now referred to as social facilitation can be traced to the early observations and experiments of Norman Triplett in the late 1890s. Triplett worked in the Psychological Laboratory of Indiana University, one of the earliest psychology labs in the United States. Triplett (1898) noticed that bicycle racers turned in faster times when they were racing with other cyclists than when they raced alone. The fastest times were produced by cyclists who actually raced against each other in competition. The next fastest times were by cyclists who raced against the clock but had a tandem or other multicycle setting the pace. The slowest times were by cyclists who raced against the clock with no pace setter. These observations, although clearly related to competition, inspired subsequent experimentation by Triplett and others.

In order to further explore the phenomenon he had observed in bicycle racing, Triplett (1898) conducted an experiment that tested the speed with which children turned a fishing reel. He constructed a dual rod and reel apparatus that enabled him to count the number of times an individual turned the reel. The dual apparatus enabled Triplett to test individuals working alone and reeling side-by-side with another person. Most of the children Triplett tested reeled faster when they were reeling alongside another child.

Triplett (1898) proposed several possible explanations for his results. One was that the presence of the other reeler (a *coactor* in later terminology) stimulated a competitive instinct that motivated the individual to reel faster. Another explanation was that the sight of someone else performing the same activity stimulated an idea or thought of moving faster. This idea combined with competitive instinct led to what Triplett considered a "greater concentration of energy" (p. 526). Triplett also proposed that the individuals who performed slower in the presence of another reeler (a smaller group) may have been overstimulated by the exercise.

Triplett's (1898) observations of cyclists and his experiment with the rod and reel both involved obviously competitive situations. Subsequent researchers attempted to conceptually separate competition from social facilitation (cf. Allport, 1920; Zajonc, 1980); however, the importance of these early studies is clear. They highlight the notion that people perform differently when others are present, even though they are not interacting. Subsequent research during the 20th century sought to clarify the nature of these performance differences and to understand their causes.

The early Triplett (1898) study provided some behavioral explanations that are important to social facilitation. As noted above, Triplett suggested that the sight or sound of another's movement might strengthen the idea of movement and thereby increase energy and motivate greater effort. His notion of increased energy may have developed into what was later conceptualized as arousal. In a similar manner, inspiration for greater effort that is sparked by the sight and sound of someone else suggests some sort of comparison (Guerin, 1993). Arousal and social comparisons evolved into two primary explanations for social facilitation in later years. Therefore, although Triplett's early study did not provide clear evidence of social facilitation, it introduced concepts that were important in the development of this theory during the 20th century.

Allport (1920) coined the term *social facilitation* and extended the research of that time by attempting to control potentially extraneous influences, such as competition. Allport wanted to learn about the more basic social influences of others on individual performance, and he therefore attempted to design experiments that would minimize competition effects. He instructed his participants to avoid comparing themselves to others and to not consider the situation as competitive (p. 160).

Allport's (1920) experiments used two kinds of mental tasks: word associations and generation of arguments to a written passage. For the word association tasks, participants were given a sheet of paper with a single word. They were instructed to free-associate and write down the first word that came to mind, then the next word, and so on. In a series of experiments, he

varied the instructions, asking them in some cases to write down only every third word or to write down associations with something other than the stimulus word. The argument-generation tasks required participants to write down every argument they could generate for a passage from the classic literature. For all these studies, Allport had participants perform the tasks both in groups and alone. His results revealed that people in the group situations made a higher number of associations and generated a larger number of arguments. However, Allport judged the quality of the arguments to be better when they were generated alone. These results provided an early suggestion that different kinds of tasks may be affected differentially by social presence.

Allport (1920) proposed explanations for both facilitation effects and impairment effects of other people on performance. Similar to Triplett (1898), Allport proposed that the presence of others facilitates the idea of movement and thereby encourages movement in the individual. He also suggested that rivalry stimulates increased action. Over-rivalry, distraction, and emotions were suggested to be performance impediments. These proposed explanations served as important precursors to later explanations for social facilitation and impairment. The distraction explanation had been proposed earlier by Meumann (1904); however, Allport's explanation was contradictory. Meumann had suggested that individuals performed better in the presence of others because they were distracted and they responded by working harder to compensate. By contrast, Allport hypothesized that when distraction occurred, performance was impaired. The role of distraction has continued to be explored by social facilitation researchers in subsequent years.

Allport's (1920) conceptualization of social facilitation focused on coaction, that is, individuals who performed the same tasks in the presence of each other rather than alone. Allport did not consider possible effects of an audience on individual performance.

Dashiell (1930) proposed that presence takes different forms, one of which might be audience observation. Other forms of presence studied by Dashiell included the following: (a) the mere presence of observers, (b) the presence of others who express attitudes about the individual (later theories would refer to this as an evaluative audience), (c) the presence of noncompeting coactors, and (d) the presence of competing coactors.

Dashiell's (1930) proposal constituted one of the earliest suggestions that social facilitation effects may vary depending on the specific kind of social presence. In one of his studies, he compared effects of these four different forms of presence on individual task performance. His results indicated small differences between the groups; however, the observed group was generally fastest, and the competing group was generally second fastest. Dashiell also provided an early suggestion that physical presence may not be necessary for social facilitation to occur. He proposed and claimed some support for the proposition that individuals experience coaction effects while working alone if they are aware that others are simultaneously working on the same task while out of sight in another room. This notion of indirect presence may have implications for virtual teams, electronic performance monitoring, and other present-day work arrangements that involve connections other than physical presence.

Examination of the characteristics of the "other" person or people in social facilitation research has focused predominantly on audience versus coactor status and on evaluative versus nonevaluative roles. Dashiell's (1930) concept of the audience that vocally expresses opinions is similar to the evaluative audience used in many subsequent studies and may also provide a hint of another later category—the expert versus novice audience.

Research that manipulated the role of the other or others provided early recognition of the potential value of exploring individual perceptions: How the focal person perceives the others and interprets their presence may have an important influence on his or her reaction to them and on his or her subsequent performance in their presence.

Allport (1920) attempted to remove competition effects from his studies by instructing participants not to compete. Dashiell (1930) studied competition effects as well as other kinds of presence by manipulating the experimental conditions. Dashiell concluded that rivalry was a factor even if participants were alone but aware they were performing a task at the same time as someone else. These early studies illustrate the concern that researchers

had for separating competition effects from other effects of social presence. They highlight one of the biggest difficulties to plague the development of social facilitation theory: Potential mediators of social facilitation effects are not easily manipulated or isolated. As a consequence, many questions raised in the early part of the century remain unanswered today.

