

ABSTRACT

Title of Document: SOCIAL FACILITATION AND MOTOR PERFORMANCE: A META-ANALYSIS

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The purpose of this study was to examine the specific social conditions and contexts in which motor performance is facilitated or inhibited and to synthesize the findings of previous research into the theoretical framework that best explains the trends in the data. In 39 studies, the presence of others had small to moderate effects on motor performance. The main findings indicate that the mere presence of individuals does slightly facilitate performance. Similarly, in co-acting dyads, moderate facilitation effects were found for complex tasks. However, participating in activities with groups of individuals leads to decreased performance through social loafing. Evaluation also results in performance declines across all conditions. These meta-analytic results are discussed in relation to the Attentional Processes model. Additionally, the majority of excluded studies involved the home advantage/choke phenomena, thus a discussion of this literature was also included.

SOCIAL FACILITATION AND MOTOR PERFORMANCE: A META-ANALYSIS

By

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Introduction

Why is it that when faced with a pressured situation, in the company of others, some individuals prevail at their given task, while others seemingly choke and fail? Is it individual differences regarding past history and familiarity with such situations or tasks? Or, is there something about the mere presence of other individuals – whether they are friends or strangers, supportive or critical? Rarely does the reply to such a broad question include one all-encompassing answer. Perhaps the most likely response involves an interaction between the two factors of individual differences and crowd characteristics. Much research has been completed attempting to answer the question posed above, and most of this research has surrounded the theory of social facilitation.

Early research in the area of performance effects due to co-actors or an audience showed contradictory findings. As Dorrance (1973) notes, some studies (Tripplett, 1897 and Meumann, 1904) indicated that an audience improved or facilitated performance, while others (Moore (1917), Ekdahl (1929), and Burri (1931)) noted performance decrements in the presence of others. It was in 1924 that the term *social facilitation* was coined by Allport. Perhaps due to the contradictory findings and, as Zajonc (1965) suggests, the outbreak of World War II, research in this area severely declined in the late 1930s. It was not until 1965 when Zajonc rekindled the interest in this subject with his influential paper.

In this article, Zajonc (1965) reviews the research to that date, clarifies the concept of social facilitation, and more importantly, offers an explanation as to why the phenomenon occurs. Early in his piece he divides social facilitation into two distinct paradigms. He writes, “Research in the area of social facilitation may be

classified in terms of two experimental paradigms: audience effects and co-action effects. The first experimental paradigm involves the observation of behavior when it occurs in the presence of passive spectators. The second examines behavior when it occurs in the presence of other individuals engaged in the same activity” (p. 269). Thus, the first divergence arises. Subsequent inquiries have tended to select one of these paradigms, creating essentially two separate tracks of research. Zajonc (1965) continues in his article and develops the drive theory of social facilitation. This explanation was the catalyst to the renewed interest in the field. Just as the two paradigms have created distinct paths of research, so too has the explanatory framework. Perhaps the most prominent explanations are drive theory, Cottrell's (1968) learned drive theory, and the inverted-U theory.

In her thorough report, Dorrance (1973) briefly summarizes the majority of "explanations for underlying causes of social facilitation" (p. 9). These causes include mechanical and physiological reasons, distraction, social reinforcement and punishment, motivation, competition, and arousal. Of these, several review articles (Landers and McCullagh (1976), Guerin and Innes (1982), and Guerin and Innes (1984)) have indicated that arousal and the subsequent effects on attention are the dominant underlying mechanism on which the larger theories are based. For example, Zajonc's (1965) original application of the Hull-Spence drive theory states that as drive increases, so too does the elicitation of the dominant response to a given task. In the early learning stage of a task, the dominant response is composed of many incorrect decisions. However, as one progresses and becomes an expert at the task, the dominant response is categorized by correct responses and choices. As

Zajonc (1965) posits, the influence of an audience or co-actor(s) may serve to increase an individual's arousal level (drive), thus eliciting the dominant response. Therefore, for novices the presence of an audience will increase drive and bring forth the dominant response of incorrect choices, thus decreasing performance. However, the presence of an audience for an expert will increase drive and the likelihood of the correct dominant response, thus enhancing performance.

Despite the fact that Zajonc (1965) based his drive theory explanation on "indirect and scanty" (p. 274) evidence, his ideas have permeated and propelled many research efforts. More recently, however, Zajonc's original idea has been questioned and other theories and explanations for the social facilitation phenomenon have emerged. Perhaps the most prominent critic of Zajonc's (1965) views is Cottrell (1968) and his learned drive theory. His contention is that the mere presence of another individual may not be enough to increase one's drive. Rather, a condition of evaluation (potential or actual) is required to augment one's arousal level. This evaluative context integrates a learning component such that drive becomes a learned condition based upon the presence of evaluative others.

Another critic of Zajonc's (1965) views is Glaser (1982). Addressing Zajonc's theory he writes:

This interpretation is challenged on five main grounds: that it fails to explain adequately the early findings in the field; that the most influential subsequent tests of it are unsatisfactory; that a large number of studies which appear to contradict it have gone uncited and unheeded; that Hull-Spence drive theory is problematic *per se*; and that its application to the core of social psychology is inappropriate and has led to an impoverished conceptualization of the field (p. 265). This rather scathing criticism is backed up by the suggestion that researchers take a symbolic interactionist approach to the study of social facilitation. As Glaser (1982)

notes, this view maintains that the self is made up of the "reflected appraisals" of others. When performing a task before an audience one receives these appraisals. If the appraisals (real or imagined) are incongruent with one's sense of self a heightened situation of threat, and in turn anxiety, arises. Glaser (1982) goes on to state that this anxiety will affect performance "directly through the Yerkes-Dodson inverted-U relationship" and "indirectly through behaviors and cognitive processes" (p. 276). The Yerkes-Dodson inverted-U law essentially states that arousal and anxiety will facilitate performance up to a certain threshold based upon the task and personal characteristics. However, if arousal increases beyond that threshold, performance quickly deteriorates. An earlier study (Dorrance, 1976) lends support to this view. On a ball rolling task, increases in audience size coincided with increases in arousal, and the performance pattern suggested an inverted-U relationship.