A variety of studies were conducted during the first half of the 20th century to investigate social facilitation effects. These early studies examined aspects of social facilitation and provided clues about possible explanations for the facilitation or impairment effects of others' presence. For example, Triplett (1898) focused early attention on the effects of other people on individual performance. Allport (1920) named the phenomenon social facilitation, attempted to eliminate competition effects, and studied the phenomenon in the context of mental as opposed to motor tasks. Dashiell (1930) proposed several different kinds of presence that might have differential effects on individual performance.

Although the early social facilitation research explored some of the explanations that are still considered viable today, results of these studies were inconsistent. It is likely that part of the reason for some of the inconsistencies may be the research methods that were used. Sample sizes were often small, and experimental conditions were often poorly controlled. Guerin (1993) noted that many experiments designed to compare performance of individuals in the presence of others versus performance of individuals working alone frequently had the experimenter in the room during the so-called alone condition. Therefore, valid conclusions regarding the effects of presence cannot be drawn from these studies.

In spite of the problems with many of the early studies, they raised many of the theoretical issues and questions that continue to be explored and that require further development today. For example, subsequent researchers continued to explore the notion that the role of the others (e.g., passive vs. evaluating observer vs. coactor) may affect individuals' reactions to presence (Dashiell, 1930). Extensions and further development of social facilitation theory involved studies that manipulated individual perceptions about others (e.g., Borden, 1975) and studies that focused on different degrees or levels of presence (e.g., Henchy & Glass, 1968; Laughlin & Wong-McCarthy, 1975).

Another inconsistency in early research relates to the kinds of tasks performed and was not brought into clear focus until Zajonc (1965) wrote his seminal article. Zajonc reviewed the social facilitation literature beginning with the Triplett study and provided a viable explanation for some of the inconsistencies in these earlier studies. Zajonc used drive theory to explain individual reactions to the presence of others and introduced task complexity as a critical moderator of facilitation–impairment effects. His article helped to advance social facilitation theory by integrating the past half-century of animal and human studies and by stimulating subsequent research that further developed explanations for the social facilitation–impairment phenomenon.

Primary Explanations for Social Facilitation

Various theories have evolved as explanations for social facilitation effects. Guerin (1993) grouped these explanations into three categories: drive theories, social comparison theories, and cognitive process theories. The categories are helpful for examining specific reactions to social presence that mediate effects on performance. The first category of reaction is increased drive or arousal. Zajonc (1965, 1980) asserted that individual drive or arousal levels increase in the (mere) presence of others, and that it is this increase that either enhances simple task performance or impairs complex task performance. The second category involves a concern about comparisons with others. In the presence of others, individuals may become concerned about how they look or perform in comparison with others. These concerns include apprehension about the possibility of being evaluated by others (Cottrell, 1972), desire to present oneself in a certain way to others (Baumeister, 1982; Bond, 1982), or intention to match performance to a socially constructed standard (Carver & Scheier, 1978, 1981, 1982). The third category involves a shift in cognitive processing capacity caused by the distracting presence of others (Baron, 1986).

This section presents an overview of some of the primary social facilitation studies. It is not

intended to be comprehensive[1] but, instead, attempts to highlight important aspects of these theories that have affected the advancement of social facilitation theory as a whole.

Drive

A variety of explanations for the social facilitation phenomenon were suggested prior to Zajonc (1965). However, none of these explanations had been able to adequately account for the inconsistency of results that was obtained. Zajonc provided an explanation that accounted for both facilitated and impaired performance. His explanation also accounted for social facilitation effects in both human and nonhuman species.

Zajonc (1965) noticed that some social facilitation studies found performance enhancements in the presence of others, and other studies found performance impairments. He proposed a theory based on the Hull–Spence drive theory (Spence, 1956) to explain these differences in performance. In the presence of others, he proposed, individual drive levels are elevated. He asserted that increased drive enhances emission of dominant responses and inhibits emission of subordinate responses. When a task is well learned, the dominant response is likely to be correct. In the presence of others, more dominant responses will be emitted, and if the task is simple or well learned, performance will be enhanced. If the task is complex or not well learned, performance will likely be impaired.

The influence of "mere presence" (the term used by Zajonc, 1965) on individual performance was challenged by researchers who asserted that presence carries more meaning to individuals than Zajonc had acknowledged. Zajonc (1980) clarified that the presence of another individual inevitably has significance, and that significance varies depending on the situation and the behavior of the other. For example, the presence of another individual may create a competitive situation, or it may indicate to an individual the potential for evaluation or for a reward or punishment. Nevertheless, Zajonc (1980) asserted that social facilitation effects occur even after these other situations are ruled out, that is, in the "mere" presence of another individual. With this argument, he clearly distinguished his drive theory from other drive-based theories, such as evaluation apprehension (discussed below). He emphasized that although evaluation apprehension may be a factor that influences individual reactions to the presence of others, it is not a *necessary* condition for social facilitation effects to occur. Mere presence, he asserted, was not only necessary but *sufficient* for social facilitation.

Zajonc's (1965, 1980) theory was an important influence on the development of future social facilitation theory because it highlighted differences in performance based on task complexity. To be considered viable, subsequent theories must now be able to predict and explain enhancements of simple task performance and impairment of complex task performance.

Zajonc's (1965, 1980) theory was also able to account for similar kinds of results with different animal species. For example, in some studies rats pushed levers to obtain food more often in the presence of other rats (Wheeler & Davis, 1967; Zentall & Levine, 1972). Chickens pecked faster with others than alone (Tolman, 1967). Cockroaches navigated a simple walkway faster and a complex maze slower in the presence of other cockroaches (Zajonc, Heingartner, & Herman, 1969). These kinds of results suggested reactions that could be explained by Zajonc's drive theory.

However, some animal studies suggested different explanations. For example, it may be that experienced animals provide some kind of behavioral cue to naive animals. Animals raised in social versus nonsocial conditions may react differently to the presence of other members of their species (cf. James & Gilbert, 1955). Thus, for animals this evidence suggests the influence of social context and individual differences on reactions to social presence. Nevertheless, Zajonc (1965, 1980) asserted that the mere presence of others was sufficient to elevate drive levels and thus create social facilitation effects.