From the brief discussion above, one can clearly see that both sides maintain strong convictions in support of their own theories. While this debate has been beneficial to the generation of research, the lack of unity has hampered our understanding of the social facilitation phenomenon. There is a need for a well controlled, un-biased, quantitative review of the literature to elucidate which theories are the most valid and reliable. While traditional narrative reviews are important and insightful, meta-analyses offer empirical evidence and may be less susceptible to bias. Meta-analysis statistically combines the findings of multiple inquires within a given topic. Critics of this method have often used the "apples and oranges" excuse, stating that trying to combine all the findings of a diverse set of studies is like comparing apples and oranges in terms of the differing populations, methods, and overall

qualities of the studies. However, a well devised, controlled, and executed meta-analysis can control for these potential limitations, with the result being a strong summary position of where we stand in our understanding of a given phenomenon.

In 1983, Bond and Titus conducted a meta-analysis of social facilitation. Their all-inclusive investigation included 241 studies from 1927-1982, and included any/all pertinent articles. By trying to focus on so many different areas and variables, it seems that their analysis, although well done, is spread too thin. Their three dependent variables included physiological arousal, performance quantity (speed), and performance quality (accuracy). However, they investigated two very different processes, namely both mental and motor tasks. Perhaps the most useful finding is that their results support Zajonc's (1965) position. The researchers write, "Results from this meta-analysis favor Zajonc's mere presence position: Others who lack the potential to evaluate task performance have reliable effects on physiological arousal, performance speed, and performance accuracy" (Bond and Titus, 1983, p. 283). While this report is comprehensive and is the backbone of the present investigation, perhaps more useful results can be obtained by narrowing the criteria. As Guerin and Innes (1984) write, "It is proposed that what is needed is not a new overall theory of social facilitation but a micro-analysis of different contexts and the behavior changes they elicit, to see which of the many processes are present in which situations" (p. 47).

The purpose of this study was to integrate the most recent (1983-2004) social facilitation research. Unlike the Bond and Titus (1983) investigation, this meta-analysis consisted only of articles and publications relating social facilitation to motor

performance. By narrowing the review to a specific focus, it was hypothesized that a stronger effect would be present, and the specific social contexts that facilitate or inhibit motor performance would be extracted. Thus, the specific questions to be answered were: what are the specific social conditions and contexts in which motor performance is facilitated? And, what theory best explains what the research shows?

Method

Selection and Inclusion of Studies

In order to ensure a comprehensive review and in line with previous meta-analyses, the data was obtained through three sources: computer database searches, manual searches, and journal sources. The computer database searches included Academic Search Premier (EBSCO) (1982 to the present), MEDLINE (1982 to the present), ERIC Psychology and Behavioral Science Collection (1982 to the present), PSYCHarticles (1982 to the present), PSYCHinfo (1982 to the present), and SPORTdiscus (1982 to the present). 1982 was selected as the starting date due to the publication of Bond and Titus' (1983) meta-analysis. Their exhaustive review contained data obtained through similar sources from 1927-1981. Thus, the present study serves to update and summarize the most recent findings. The keywords for the search consisted of: "audience," "social facilitation," "crowd," "spectator(s)," "mere-presence," "co-action," "performance," "motor performance," "motor behavior," "sport performance," "athletic performance," "motor task," and "choking." In addition to Bond and Titus' (1983) paper, other comprehensive narrative reviews on social facilitation have been published. The reference lists from these reviews were manually searched for pertinent articles. Finally, 19 journals with a likelihood of relevant research were searched from 1982 (or when they began publication) to the present. These journals included: *Psychological Bulletin*, *Perceptual and Motor Skills*, *Journal of Personality and Social Psychology*, *Journal of Motor Behavior*, *International Journal of Sport Psychology*, *Research Quarterly*, *Journal of Experimental Social Psychology*, *Journal of Personality*, *Journal of Sport Psychology*, *The Sport Psychologist*, *Journal of Applied Sport Psychology*, *Sociology*

of Sport Journal, International Review of Sport Sociology, Journal of Sport and Exercise Psychology, Journal of Sport Behavior, Journal of Sport and Social Issues, Motor Control, Human Movement Science, and Journal Social Psychology.

The two primary criteria for selection were that the study incorporates some aspect of the theory of social facilitation (e.g. evaluation, mere presence, or co-action) and examines some form of motor task. The operational definition of “motor task” for the purposes of this paper was any task that requires the participant to respond to a stimulus using a manual component. Verbal responses were not included, nor were key presses in response to a predominately mental or memory task. However, video games, reaction time trials, and gross motor tasks did meet selection criteria.

Coding the data

Each study that met the eligibility requirements above was then coded based upon several characteristics and variables. Bond and Titus (1983) elected to code their data on “5 procedural and 13 substantive variables” (p. 269). This project followed a similar guideline, but organized the coding of data into six broad categories, with several variables under each heading. The first category that was recorded was the date of the study. Next, the paradigm that was tested was classified. Bond and Titus (1983) named this the “role” variable, as it describes the actions of the others in the study (e.g., evaluative others, mere-presence, or co-actors). Following this was a category that described the various study designs. Information under this section included variables describing the control condition - whether subjects are truly alone in the room, or if others (including the experimenter) are present, or if it is possible to tell given the information reported. Other information

included the number of other people that are in the room during the experiment, the familiarity of both the audience and the task, the visibility of both the subject and the observers, and the observer status (e.g., peer or expert). Under the next category were subject characteristics, which included demographic information such as age, gender, and occupation. After the subject characteristics, the response characteristics were recorded. Items under this category were task complexity, the type of task, and the quality and quantity of the response. The two dependent variables [response quality (accuracy) and response quantity (speed)] fell under this heading. Finally, a category that examines the quality of the study was incorporated. Information pertaining to test-retest reliability, validity, and internal consistency was documented under this label.

Computation of effect size

Glass, McGaw, and Smith (1981), Hedges and Olkin (1985), Cohen (1988), Cooper (1989), and Thomas and French (1986) provide the significant studies and literature describing the statistical analyses and terminology for a meta-analysis. This meta-analysis followed the guidelines set forth by these seminal reports. As such, d statistics were computed as follows: $d = ((M_1 - M_2) / SD) * (1 - 3/4(N_c + N_e - 2) - 1)$, where M_1 is the mean of the experimental group, M_2 is the mean of the control group, and SD is either the standard deviation of the control group or the pooled standard deviation, as outlined and suggested by Thomas and French (1996). Their suggestions indicate using the pooled standard deviation when there is no clear difference between the experimental and control groups; otherwise the control group SD is acceptable.

The second factor in the equation is a correction for small sample sizes, where N_c and N_e are the number of participants in the control group and experimental group, respectively. Hedges and Olkin (1985) indicated that effect sizes tend to be positively biased in studies with small sample sizes. This correction, therefore, produces a far less biased and more precise statistic. When means and standard deviations were not reported, transform calculations (as stated by Cooper, 1989) were performed so that an equivalent d statistic was obtained through whichever significance test (e.g. t or F) the researchers of a given study used. In these instances *MetaWin* statistical software (Rosenberg, Adams, and Gurevitch, 2000) was used to obtain the statistic. Study variances were then calculated following the formula: $V_d = (N_c + N_e / N_c N_e) + (d^2 / 2(N_c + N_e))$, where, again N_c and N_e are the number of participants in the control group and experimental group, respectively, and d is the calculated effect size. Effect sizes (ESs) and variances were first calculated for all individual studies. Next, overall effect sizes and variances were obtained by averaging all of the component studies within a given category/variable. All summary statistics were obtained using the *MetaWin* software and a random-effects design (Rosenberg et al., 2000). For a more detailed description of the formulas and steps in this process, readers are encouraged to reference the reports of Thomas and French (1986) or Hedges and Olkin (1985).

It was necessary to stratify studies according to the moderating variables. For example, under the “paradigm” heading, ESs from articles examining mere presence were averaged under one overall ES, while ESs pertaining to co-action were averaged under another overall ES. The moderating variables were then addressed within one

of the three paradigms. This stratification and categorization should serve to control many of the potential limitations and criticisms of meta-analysis.

Results

The literature search produced 79 studies relating some aspect of the theory of social facilitation to motor performance. Of these studies, 39 reported appropriate statistics for analysis. Studies not reporting the necessary information were not included in the summary statistics, but will be discussed in narrative form.

Additionally, the search revealed two phenomena related to social facilitation - social loafing and the home advantage/disadvantage/choke. Separate analyses were performed on each of these subjects. The results from these analyses will be discussed in turn, followed by a general discussion and conclusions.

Social Facilitation

Mere Presence

The overall social facilitation ES, including all 18 studies and 41 individual ESs was .046. While this is a very small statistic (no effect), it is important to note that not much should be read into this value as it is composed of all paradigms and moderating variables. Cohen (1988) devised the following scale to estimate the magnitude of effect sizes: .2 = small, .5 = moderate, and .8 = large. As stated above, the social facilitation studies were stratified based upon the specific paradigm being tested (i.e., mere presence, evaluation, or co-action). Table 1 presents all of the summary statistics under the mere presence heading. It should be noted (for all tables) that a significant value ($\leq .05$) in the "prob(X^2)" column "indicates that the variance among effects sizes is greater than expected by sampling error" (Rosenberg et al, 2000, p. 23). The authors go on to state that the total heterogeneity (Q_{total}) is tested against a X^2 distribution, with the null hypothesis being that all ESs are equal. Thus,

non-significant values are desired because it indicates that sampling error accounts for most of the variance under the variable being studied. Under the mere presence paradigm, the overall ES, based upon 11 studies and 24 individual ESs, proved to be a small effect, with a value of .202. This statistic was further examined in regards to the moderating variables.

Control group validity was the first variable to be studied. Studies were categorized as either "high" or "low" depending upon whether or not the subject was truly alone (pure test of mere presence) in the room or if someone (usually the experimenter) was present during the control condition. The word "valid" was used solely as a description and is not intended to indicate any connotation of statistics or significance. Thus, highly "valid" control conditions are true tests of the mere presence paradigm, while studies with low "validity" in the control conditions are confounded by the presence of at least one person, usually the experimenter. The results showed that studies with high (truly alone) control condition validity had a larger effect than those studies with low (experimenter or others present) control condition validity (ES = .4158 and ES = .1248, respectively).

Audience size was examined next. Since there was a wide range in the number of audience members, a dichotomous grouping was established based upon the characteristics of the sample. Studies with 10 or fewer audience members were lumped into one group, while audiences of 11 or more members were grouped into another cluster based upon a logical break in the sample. Small facilitation effects seemed to occur only in audiences with 10 or fewer individuals (ES = .3891).

Audiences of 11 or more were not associated with either performance enhancement or deterioration ($ES = -.1848$).

Another audience variable, audience familiarity, was coded based upon how familiar the subject was with the audience members. Based upon the data, familiar audiences tended to have no effect on motor performance ($ES = -.0790$). However, unfamiliar audiences had a small facilitative effect ($ES = .3400$). It is proposed that performing in front of a familiar audience may not be a sufficient means to increase drive. Thus, neither performance facilitation, nor deficits were found in the familiar audience condition.

Zajonc's (1965) drive theory explanation of social facilitation revolves around experts and novices. The presence of an audience is hypothesized to facilitate expert performance, while hindering novices'. This issue was addressed with the task familiarity variable. Subjects were classified as being familiar with a task if they went through a series of learning trials to reach a baseline criterion or it was stated in the text that they were "skilled". If no mention was made, it was assumed that the task was new, and thus unfamiliar. The results do not directly support Zajonc's (1965) explanation. Familiar tasks (experts) were not affected by the presence of an audience ($ES = .0623$), whereas non-familiar tasks (novices) showed small to moderate facilitation effects ($ES = .4509$). This finding will be addressed in the discussion.

The results from both the visibility of the subject and the visibility of the observer variables were similar and unremarkable. When subjects were visible to observers higher effects were found than when they were not visible ($ES = .2206$ and

ES = .1354, respectively). Likewise, when observers were visible to subjects, higher effects were found than when the observers were not visible (ES = .2133 and ES = .1366, respectively). In both non-visible conditions, the ESs approached a small effect, but can still be considered as having no effect.

While the visibility of the observer had little to no effect on performance, the status of that individual(s) did seem to have an impact. Peer observers were shown to have a small debilitating effect (ES = -.2086). Conversely, expert observers had a moderate to strong facilitative effect (ES = .7028).

Finally, the last variable to be looked at was the type of task. Tasks were divided into either sport/exercise endeavors or laboratory activities. Laboratory tasks (pursuit rotor, computer tracking, etc.) produced moderate facilitative effects (ES = .6466), while the sport/exercise (basketball, baseball, running, etc.) tasks were shown to have no effect (ES = -.1146).