Drive or arousal was a consistent element in most of the earlier social facilitation theories. Alternative drive theories, including Cottrell's (1972) evaluation apprehension theory discussed below, asserted that drive is learned. The notion of learned drive is that individuals associate certain social situations with certain consequences on the basis of their own experiences

[1]Guerin (1993) provides an excellent detailed, comprehensive review of social facilitation theories.

and history. Distraction theories were initially proposed as drive-based theories (cf. Baron, Moore, & Sanders, 1978), asserting that the distraction attributable to the presence of others increased drive levels in individuals. Baron (1986) later proposed that attentional mechanisms were most important, and that drive may not be necessary for social facilitation effects to occur.

In the 1980s, theories began to emerge that used cognitive or other explanations for social facilitation (cf. Carver & Scheier, 1981) and asserted that drive or arousal was not a necessary condition for social facilitation effects to occur. Recently, however, Blascovich, Mendes, Hunter, and Salomon (1999) proposed a biopsychosocial model that attempts to account for different kinds of arousal as well as affective and cognitive processes. They used the distinction between challenge and threat to explain different physiological responses to simple and complex tasks. Technological advances enabled them to obtain more sophisticated physiological measures. Their measurement advances, combined with efforts to integrate theoretical explanations, suggest renewed interest in the potential utility of arousal explanations for social facilitation.

Social Comparison

Evaluation apprehension. A few years after Zajonc (1965) presented his drive-based theory, Cottrell (1972) asserted that mere presence was not enough to elevate drive levels and would not necessarily cause social facilitation effects. He proposed that only when individuals were concerned about how others would evaluate them would drive levels increase, resulting in social facilitation or impairment of task performance. As evidence for his assertion, Cottrell and colleagues (Cottrell, Wack, Sekerak, & Rittle, 1968) conducted a study in which a confederate was seated in the room during the experiment. The confederate wore a blindfold, supposedly to get adjusted to the dark for a different experiment. Because the confederate was unable to see the individual performing the task, it was presumed that the individual would perceive the presence of the confederate as nonevaluative (and hence "mere presence"). No social facilitation effects were revealed in this experiment; however, a similar experiment did reveal social facilitation effects (Rajecki, Ickes, Corcoran, & Lenerz, 1977).

Cottrell's (1972) theory was similar to Zajonc's (1965) in its assertion that drive was a mediator between the presence of others and performance effects. Both theories attributed performance enhancement or impairment in the presence of others to elevated levels of drive. Cottrell's theory differed from Zajonc's, however, in terms of what triggered increases in drive levels. Cottrell asserted not only that evaluation apprehension caused drive, but that prior evaluation experiences caused people to develop a drive reaction—a learned drive. Cottrell's theory attempted to account for social facilitation in animals by explaining that various frustrations they experienced in the presence of other animals increased their drive levels. The theory used learned drive but not evaluation apprehension to account for animal effects.

Bond and Titus (1983) conducted a meta-analysis of social facilitation studies and concluded that evaluation apprehension had little influence on the effects of social presence on performance. They noted that in some cases, evaluation potential increased the effect of presence; however, in nearly as many cases, it reduced the effect. It is not entirely clear why results have been so inconsistent. Perhaps some other unknown factor plays a role and has not been adequately accounted for in earlier research and in Bond and Titus's meta-analysis. For example, finer distinctions in the nature of the tasks may be relevant. Experimental procedures may also manipulate evaluation in different ways, thus yielding different kinds of results. Harkins (1987) noted that many social facilitation studies have been unclear as to the specifics of the experimental instructions, and it is consequently not always apparent what inferences participants make about their potential for evaluation. Henchy and Glass (1968) assessed the effects of different levels of evaluation by testing responses of individuals in four conditions: alone, expert, nonexpert, and alone but recorded on film. The expert condition showed the most facilitation, followed by recorded and then nonexpert. The recorded condition provided another early indication that indirect presence may lead to social facilitation effects. Furthermore, the fact that a marginal effect was found for the nonexpert condition suggested

that mere presence should not be ruled out as a viable factor.

Self-presentation. Theories of self-presentation build on work by Goffman (1959) that focused on the efforts people make to manage their impressions on others. Baumeister (1982) proposed a theory that includes elements similar to evaluation apprehension and deals only with human social behavior. He proposed that in the presence of others, people are motivated by a desire to please those who are observing them and to construct a certain public image of themselves. People use their social behavior to communicate information about themselves. This theory also recognizes drive as a potential influence on performance. Baumeister suggested that the presence of someone considered to be evaluative would likely trigger more drive than the presence of someone who was not able to evaluate performance.

Bond's (1982) self-presentation theory did not require a drive element for social facilitation to occur. Bond emphasized the efforts people make to present themselves as competent. When simple tasks are performed in the presence of others, the individual's impression management efforts will improve performance. When complex tasks are performed, however, embarrassment from errors that are made will result in greater impairment of performance.

Self-awareness. Two kinds of social facilitation theories assert that the presence of other people causes individuals to focus on themselves. Duval and Wicklund's (1972) objective self-awareness theory suggests that people focus on themselves as a way of considering how others might see them. In this respect, the theory has similarities with evaluation apprehension and self-presentation theories. Duval and Wicklund attributed performance differences to increased focus on personal ideals and increased effort to avoid the unpleasantness of falling short of the goal. With a simple task the effort may result in better performance, but with a complex task it may not do so.

Carver and Scheier (1981) suggested that when individuals are faced with a task, the presence of someone else (an audience) causes those individuals to focus their attention inward, on themselves, engaging a discrepancy-reducing feedback loop. This feedback loop is the key element of control theory, and its function is to minimize discrepancies with a standard or goal. The degree to which an individual engages in this process determines the intensity of the behavior. As individuals compare their own performance with their standard, they adjust subsequent effort depending on expectations for success. With a simple task, outcome expectancy may be high, motivating continued effort. As outcome expectancy decreases, however, individuals will withdraw effort and perhaps even withdraw from further attempts.

Cognitive Processes

Several theories have been proposed that focus on variations in the way individuals process information in the presence of others. Most of these theories emphasize distraction (Baron et al., 1978; Meumann, 1904; Sanders, Baron, & Moore, 1978), although they vary in the kinds of distraction they highlight and the effects of distraction they propose. One of the more recent theories is discussed below.