Table 1. Mere Presence Summary Statistics

	Mean ES	95% CI	Heterogeneity (Qtotal)	df	Prob (X ²)	t- score	df	p- value
High Control Validity	.4158	-.48 to 1.31	6.4369	5	.26599			
Low Control Validity	.1248	-.33 to .58	18.9842	17	.32944			
Audience # ≤ 10	.3891	-.08 to .86	19.1686	16	.26002	1.41	22	p>.05
Audience # 11+	-.1848	-.71 to .34	5.3409	6	.50089			
Familiar Audience	-.0790	-.61 to .46	5.9257	6	.43156	2.26	22	p<.05
Non-familiar Audience	.3400	-.17 to .85	18.4735	16	.29691			
Familiar Task	.0623	-.43 to .56	16.7502	15	.33402	1.94	22	p>.05
Non-familiar Task	.4509	-.25 to 1.15	8.4994	7	.29062			
Subject Visible	.2206	-.24 to .68	21.1742	18	.27072	2.08	22	p<.05*
Subject Not Visible	.1354	-.79 to 1.06	3.7384	4	.44256			
Observer Visible	.2133	-.21 to .64	23.4245	20	.26843	.45	22	p>.05
Observer Not Visible	.1366	-1.53 to 1.81	1.8037	2	.40582			
Observer Stat: Peer	-.2086	-.54 to .12	10.9628	12	.53211	.334	22	p>.05
Observer Stat: Expert	.7028	.03 to 1.38	11.9714	10	.28698			
Sports Task	-.1146	-.41 to .18	11.5883	12	.47928	4.85	22	p<.05*
Laboratory Task	.6466	-.07 to 1.36	11.8699	10	.29386			
Overall	.2020	-.17 to .58	26.9636	23	.25752	4.07	22	p<.05*

"*" indicates a significant value at the .05 level

Discussion

The results from the mere presence paradigm are logical, though not striking. Further discussion of the control condition validity, audience size, subject visibility, and observer visibility variables is not warranted. The non-existent to small effects stand for themselves. However, as was alluded to earlier, some surprising results were found. The fact that no effect was found for familiar audiences may indicate that performing in a comfortable situation (i.e., in front of individuals one knows) is not a sufficient condition to increase drive, and thus produce the social facilitation effect. Additionally, the finding that the ES was negative may further be a sign that familiar audiences distract attention away from the task at hand, thereby decreasing performance.

This idea is supported by the Distraction/Conflict theory, which states that the presence of others attracts the performer's attention, leading to distraction from the task and decreased performance (Jones and Gerard, 1967). Further, Sanders and Baron (1975) suggest that distraction can increase drive through the conflict between attending to the task and attending to the distraction. This notion is strengthened by the fact that the ES was also negative under the peer observer status variable. Conversely, expert observers generated the strongest ES. Perhaps this is due to their status as experts generating a condition of increased drive, and thus facilitating performance. Of course, this reasoning must be considered within the context of skilled and novice performers. The seemingly contradictory finding that peer observation resulted in a decrease in performance (perhaps due to higher distraction) and the finding that familiar tasks were not affected by an audience (perhaps because they could block out the audience) is explained through the different levels in skill of

the participants. When examining observer status, task familiarity was not controlled. Thus, in each level of the observer status variable there were both skilled and novice performers. Similarly, when discussing the task familiarity variable, observer status was not controlled. Thus, in each level of task familiarity variable there were both peer and expert observers. Each dyad was tested against its counterpart, so any conclusions or explanations must remain specific to that individual variable.

The data from the mere presence paradigm does not fully support Zajonc's (1965) theory. Non-familiar (novel) tasks generated small to moderate facilitative effects, while the performance on familiar activities was not affected by the presence of an audience. However, there is a potential confound in the way the familiar tasks were coded. It is possible that tasks were not well learned, even after progressing through a series of trials and reaching a baseline criterion. Thus, the "familiar task" group may contain studies in which individuals were classified as skilled, yet were really novices. If this was the case, instead of seeing facilitative effects, the ES would be smaller than expected, as the present data showed. Future studies should attempt to have a clearer delineation of novice and skilled participants. It may even be necessary to stratify various levels of skills, such that high school, college, and professional athletes' reactions to the presence of an audience can be documented and studied.

Evaluation

The evaluation paradigm was coded such that only those studies indicating that participants were explicitly evaluated, graded, or judged were included. This left a total of seven studies and 11 individual ESs. The overall evaluation ES was

moderate and negative (ES = -.5091). As with the mere-presence paradigm, evaluation studies were, with two exceptions, examined based upon the same moderating variables. Since subjects were evaluated, they had to be visible. Thus, the visibility of the subject variable was excluded because all studies and individual ESs would have been included. The result from this category would be identical to the overall effect. Additionally, only one study used a familiar audience. Due to this fact, the familiar audience variable was also excluded from further analysis. Table 2 displays all of the summary statistics under this heading.

The results from the control condition validity variable were not remarkable. It is important to note that the ES in the high control condition is only based on two individual ESs. With that fact in mind, no effect (ES = -.1879) was found in the high validity situation, while a moderate effect (ES = -.5986) was discovered in the low validity group. Similarly, the observer visibility variable produced small to moderate effects, close to the overall ES, with a slightly larger decrease in performance in the visible observer group. It appears that being evaluated, either by a visible or non-visible individual, has a similar negative effect on performance.

The number of individuals in the audience was much smaller under this paradigm than in the mere presence group. In fact, only one study investigated the effects of an audience greater than 10. This study was excluded, thus creating only one audience group of ≤ 10 . Not surprisingly, the ES was moderate and negative (ES = -.5416). This same study was also the only study to examine the effects of a familiar audience. The small individual ES (-.199) from that study was removed

from further analyses, eliminating the familiar audience condition. Thus, the ESs for both the audience number and non-familiar audience variables are the same.

Table 2. Evaluation Summary Statistics

	Mean ES	95% CI	Heterogeneity (Qtotal)	df	Prob(X ²)	t-score	df	p-value
High Control Validity	-.1879	-4.35 to 3.97	1.00	1	.31731			
Low Control Validity	-.5986	-1.38 to .18	8.2474	8	.40968			
Audience # ≤ 10	-.5416	-1.22 to .13	10.0904	9	.34322	1.56	9	p>.05
Non-familiar Audience	-.5416	-1.22 to .13	10.0904	9	.34322			
Familiar Task	-.2639	-.61 to .08	3.5639	6	.73545			
Non-familiar Task	-.9370	-3.11 to 1.24	3.9094	3	.27142			
Observer Visible	-.5397	-1.55 to .47	7.4788	6	.27882	3.11	9	p<.05*
Observer Not Visible	-.4541	-1.07 to .16	.7038	3	.87230			
Observer Stat: Peer	-.0459	-.86 to .76	2.9569	3	.39832	.369	9	p>.05
Observer Stat: Expert	-.7820	-1.72 to .15	6.7842	6	.34127			
Sport Task	-.2639	-.61 to .08	3.5639	6	.73545	3.28	9	p<.05*
Laboratory Task	-.9370	-3.11 to 1.24	3.9094	3	.27142			
Overall	-.5091	-1.11 to .09	11.3637	10	.32989	3.11	9	p<.05*

"*" indicates a significant value at the .05 level

The effect of observer status showed a similar trend as in the mere presence paradigm. Peer observers/evaluators had no effect on subsequent performance (ES= -.0459), while expert evaluators caused a moderate to large (ES = -.7820)

deterioration. Again, peer evaluation may not have created a condition of increased drive, effectively neutralizing the phenomenon.

The two variables that revealed the most interesting findings were the type of task and task familiarity. Because of the small number of studies, the type of task and task familiarity variables overlapped, again giving identical statistics. Laboratory (unfamiliar) type motor tasks produced the largest ES (-.937) of the group. A much smaller ES (-.2639) was revealed for the sport (familiar) type tasks. What is interesting about these findings is that the sport studies usually examined members on a collegiate athletic team (who are highly skilled at their task), while laboratory tests were conducted with a more general student population (novices). The pattern of results is similar to what one would expect to find under Cottrell's (1968) theory. The experts' performance was less negatively affected by the audience, while novices' performance suffered greatly.

Discussion

The results from these analyses lend some support to Cottrell's (1968) learned drive theory. Thus far, it appears that the mere presence of an individual does not have as strong an effect as evaluation on motor performance. Unfortunately, these findings are based on a small sample size and must be interpreted in that light. However, the consistency of the findings (all ESs under evaluation were negative) and the pattern of results are encouraging.

Co-action

Co-action was the final paradigm under the social facilitation heading to be considered and was defined as two individuals working simultaneously on the same

task. The overall co-action ES (.4267) was in the small to moderate range and was based on four studies and six individual ESs. Table 3 presents the co-action summary statistics. Due to the small number of available ESs and similarities between studies, many of the moderating variables could not be addressed.

Table 3. Co-action Summary Statistics

	Mean ES	95% CI	Heterogeneity (Qtotal)	df	Prob (X ²)	t-score	df	p-value
High Control Validity	.6364	-.01 to 1.28	2.8979	3	.40763			
Low Control Validity	.0435	-2.88 to 2.96	1	1	.31731	2.13	4	p>.05
Subject & Observer Visible	.2575	-.14 to .66	3.0152	3	.38929			
Subject & Observer Not Visible	1.1236	-2.83 to 5.08	.0581	1	.80946	2.53	4	p>.05
Simple Task	.1285	-4.63 to 4.89	1	1	.31731			
Complex Task	.5575	-.11 to 1.22	3.5180	3	.31843	1.45	4	p>.05
Overall	.4267	-.025 to .88	6.1517	5	.29174			

"*" indicates a significant value at the .05 level

The control group validity variable once again showed that the high validity control condition was associated with larger effects than the low validity group (ES = .6364 and ES = .0435, respectively). Similar disparities in the differences of ESs between dyads were found for all tested variables. Both visible subjects and visible observers shared the same individual ESs; as did the non-visible subject and non-visible observer variables. Thus, the two variables were combined under one visible vs. non-visible dyad. The visibility effect was only slightly facilitative (ES= .2575), whereas the non-visibility effect was highly facilitative (ES 1.1236) . Also

noteworthy is the difference in task complexity. Working on a complex task with a co-actor (ES= .5575) tends to increase performance over working with a co-actor on a simple task (ES= .1285), which seems to have no effect.

Discussion

The large differences between the visible and non-visible conditions may be indicative of a fear of performing worse than the co-actor. When performing in the presence of co-actor, one can gauge individual performance simply by monitoring the other performer. However, when performance norms are unavailable (non-visible condition), and one cannot tell if he/she is performing up to par, the fear of being labeled "below average" may be enough to increase drive and facilitate, or hinder, subsequent performance. As for task complexity, simple tasks may not hold performers' attention as well as complex tasks do; nor may they elicit the same desire for social comparison as complex tasks. The need for social comparison, therefore, may be the stimulus for increasing drive and performance outcomes. This paradigm leads directly into the related field of social loafing.

Social Loafing

Five studies, yielding 17 ESs, were included in the social loafing analysis. Social loafing (also known as the Ringelmann Effect as cited by Latane et al., 1979) is defined as the tendency for individual performance to decrease in a group, such that group performance is substantially less than the sum of individual performances. Individual ESs were calculated using group performance as the experimental mean and individual performance as the control mean. By setting up the formula in this way, if individual performance exceeded group performance, a negative value would

result. Thus, any negative ES is indicative of the social loafing phenomenon.

Similarly, a more negative value is representative of a larger effect.

The results confirm that social loafing seems to exist. The overall mean ES of -.26 falls into the "small" range of Cohen's classifications. This effect appears to be fairly constant between males and females. When controlling for gender, the resulting ESs were -.26 for males and -.19 for females (see Table 4).

Table 4. Social Loafing Summary Statistics

	Mean ES	95% CI	Heterogeneity (Q_{total})	df	Prob(X^2)	t-score	df	p-value
Males	-.2622	-.50 to -.02	4.4981	11	.95302			
Females	-.1900	-.67 to .49	3.9158	4	.41752			
						.27	15	p>.05
Overall	-.2600	-4.65 to -.05	9.5150	16	.89070			

"*" indicates a significant value at the .05 level

Discussion

Even though the resulting ESs represent small effects, it is again encouraging that the results are consistent. One would not expect to find large differences between males and females, nor should those values be different from the overall effect. It is important to keep in mind that these statistics are based upon five studies and 17 individual ESs. With these low numbers one must be cautious when drawing any meaningful conclusions. Future studies should address this issue. It seems reasonable to conclude, however, that individual performance often exceeds that of performance within a group.

Home Advantage and Choking

The home advantage literature does not often report the appropriate statistics to calculate effect sizes. Out of a sample of 30 published studies, only 11 provided

the needed information to be included in this meta-analysis. The main findings from the articles excluded in this analysis are presented in the Appendix. It is clear from the table that the home advantage is a phenomenon that warrants further attention. Out of the approximately 50 reported findings included in the table, over 70% found either a home advantage or at least not a home choke. However, the converse of that is that about 30% of the studies did find evidence of either an away team advantage or a home choke. The 11 studies and 44 individual ESs included in the analysis resulted in a small (ES= .3369) effect supporting the home advantage (see Table 5 for complete summary statistics). The type of activity was used as a moderating variable to further explore this sample. The majority of ESs were derived from studies examining the sport of basketball. Therefore, basketball ESs were separated from all other sports and activities. The resultant ESs indicated that, in this sample, there was a small home advantage for basketball (ES= .3338) and for all other activities (ES= .3043) combined.