Baron (1986) proposed a cognitive theory that attempted to account for other explanations, both drive- and non-drive-based. He proposed that attention conflict can produce what he called drivelike effects on performance, such that it can facilitate simple tasks and impair complex ones. He suggested that this attention conflict can have social or nonsocial causes, and three conditions are likely to trigger the conflict: (a) the distraction is very interesting or hard to ignore, (b) there is pressure to complete the task quickly and accurately, and (c) attending to the task and the distracter simultaneously is difficult or impossible (p. 7).

This theory suggests that distraction may also elevate drive, which may or may not have additional performance effects beyond those attributable to attentional focus. A certain amount of distraction may create an attention conflict that is stressful and elevates drive or arousal levels. Hence, Baron (1986) asserted, the effect of distraction on simple task performance may be curvilinear: Performance may be facilitated by distraction up to a point, beyond which it may level out or decline (p. 7). In addition, Baron described internal as well as external distractions that may create a conflict, such as ruminations about the adequacy of task performance. His proposition accounted for evaluation apprehension and self-presentation con-

cerns in this way. He noted that social comparisons are a common distracter.

Other Theories

Behavior analysis. Guerin (1993) proposed a theory that applied behavioral theory to social facilitation. Earlier drive-based theories had suggested that individuals learn to associate the presence of others with certain consequences, and these associations lead to variations in drive or arousal levels. Guerin's behavioral approach focused on the learning history of the individual but did not assert that drive is necessary for social facilitation to occur. Behavior analysis focuses on behaviors that occur, the contexts in which they occur, and the consequences that affect their likelihood of recurring. Social facilitation can be said to occur, according to this theory, because individuals learn to associate the presence of others with certain consequences (pp. 78–79).

Cognitive–motivational model. Paulus (1983) proposed a model that attempted to integrate earlier theories by proposing that drive or arousal, effort, and task processing may all influence task performance in social situations. Paulus also focused attention on the potential for group size and crowding to play a role. His model suggested that the influence of a group on individual performance depends on task complexity and the degree and direction of performance consequences. These factors may affect the degree to which individuals experience arousal, their processing of task-irrelevant stimuli, and the amount of effort they expend. These reactions may consequently facilitate simple performance or impair complex performance.

The cognitive–motivational model recognized greater complexity of potential group effects than earlier theories had done. It acknowledged a variety of situational and group factors that may influence performance, such as group size and density, as well as individual factors, such as consequences. It also suggested potential interactive effects of various factors. A test of Paulus's (1983) theory by Griffith, Fichman, and Moreland (1989) provided some empirical evidence for a simplified model.

Expectancy model. Sanna (1992) proposed that efficacy expectations and outcome expectations interact to affect individual performance in the presence of others. Task complexity may affect self-efficacy expectations for future performance. The level of performance evaluation (e.g., the individual vs. group level) may affect outcome expectancy. By incorporating both efficacy and outcome expectancies, Sanna's model addressed both social facilitation and social loafing.

Discussion: Issues and Problems With Social Facilitation Theories

The various social facilitation theories clearly differ in their explanations for performance effects of social presence; however, they all attempt to explain why, in the presence of others, simple task performance is enhanced and complex task performance is impaired. This is interesting in light of two points. First, the social facilitation phenomenon that was suggested by Triplett and later named by Allport was not seen in those days as a performance effect moderated by task complexity. It wasn't until Zajonc (1965) integrated the past half-century of research in his seminal article that task complexity was identified as an important element. No other threads of research appear to have focused beyond the simple–complex task performance paradigm to investigate other dimensions of performance, such as, for example, extra-role performance.

Second, research on social loafing has found effects that are generally the reverse of social facilitation (Harkins, 1987). Social loafing research is rooted in early studies by Ringelmann (Latané, Williams, & Harkins, 1979), which began in the 1880s, even prior to the work of Triplett. These studies found that people exerted less effort and consequently exhibited worse performance when they worked with others on a common task than when they worked on the same task alone (now termed the Ringelmann effect). Early research on social loafing and social facilitation appears to have taken place, for the most part, in separate domains until the 1980s. Integrative theoretical efforts by Paulus (1983), Harkins, and Geen (1991) suggest that the two topics might both be better served by studying them together.

Jackson and Williams (1985) tested social facilitation and loafing effects together and found effects that suggested the possibility of a consistent explanation for both facilitation and loafing effects. When people performed with

coworkers and their performance was individually identifiable, facilitation effects occurred. Simple task performance was better in coworker conditions than in alone conditions, and complex task performance was worse in coworker conditions than when alone. However, when the group situation removed the potential to identify performance at the individual level (i.e., performance was only identifiable at the group level), simple task performance was worse than it was for those whose performance was individually identifiable—as predicted by social loafing theory. Furthermore, complex task performance was better for the nonidentifiable group. This result suggests the utility of considering social facilitation and social loafing phenomena together. Sanna (1992) provided empirical evidence of a link between these two phenomena in tests of his expectancy-based model.

Social facilitation theories have several problems that weaken their ability to effectively predict and explain the phenomena they seek to address. The boundary conditions for which the theories hold are not yet adequately determined or described. The theories rest on assumptions that are not adequately specified or tested. Some of the constructs and variables are not adequately defined. These issues are described below.

Boundary Conditions

The theories that have been advanced so far have been inconsistent or unclear about the boundaries of the theories. They have not specified the kinds of people and relationships for whom social facilitation effects are predicted to occur, the time boundaries within which these effects will occur, or the kinds of performance that may be affected. Efforts to distinguish social facilitation effects from competition effects have been largely unsuccessful so far. Perhaps competitive intentions have an important impact on the way people react to the presence of others. It may not make sense to completely separate competition conceptually from other social facilitation explanations.

People—who they are. Social facilitation theories do not distinguish whether or not familiarity with the other person or people is important. These theories discuss the role of the others as evaluative or nonevaluative spectators, or as coactors, or neither. However, beyond these distinctions, they do not specify whether effects might be expected with friends, family members, coaches, teachers, supervisors, and so forth. The studies are generally done with groups of participants whom we might assume are strangers, but this detail has usually not been noted. This is a little surprising, because in the animal literature, the role of the other animal has been clearly specified and examined.