Table 5. Home Advantage Summary Statistics

	Mean ES	95% CI	Heterogeneity (Qtotal)	df	Prob(X ²)	t-score	df	p-value
HA Basketball	.3338	.1616 to .5060	20.1198	21	.51369			
HA Other Activities	.3043	-.2109 to .8195	6.4880	21	.99895			
						.438	42	p>.05
HA Overall	.3369	-.0085 to .6823	10.0216	43	1.00			

"*" indicates a significant value at the .05 level

Lastly, the four studies and six ESs from the choking literature were summarized. It should be noted that the choking studies are unrelated to the home

advantage studies. The result of this analysis indicated that there was a large choking effect (ES= -.8846). See Table 6.

Table 6. Choking Summary Statistics

	Mean ES	95% CI	Heterogeneity (Qtotal)	df	Prob(X^2)
Choking Overall	-.8846	-1.482 to -.2875	4.6833	5	.45574

"*" indicates a significant value at the .05 level

Discussion

At first glance, the data on the home advantage would appear somewhat inconsistent with the findings included in the Appendix. Since the majority of findings indicated the presence of the phenomenon, one could expect a larger overall ES. However, most of the findings in this study have been in the small to moderate range. It is at least encouraging that there was an effect and it was in the predicted direction. The results from the choking analysis showed a strong effect. It is important to note that all studies included in the analysis were strictly choking studies, and not reports examining the home choke. It would appear that both the home advantage and choking phenomena are legitimate occurrences and warrant further investigation. However, one must be cautious when interpreting the results of the choking analysis, as it is only based upon six individual ESs.

General Discussion

The purpose of this study was to review the most recent social facilitation literature and identify the specific social contexts which bolster or hinder motor performance. Another goal was to evaluate which theory best explains the trends found in the data. The results from the mere-presence paradigm generally revealed small to moderate effects, indicating the presence of an individual does facilitate performance, but only slightly ($ES = .202$). One of the most striking findings occurred under the task familiarity variable in which novice performers (non-familiar task) experienced facilitation effects in the presence of an audience, while skilled performers (familiar task) did not receive any benefit. Another noteworthy result indicated that peer observers had small debilitating effects on performance, whereas expert observers elicited moderate to large facilitation.

The evaluation paradigm also showed moderate effects. Interestingly, all effect sizes were negative, meaning that the presence of an evaluative other decreased performance across all conditions. For the purposes of this study, the most telling statistics were found under the task familiarity, observer status, and task type variables. When the task was familiar (skilled performers) evaluative audiences only had a small debilitating effect on performance. However, non-familiar (novel) tasks performed under evaluation showed large performance decreases. Apparently, familiarity with a task mitigated the negative effects of evaluation. A similar pattern emerged under the observer status variable. Expert evaluators were associated with moderate to large performance declines, while peer evaluators had no effect on performance. Evaluation by an expert tended to negatively impact performance,

while peer evaluation, perhaps perceived as less threatening, had no negative impact. Finally, performance on sport tasks was only slightly hampered, yet performance on laboratory motor tasks suffered large negative effects during evaluation. Perhaps the familiarity of sports tasks made evaluation less negatively charged, while laboratory motor tasks, by definition not in a particularly familiar setting, elicited large negative effects on performance.

Another paradigm, the co-action paradigm, was limited by a small sample size, and thus the worth of the results is questionable. An extension of this paradigm is the social loafing literature, which showed an interesting facilitating effect. As with the mere presence paradigm, small to moderate facilitation effects occurred when working with another individual on the same task. While facilitation effects were found for one co-actor, groups of co-actors lead to social loafing. There was a small overall social loafing effect that was fairly constant between males and females.

The last group of studies to be examined revolved around the home advantage and choking literature. Support was found for the home advantage, indicating that teams should strive for, and if given the opportunity, take, the home field/court/playing surface. Additionally, strong support was found for the choking phenomenon. However, due to a small sample size further examination was not feasible.

Returning to the goals of this report, the main finding that evaluation caused a decline in motor performance lends some support to Cottrell's (1968) learned drive theory. Recall that his theory states that evaluation is necessary to increase arousal level, thus making drive a learned response. Experts experienced a decline in

performance (contrary to theory predictions), but this decline was marked by a small effect size (-.26). Alternatively (and in accordance with Cottrell's (1968) statements), non-skilled individuals suffered large (ES = -.94) performance declines when being evaluated. While social facilitation was not demonstrated, the fact that the experts did not experience the same severity of performance decline as did the novices is in the predicted direction. Essentially, the presence of an evaluative audience resulted in drastic performance deterioration for novices, but only small declines for experts. Further, these evaluation effects were much stronger when the evaluator was an expert, as opposed to a peer.

As previously stated, Zajonc's (1965) drive theory was not substantiated. The mere presence of another individual did facilitate novice performance, but had no effect on expert performance. This finding is the opposite of what Zajonc's (1965) theory would have predicted. As noted above, increased drive should result in the elicitation of the dominant response. For novices this response consists of incorrect movements. Thus, in the presence of an audience, drive increases, incorrect decisions and movements are evoked, and performance decreases. It is possible, as discussed in the results section, that audiences made up of peer observers are not a condition that increases one's drive. If drive is not increased, the incorrect dominant response would not be elicited, and performance would be largely unaffected.

Taken together, the results from this analysis provide new insight into the social facilitation effect. Although this analysis was similar to Bond and Titus' (1983) paper, it is difficult to draw direct comparisons because different aspects of the social facilitation phenomenon were assessed. However, some similarities do exist.

For example, in both studies the magnitudes of effect sizes were generally in the small to moderate range of Cohen's (1988) classifications. Additionally, several variables showed a similar pattern of results. The control condition "validity" variable in both studies tended to report larger effect sizes when the subject was truly alone (high validity). This finding is logical in that better controlled and more thoughtfully planned studies often show greater effects. Another variable that was found to corroborate Bond and Titus' (1983) report was the observer status category. They write, "...familiar others have smaller effects than unfamiliar others in all six of the comparisons..." (p. 280). As affirmed earlier, comparable results were also found in this study. The idea that peer observers may not increase drive is based upon the distraction/conflict theory (Jones and Gerard, 1967), as stated in the discussion of the results of the mere presence paradigm.

Although such variables as observer and subject visibility and the number of audience members are interesting and provide unique insight into the various social conditions that facilitate or hinder motor performance, the crux of the matter lies within the various paradigms, task familiarity, and type of task variables. Differences emerged between this study and Bond and Titus' (1983) conclusions in regards to these variables. As stated in the introduction, the researchers found support for Zajonc's (1965) drive theory. In the present endeavor, Cottrell's (1968) learned drive theory seems to better explain the results. In the evaluative context, much more robust effect sizes, in line with his theory, were found. This finding was strengthened through the type of task variable that showed sports tasks, consisting primarily of skilled participants, had less performance decreases than individuals

completing novel tasks. It was not unexpected that this difference would occur. The Bond and Titus (1983) investigation primarily consisted of cognitive activities whereas this review concentrated exclusively on motor tasks. Because mental and motor responses are two separate (but related) channels, it is reasonable to assume that the overt action associated with a motor response is susceptible to different (but related) stressors than the intrinsic processes of a mental task. This could explain why the Bond and Titus (1983) investigation resulted in Zajonc's (1965) explanation being favored, whereas this study supports Cottrell's (1968) theory.

There is also another explanation that better describes the results reported here that has largely gone either unnoticed or unheeded in the literature. Sanders (1981) proposed the Attentional Processes model in which the three leading theories (mere presence drive theory, learned drive theory, and distraction/conflict) are slightly modified and combined. Sanders' (1981) contention is that the mere presence and learned drive theory explanations are "antecedents leading to the attentional conflict described by the D/C explanation" (p. 245). He proposes that the mere presence assumption be modified from a "drive-inducing alertness reflex" to a "drive-neutral orienting reflex" (p.245). Thus, the presence of an audience may be significant, but does not necessarily increase drive. Rather, the orienting reflex serves as a monitoring system to either keep attending to the audience or to the task. He suggests a similar modification to the learned drive theory, where the "drive-inducing anticipation of rewards and punishments" is changed to "a drive-neutral learned motivation for attending to others" (p. 246). Again, this would have the effect of acting as a monitoring system. If information can be gleaned from the audience, attention and

drive are increased to those individuals. Conversely, if no information can be acquired, attention is directed at the task and no increase in drive occurs.

The results from this study generally lend support to this model. In the mere presence paradigm peer observation resulted in a decline in performance, while observation by experts facilitated performance. Under the Attentional Processes model, it can be said that peer observers captured more attention from the participants than did the expert observers. Experts may have been viewed as individuals who will never be seen again, whereas peers are friends and people who may be seen on a regular basis, and thus social comparisons and competition may influence the amount of devoted attention. Further support comes from the evaluation paradigm, although the results are the inverse of the mere presence data. Again, the apparent contraction between the mere presence and evaluation paradigms can be conceptualized if one maintains that the two groups (mere presence and evaluation) are distinct. Overt evaluation is a different situation than inferred evaluation. In inferred evaluation, peer observation may attract more of the participant's attention because no concrete statements about performance quality are proffered. Thus, performance norms only reside in the participant's thinking and social comparisons. However, when overt performance feedback is being offered, it is logical that experts would carry more weight than a peer. As such, in this paradigm, peer evaluation may not be as attentionally consuming as expert evaluation. Peer evaluation may have less meaning for the individual than the feedback from an expert. Again, the pattern of results is consistent with this line of reasoning. Peer evaluators had no effect on performance,

indicating attention was devoted to the task, while expert evaluation resulted in a large performance decline, suggesting attention was given to the evaluator.

More support for the model comes from the task familiarity variable. Zajonc's (1965) theory expects experts to perform better in the presence of an audience. The Attentional Processes model does not directly address this issue. However, skilled performers, by definition, would not devote attention to the audience; they would have learned to focus on the task at hand and block out all other distractions. In fact, Williams and Krane (1998) list "a narrow focus of attention concentrated on the activity itself" as a characteristic of the ideal performance state that often leads to peak performance. Therefore, one can assume that neither facilitation effects nor performance decreases would be present. Essentially, there would be no effect. The results from this meta analysis support this view. For both the mere presence and evaluation paradigms, no effect was found for expert performance.

A potential drawback of the model is that it does not address the facilitation effects found for novice performers. If attention was devoted to the audience, as the model would predict, attentional conflict would lead to increased drive, the elicitation of the dominant response, and decreased performance. The results from this study do not support such a scenario. Novice performance was facilitated in the presence of an audience. It is possible that the effects of motivation and competition are responsible for this finding.

Generally the term "motivational climate" is reserved for and used in describing sport settings. However, this concept can be readily applied to learning and performing motor tasks. As Cox (2002) explains, there are two types of

motivational climates - mastery and competitive/performance. Mastery climates are similar to task orientations in that the emphasis is on learning, and judgments about performance and ability are based upon improvement. Conversely, competitive climates, similar to ego orientations, are situations in which athletes or performers believe that the coach or evaluator will punish them for poor performance and ability is based upon outperforming others.

It is reasonable to assume that a competitive climate is evoked during a scientific study. Participants, especially novices, are not likely to want to gain mastery over a task that, once the study is over, they will not perform again. Thus, outperforming others becomes the main motivation. This could explain the finding that social facilitation effects were present for novice performers. Perhaps these novices felt that social comparisons or judgments about their ability were being made. Thus, they tried their best, focused on the task at hand, and performance subsequently increased. This is a reasonable (but purely speculative) explanation that future studies should address.

The motivation variable could also be involved in the social loafing results. Recall that small effect sizes were found for the overall effect and for both males and females. Thus, the data show a steady uniform condition. Individuals perform better alone than as part of a group. The question, then, is why? Again, motivation could be (at least part of) the answer. The small sample size in this study did not allow for much in-depth analysis. The literature is often broken down into two different conditions - when individual performance within the group will be publicly displayed and when the results will remain undisclosed. It is possible that greater social loafing

would occur in the latter condition. Participants may be amotivated (the relative absence of motivation, Cox, 2002, p. 75) to perform when no evaluation of individual performance will be made. Swain (1996) investigated both identifiability and goal orientations in regards to the social loafing phenomenon. His results point to motivation as a key variable. He writes: "While confirming that identifiability of performance is an important situational variable, the findings suggest that the dispositional factor of achievement orientation may interact to provide a more detailed explanation of the social loafing phenomenon" (p. 337).