Animal studies have referred to the importance of considering the role of the other animal that is present, that is, whether the other is experienced or inexperienced, whether the other is dominant or submissive, and whether the other is the same or a different sex. These differences frequently seem to influence the way animals react. It may be that animals are more competitive with certain other animals or that they take cues from some animals. The variety of animal roles that have been investigated has been noted as an indication that animal studies may be capturing a variety of effects, perhaps besides pure social facilitation. Competition and cueing are two such examples of other behaviors that are easily confounded with social facilitation.

People—where they are. It is not clear whether or to what degree social facilitation effects are influenced by physical proximity of the coactors or audience members to the focal person. Paulus (1983) suggested the importance of crowding and its effects on task performance (see also Aiello & Baum, 1979; Aiello, Nicosia, & Thompson, 1979). Aiello et al., for example, found that children who had been exposed to crowding were more likely to be competitive with others, even when they had everything to gain and nothing to lose if they cooperated. Some studies have reported the relative positions of the participants and experimenter (cf. Cohen, 1980), generally for the purpose of controlling line of sight for perceptions of capacity to evaluate. These studies have considered positioning of people relative to each other but have focused less on distance. Physical proximity is also related to virtual presence, which may be a factor with e-mail, Internet communications, computer decision support systems, and virtual reality. Subsequent theorizing needs to focus more explicitly on both physical and virtual proximity.

Time. Social facilitation theory has not specified how long the predicted effects are

expected to last. Weiss and Miller (1971) noted the possibility that drive effects could be extinguished, suggesting that drive-based theories might not be able to predict long-term effects. But the literature has been essentially silent on this issue. If social facilitation effects last over days or weeks, the practical implications would be different than if they only last for a couple of hours, the maximum length of most human experiments conducted during the last century.

Nature of performance. Especially since Zajonc's integration of the literature in 1965, social facilitation theory has been tested using a variety of laboratory tasks and by assessing quantity and quality of tasks performed. Guerin discussed this as a side effect of Zajonc's work. He noted that most experiments "used the same paradigm and looked only for the same type of behaviour change—the facilitation of simple responses and the inhibition of complex responses" (Guerin, 1993, p. 49). Social facilitation theories don't specify whether affected task performance is limited to the domains of quantity and quality or if it might include other aspects of performance, such as, for example, contextual performance or citizenship.

Assumptions

The drive theories appear to be based on the assumption that drive causes simple performance to be enhanced and complex performance to be inhibited. This assumption is derived from the Hull–Spence drive theory (Spence, 1956), and although that theory is usually noted, it seems important to acknowledge the inferential leap required to make the step from drive to performance. This link appears to be simply assumed in much of the literature. Other assumptions, including how information is processed or how impression management efforts are made, need to be clearly specified to facilitate future testing.

Theoretical Constructs

The drive or arousal construct is not clearly defined in most social facilitation theories. The vagueness of this construct has made hypothesis testing difficult. Zajonc's (1965) original drive theory was based on the Hull–Spence drive theory (Spence, 1956); however, his later work (Zajonc, 1980) used both the terms *drive* and *arousal.* Subsequent social facilitation theories seem to have gravitated away from the term drive and toward the term arousal; however, the terms don't mean exactly the same thing, and specific meanings have not been clearly explicated. Cohen (1980) described three different kinds of arousal that might work separately or in combination to influence individual responses to presence: electrocortical, autonomic, and behavioral (p. 23). He noted that the two independent variables in his study, mere presence and evaluation apprehension, may have differential effects on the different kinds of arousal, making interpretation of other studies difficult. Social facilitation research during the last two decades has not focused on multiple forms of arousal, as Cohen suggested was needed. It is important to social facilitation theory to know exactly what construct is being proposed as an intervening process—as terms are currently defined, there may be more than one construct.

A number of other theoretical constructs would benefit from greater clarity. These include task difficulty, performance, and many of the proposed mediators.

Measures

Because the drive construct does not appear to be well defined, it is not surprising that measures may be lacking. Physiological measures have been used as indicators of drive; however, how do we know they are direct measures of "drive," a concept that is not itself well specified?

Other variables used to explain social facilitation effects are also difficult to measure. They are sometimes captured through self-report questionnaire items (e.g., "Did you feel you were being *evaluated*?") or through inference by manipulating experimental conditions (e.g., a condition in which people are either told they are being evaluated or not). In order to advance our knowledge of the causes of social facilitation and the processes through which these effects occur, we need to improve the measures used to test these effects. Of critical importance is the ability to effectively test the variety of mediators that have been proposed for social facilitation effects.

Comments on Issues

Research since Zajonc has focused on the same kinds of behavioral effects that he highlighted: facilitation of simple responses and inhibition of complex responses (Guerin, 1993, p. 49). Other research, both before and after Zajonc, provides hints that there may be additional, important behavioral effects besides performance of simple or complex tasks, and that different phenomena may still need to be distinguished from one another. These points, taken together, suggest the need for clarification in several areas: (a) the definition of social facilitation, (b) the dimensionality of the social facilitation construct, and (c) the predicted effects of the presence of others, beyond simple and complex task performance. Clarification of these issues will require expanded research. Construct validity is a critical concern in this research. It is difficult to isolate extraneous factors and to ensure that research studies are actually measuring what they intend to measure. Furthermore, to the extent that there is confusion over the construct, different studies may be based on different conceptualizations of social facilitation.

Toward a Unified Perspective on Social Facilitation

Various social facilitation theories have dealt with different aspects of social presence and its effects on individuals. A model of social facilitation that attempts to integrate these explanations may help to develop understanding of the various individual, social, and contextual factors that influence individual reactions to the presence of others. The framework presented in Figure 1 attempts to combine explanations presented by various theories and to present additional factors that may also be influential. The purpose of this model is not to propose a new theory but rather to pull together the variety of theories and factors that have been previously proposed and to suggest avenues for future research.

Performance

Performance (the box at the bottom of Figure 1) is the primary outcome attributed to social facilitation. The phenomenon is generally described as an influence of social presence on individual performance. Most studies testing social facilitation effects have examined performance in terms of two dimensions, speed and accuracy. Research investigating other aspects of performance is limited. Other qualitative variations in behavioral responses resulting from the presence of others need to be explored in greater detail. Extra-role performance is another dimension that may be fruitful for this line of research. To what extent might the presence of others facilitate or inhibit cooperation–competition, teamwork, or helpfulness?

Reactions to Presence

The middle section of Figure 1 includes a set of boxes called "initial reactions" and "subsequent reactions." These include physiological arousal, cognitive conflict related to attention and processing demands, and self-focusing of attention in order to match behavior with a socially constructed standard or objective. In each of the social facilitation theories, the individual's reaction is hypothesized to influence subsequent performance. A critical question related to social facilitation has to do with determining which of these theories is correct and whether there are situational factors that influence which theory is most applicable. For example, are there some cases in which physiological arousal leads to social facilitation effects and other cases in which it does not? If so, what are the distinguishing factors? What factors distinguish whether cognitive conflict or self-monitoring efforts lead to social facilitation of performance?

A common weakness of the various social facilitation theories is that they have not been able to adequately rule out effects that may be due to one or more of the other possible explanations. As a consequence, it is frequently possible to account for an observed response with any one of several social facilitation explanations. Research efforts are needed to isolate conditions under which one and only one explanation can feasibly account for observed behaviors and also to determine when more than one factor may play a role.

The reaction boxes in Figure 1 suggest subsequent reactions that follow an individual's initial reactions. Potential changes in individual

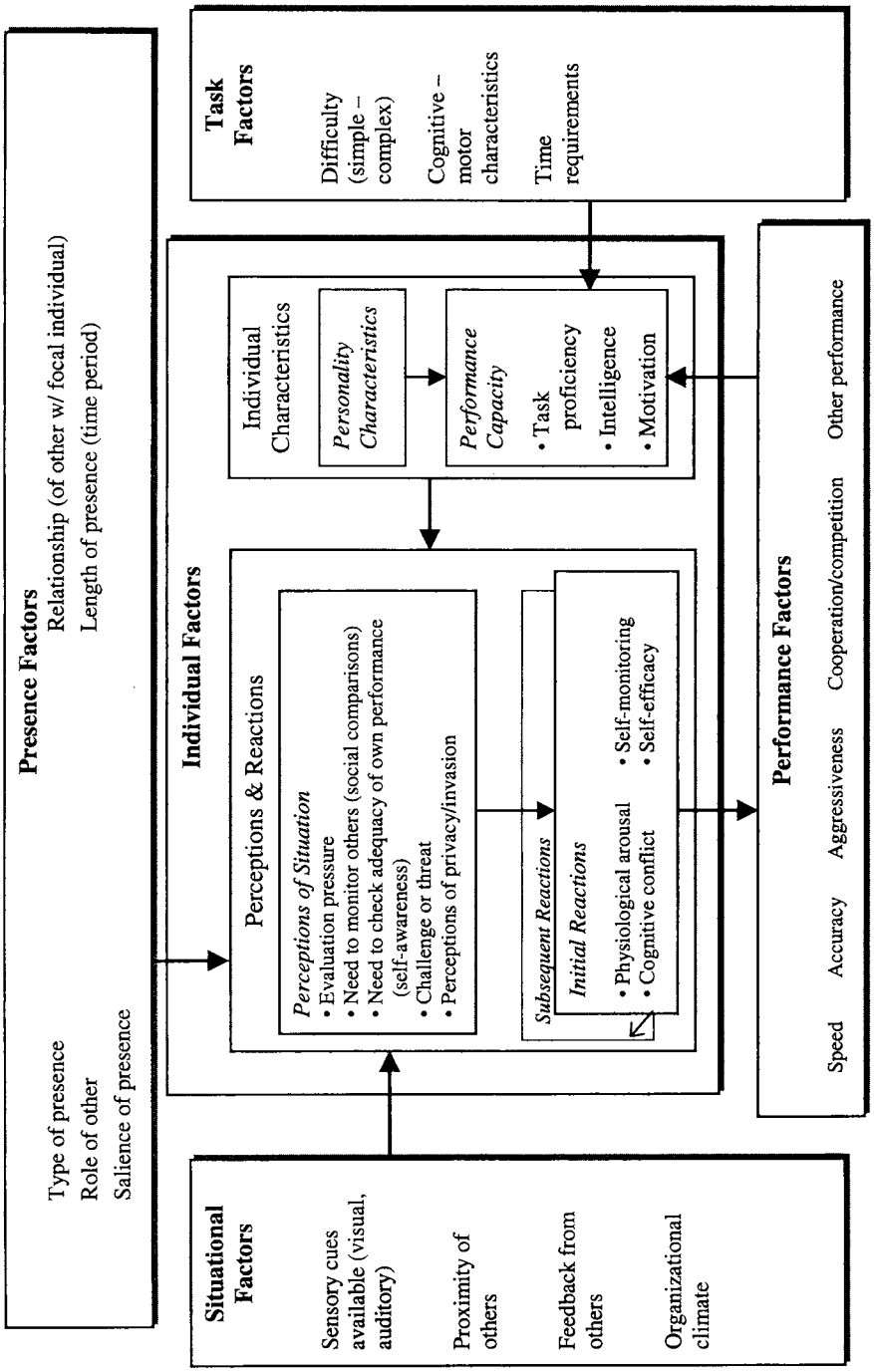

Figure 1. Social facilitation integrative model.

reactions have not been adequately examined by any of the extant social facilitation theories.

Temporal elements. One factor that may influence subsequent reactions to social presence is time. We need to understand what happens when individuals are exposed to others over extended time periods. Most social facilitation experiments have taken place over relatively short periods. Inclusion of this temporal dimension in the framework may influence the utility of various explanations. For example, Weiss and Miller (1971) suggested that if drive influences individuals' reactions to presence, then that drive could probably be extinguished, resulting in a reduction of social facilitation effects over time. If drive or arousal attributable to the presence of others indeed subsides after a short period of time, and if such arousal is the primary explanation for social facilitation effects, this could mean that social facilitation effects last for only a few minutes. On the other hand, perhaps social comparisons made by self-monitoring increase over time. If this is the case, social facilitation effects may become increasingly pronounced with prolonged exposure to others.

Increased knowledge of temporal dimensions of social facilitation will have important implications. In the workplace, for example, individuals often perform their duties in the presence of others (whether in their actual or virtual presence) over extended periods of time. Social facilitation theory may therefore provide keys to understanding workplace performance (if effects are sustained over time), or it may only provide limited insight about initial reactions. Research is needed that accounts for temporal aspects of individual reactions to social presence. A step in this process is to examine each of the explanatory theories in terms of their effects over time. For example, we need to investigate how long physiological arousal in the presence of others lasts. We need to determine how long cognitive and attentional conflict lasts before it is resolved and individuals can focus attention effectively on the desired source. We need to determine how long individuals sustain concern about reactions of others and thus make efforts to monitor themselves to make favorable impressions or attain satisfactory evaluations. This of course may depend on the explicit or implicit feedback from those others present.

Interactive effects. A second factor that may influence subsequent reactions to social presence is the way various explanations may combine with each other to enhance or extend social facilitation reactions. For example, if the presence of another person creates physiological arousal in an individual and also triggers an attentional conflict, will the social facilitation effect be stronger, or will it be the same as the effect caused by only arousal or only attentional conflict? Tests of these theories have not been able to successfully eliminate other explanations. It is therefore not currently possible to isolate effects of one explanation. It will be necessary to first understand the effects of each explanation independently before we can identify how they work in combination.

Individual Perceptions of the Situation

In the middle of Figure 1 is a box marked "perceptions of situation." Social facilitation theories have tended to lump perceptions and other reactions together in explaining performance effects of social presence. It may be, however, that an individual's perception of the situation may influence his or her reactions to it. For example, if an individual perceives the situation to be one in which another person's evaluation will be important to his or her future outcomes, then he or she may react differently than if he or she didn't perceive such evaluation pressure. Likewise, perceptions of the situation may influence the degree of physiological arousal a person experiences. Furthermore, different individuals may interpret the presence of others and the surrounding context differently. The different meanings they ascribe to the situation would likely result in different kinds of reactions. These different meanings and their effects on subsequent reactions need to be understood in order to explain fully why people perform differently in the presence of others in certain cases.

Perceptions of the situation are also important for understanding and distinguishing social loafing from social facilitation. Social loafing appears most likely to occur in coaction situations in which individuals and others work together on a common objective and results cannot be attributed to specific individuals (Geen, 1991). This finding suggests that perceptions of the likelihood of evaluation may affect the way

individuals react to the presence of others. Geen also noted that the lack of availability of a performance standard may be an important factor. Harkins (1987) discussed the complementary nature of the social facilitation and social loafing phenomena and argued that they need to be studied in combination. The extant research certainly highlights the need for greater understanding of factors that lead to each kind of effect. Increased understanding of the relationship between individuals' perceptions of the situation and their subsequent reactions may shed light on additional factors that lead to social loafing or to facilitation of performance.

A variety of factors may affect individual perceptions of the situation, most of which have not been examined or adequately tested in social facilitation research. The boxes in the figure reflect our proposal of three kinds of factors that may influence individual perceptions of the situation: individual characteristics, presence factors, and situational factors.

Individual Characteristics

Guerin (1993) suggested the importance of individual characteristics in his own social facilitation model. He proposed that the degree of evaluation pressure individuals experience may be a partial function of their previous experiences in the presence of others. Cottrell's (1972) theory of evaluation apprehension asserted that drive levels in the presence of others are at least partially a function of prior individual experience. In a similar manner, animal studies, such as James and Gilbert (1955), have considered the social nature and previous experience of animals (e.g., raised with others or raised alone) as relevant influencing factors on their reactions to others. This suggests that individual experience may be an important characteristic in shaping perceptions and subsequent reactions to social presence.

Other individual differences have also been proposed as relevant factors in social facilitation. Zajonc (1980) suggested that individual stress levels may interact with presence in affecting performance, and that a greater understanding is needed about the possible role of stress in social facilitation (p. 54). Aiello and colleagues (Aiello & Shao, 1993; Aiello & Svec, 1993; Kolb & Aiello, 1996) found that locus of control influenced individual reactions to tasks performed in studies of electronic performance monitoring. It may be, then, that a variety of individual characteristics affect perceptions and subsequent reactions to performance situations.

Presence Factors

The top box in Figure 1 lists a number of presence factors that may affect individual perceptions of the situation. Several of the proposed factors have been examined in social facilitation experiments. Results of these studies suggest that presence factors may be an important consideration; however, studies have not examined all the factors that might be likely to make a difference.

Type of presence. Several different categories have been used to discuss types of presence. Dashiell (1930) and Paulus (1983) proposed different kinds of presence that may have differential effects on performance. Dashiell suggested that effects may differ on the basis of whether the others are observers or coactors and whether they are evaluative, competing, or passive. He also found some support for social facilitation effects among coactors who could not see each other but were aware that they were working on the same task at the same time. Paulus suggested that the size of the group and the kinds of consequences associated with its presence may be important.

Role of other. Individual reactions to presence have been hypothesized to vary according to the role of the other person. For example, if the other person is presented as an expert who will be evaluating the individual's performance, the individual may perceive the situation more apprehensively than if the other is presented as a novice observer with no evaluative intent (or perhaps a disinterested bystander). Henchy and Glass (1968) found higher degrees of facilitation among participants who worked in the presence of experts versus nonexperts. The other person's role may influence expectations for behavior. In Borden's (1975) study, karate students practicing in the presence of another person whom they were told was aggressive performed more aggressively than those in the presence of an observer they believed to be passive.

Relationship with other. Most social facilitation studies have investigated individuals' re-

actions to the presence of others who are relative strangers. Experimental protocols have established roles for individuals in these studies as experimenter–participant or participant–participant. Social facilitation studies have not placed adequate focus on other relevant role combinations, such as supervisor–subordinate or friend–friend. Effects of social presence may be substantially different depending on who the other person is and how familiar the individual is with the other person.

Salience of presence. The salience of audience members or coactors may affect an individual's reactions to their presence. Salience may be affected by the individual's ability to monitor the audience. Guerin and Innes (1982) proposed that when an audience is not present, arousal may be heightened by the unknown and unpredictable aspects of the audience. Studies in which the other is behind a one-way mirror, for example, have revealed social facilitation effects (cf. Cohen & Davis, 1973). Salience may also be affected by reminders or cues an individual receives about the others' presence. Stanton and Barnes-Farrell (1996) found different reactions among electronically monitored individuals who were made aware of each instance of monitoring and those with only general knowledge of it. Those who were frequently reminded reported feeling lower perceptions of control.

Salience may be enhanced or reduced in a number of important ways. Visual cues are a common means by which an individual is made aware of someone's presence. When someone is standing in an individual's line of sight, that person's presence is likely to be obvious and salient. Auditory cues are another mechanism. In an office environment that uses cubicles, people seated nearby may be out of sight but the sounds they make provide aural reminders of their presence. Even when the other person is not physically present, visual and auditory cues can provide evidence that increases the salience of electronic presence. For example, the sight of a camera in the upper corner of a room may serve as a reminder that the area is subject to video surveillance. Sounds, icons, or printed messages may be used to remind electronically monitored workers that a supervisor is able to look in on the work they are performing.

Length of presence. As noted earlier, the element of time plays an as-yet unknown role in social facilitation. It is not known whether another person's presence will affect an individual in the same way for an indefinite period or if effects will change over time.

Situational Factors

Little research attention has been given to the potential influence of environmental and situational factors that may influence the effects of social presence. The left-hand box in Figure 1 proposes that factors such as organizational climate, the availability of sensory cues, and even verbal or nonverbal feedback from those present may be very important. Although Zajonc and other social facilitation theorists have focused on minimal social presence, we view social presence as occurring along a continuum. At one end the other person may be present but not observable, and at the other end presence may be highly salient and evaluative, such as when a supervisor corrects an employee.

Applicability of Social Facilitation Theory

Social facilitation studies to date have hypothesized the effect of social presence on learning and performance. A body of evidence has developed that indicates people may learn more slowly or perform difficult tasks less accurately in the presence of others, and that they may perform well-learned or simple tasks more quickly in the presence of others. Support for these hypotheses may have profound implications for organizations.

Organizations interested in facilitating effective learning (e.g., schools, training units of corporations) may need to reconsider when and how students or trainees are exposed to learning materials. Factors such as classroom size, frequency of teacher–trainer observation, and the role of others involved may be important factors that influence learning effectiveness.

Increased use of teams in organizations may increase the need for investigations of how individuals and groups perform under different levels of monitoring. Aiello and Kolb (1995) studied effects of different levels of monitoring by telling some people that their performance would be monitored at the individual level and telling others that it would be monitored at the group level. Although performance was not affected, other reactions such as stress and per-

ceived importance of the task suggested that individuals may respond differently to monitoring depending on the level at which it is focused. Additional research could help to provide needed insights in this area.

Organizations that need to maximize their performance may need to focus more attention on how they facilitate required performance levels. Factors such as monitoring methods, collaboration procedures, performance evaluation approaches, and other working conditions may be critical elements in performance outcomes. Individual differences, including perceptions of work practices, may also be important to these outcomes.

Studies of electronic performance monitoring in the workplace illustrate one area in which social facilitation theory has been applied to a workplace practice to generate hypotheses regarding effects of presence in individual performance. Electronic performance monitoring involves using computer and communication technologies to gather information about work performance. It enables managers to gather performance-related information about employees without physical observation.

Traditional monitoring practices involve direct observation of employee performance by the supervisor or manager, who must be physically present in order to conduct the observation. An implication of physical presence is that the employee can usually tell exactly when and to what degree he or she is being observed. By contrast, electronic performance monitoring involves observation by the supervisor from potentially any location. Observation may take place through a computer or telephone connection and may consequently occur with or without the knowledge of the employee.

Social facilitation studies (e.g., Dashiell, 1930; Paulus, 1983) have found predicted effects when the observers or coactors were not actually present. These studies suggested the utility of social facilitation theory for predicting employee performance not only when directly monitored by a supervisor, but also when indirectly monitored through the computer or communications media. As a consequence, a number of studies during the past decade have used social facilitation theory to predict effects of electronic performance monitoring.

Aiello and Svec (1993) and Griffith (1993) identified social facilitation effects in studies that examined reactions of electronically monitored individuals. Aiello and Svec found that complex task performance was significantly impaired when individuals were monitored by computer. Griffith found a marginal increase in simple task performance under computer monitoring.

Social facilitation effects have generally been found to be negative (i.e., performance impairment) in the case of complex tasks. These findings have critical implications for both educational and work environments. A few recent studies of electronic performance monitoring have suggested that these negative effects may be offset to a significant degree by providing individuals control over the monitoring mechanism (Aiello & Svec, 1993; Douthitt & Aiello, in press; Stanton & Barnes-Farrell, 1996). Allowing individuals to turn off or interrupt monitoring may have beneficial effects on their performance, even if they don't exercise that control.

Some electronic performance monitoring research has suggested the potential importance of individual differences. Kolb and Aiello (1996) found that electronic monitoring of simple tasks appeared to increase stress levels for people with an internal locus of control and reduced stress for those with an external locus of control. The opposite pattern was found in another study that used complex tasks (Aiello & Svec, 1993). Research needs to continue to search for interactions between individual and situational factors that may influence performance.

Conclusion

The development of social facilitation theory is generally considered to have begun over 100 years ago with Triplett's (1898) study. Many of the factors that are considered important to existing social facilitation explanations were introduced in the early years of the theory's development.

Social facilitation deals with the effects of social presence on individual performance. Theories have generally attempted to eliminate the kinds of presence associated with specific social interactions, such as competition or coercion, in order to understand how presence itself affects individuals. Research during the first half of the 20th century found mixed effects of presence on individual performance. In some studies, perfor-

mance was enhanced and in others it was impaired. These inconsistencies made theory advancements difficult in the absence of any viable explanation.

Zajonc's (1965) article was important to the development of social facilitation theory in its integration of previous work and its explanation of inconsistent results. His drive-based theory asserted that the presence of others increases drive, and that drive enhances dominant responses and inhibits subordinate ones. This perspective accounted for more than had previously been explained and generated renewed interest and research. Subsequent researchers suggested variations, refinements, and amplification of theory based on drive or arousal. Developments in the 1980s began to extend the theoretical focus away from drive or arousal and toward more cognitive mechanisms.

The current social facilitation theories provide a range of explanations for performance effects of social presence. Unfortunately, the theories are unable to predict performance effects in such a way that eliminates other possible explanations, which leaves open the possibility that multiple explanations could be appropriate, depending on the specifics of the situation. Guerin (1986) suggested the possibility of more than one social facilitation effect. The framework presented here builds on the notion of more than one effect and attempts to integrate the variety of perspectives into a unified structure that suggests useful avenues for future research. Research that identifies and distinguishes different kinds of effects and the contexts in which they occur will provide important advancements for social facilitation theory.

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