Finally, motivation may also be involved in the home advantage and choking literatures. The whole basis of the home advantage is that fan support provides the extra motivation to perform superiorly to the visiting opponent, both physically and mentally. In addition, home advantage suggests that the team benefits from familiarity with the facilities and extra rest, in contrast to the visiting team who may have had a long journey and has to contend with unfamiliar surroundings. On the other hand, however, there is also a line of reasoning that suggests the home team is more susceptible to being aware that their performance is being scrutinized and more critically judged. In turn, this awareness can lead to self-focused attention, loss of automaticity, and decreased performance (Shlenker and Leary, 1982). The psychophysiological explanation for choking is that self-focused attention creates more neural noise. An oversimplified sequence of events resulting from an excess of neural noise is that the efferent signals from the brain to the muscles are disrupted. This interruption in signals can be just small enough to fragment the smooth motion

required for many tasks (such as the pursuit rotor) and results in decreased performance.

Thus, self-focused attention seems to be a factor in choking. In fact, studies (Beilock and Carr, 2001 and Lewis and Linder, 1997) using golf putting have supported the notion that choking results from self-focused attention. It is important, here, to identify the difference between choking and the home choke. Schlenker et al. (1995) write, "Choking is easy to document; the home choke is not" (p. 649). The seminal report (Baumeister and Steinhilber, 1984) on the home choke was methodologically weak and subject to harsh criticism from Schlenker, Phillips, Boneicki, and Schlenker (1995). Baumeister and Steinhilber's (1984) results are presented in the Appendix and constitute the majority of pro-home choke findings. Again, the validity and reliability of the results must be questioned. Taken together, Schlenker et al.'s (1995) contentions are supported. The results from the present study supported a large choking phenomenon. All studies included in the analysis looked strictly at choking, not the home choke. Further, the existence of a home advantage was also supported. Thus, both choking and the home advantage seem to be viable phenomena, while the home choke does not appear to be supported by available data. The interaction of audience, familiarity of surroundings, tasks, evaluation, and motivation appear to come together in the home advantage phenomenon, and in the choking phenomenon, whether generalized choking or "home choking." Exactly how these factors interact should be studied further so that through such understanding, negative factors can be ameliorated and performance can be enhanced.

In addition to motivation, personality characteristics may play a role in the various phenomena discussed in this paper. For example, Graydon and Murphy (1995) found an interaction effect between personality type and audience condition. Essentially, extraverts performed better in front of an audience, while introverts performed better alone. While it seems that the personality characteristics of extra/introversion may be involved in the social facilitation effect, self-esteem does not appear show a relationship. In a study on soccer penalty shots, Geisler and Leith (1997) write, "The research findings do not support the hypothesis that penalty shot performance in soccer is affected by levels of general self-esteem or task self-efficacy, nor by spectator presence or absence" (p. 327). In addition to the individual differences in performers, individual crowd characteristics may also offer an interesting avenue for future research. This would especially be true under the evaluation paradigm, in which various levels of criticality could be manipulated. Given the results of this study, it would seem logical to expect that participants more critically judged or subjected to intense scrutiny would have larger decreases in performance than individuals not exposed to such extreme measures. Thus, future research can focus on both personality and crowd differences in relation to social facilitation, social loafing, the home advantage, and choking.

No study is perfect, and the present report is no exception. Due to the necessity of stratifying studies across the numerous moderating variables, many of the effect sizes were based on small sample sizes. Unfortunately there was no way to control for this, and thus the results must be viewed cautiously. A larger sample size would lend more confidence to the findings and allow for a more reliable

understanding of the phenomenon. However, the consistency of the results and the fact that the pattern is in accordance with a prevailing theory may help alleviate concerns.

Another limitation lies in the fact that this report only consisted of published studies, and is thus vulnerable to the "file drawer problem." Glass (1981) writes, "...findings reported in journals are, on the average, one-third standard deviation more disposed toward the favored hypothesis of the investigators than findings reported in theses or dissertations" (p. 67). Therefore, it is possible that the ESs are artificially inflated, but the fact that the numbers are comparable to the Bond and Titus (1983) paper, which included both published and unpublished studies, may indicate that any publication bias that exists is minimal.

Despite these limitations, the strength of this analysis lies in its narrow focus and comparable results. Although small sample size and publication bias may limit the usefulness of the findings, it is important to remember that similar magnitudes of effects were obtained through Bond and Titus' (1983) work. Additionally, by focusing solely on motor tasks, the specific social contexts which affect motor behavior were described. Another strength of this study is that it identified, although by accident, flaws in the reporting of findings.

The goal and importance of this research was to provide a context in which future research can proceed and advance. During the coding process, it became abundantly clear that many studies are not carefully constructed. Often figures presented in tables contradict what was written in the text, or essential statistics were not reported. This led to a lot of expended time and effort searching for and

calculating the necessary results. Higher and more consistent standards would facilitate advancements, thus consolidating present understanding and suggesting new directions for research. Meta-analysis can offer a convenient way to summarize the current understanding of a particular topic. However, the results of any analysis are only as good as the component studies. There is a positive trend that several journals now require the inclusion of estimates of effect size with the findings, and this should continue. In this way, the whole research field can advance as a science and as a discipline.

Future studies examining the social facilitation effect should address the peer and expert observer differences using the Attentional Processes model. Additional endeavors could address the social loafing phenomenon as it has implications for learning theory (since peer teaming is often used in educational settings). The finding that groups of co-actors led to social loafing suggests that skills may best be learned or performed in tandem, rather than in groups. Further research into this effect with larger samples might clarify whether these results are accurate, and if so what implications for learning could be derived from this paradigm. Further, research efforts should also attempt to determine if the presence of an audience can increase self-focused attention (the choking issue) and if the Attentional Processes model can satisfactorily explain the pattern.

The results from this study suggest that overt expert evaluation causes performance decreases in both skilled and novice performers, and that this effect is more pronounced for the novices. Despite the reported limitations of the Attentional Processes model, it still remains as a viable explanation of the research findings and

serves to integrate and unite the social facilitation literature into one track. Clearly, the factors that govern successful performance are numerous and interact complexly. The findings of this study suggest that the role of evaluation in performance is a critical one that needs more examination so that both novices and experts can benefit from the process of being evaluated. The examination of the specific social contexts that facilitate or hamper motor performance should be further explored so that the understanding can be applied to enhance performance at all levels of expertise.

There is a cliché that states, "Nothing succeeds like success." This study suggests the truth of that axiom. Expert performers who have successfully attained a high level of performing are not as negatively affected by audiences or evaluators and can maintain motivation and focus during motor performance. On the other hand, novice participants are more vulnerable to negative effects from evaluation, may not be as able to capitalize on the home advantage, and may be more likely to choke. Their motivation is also more likely to be negatively impacted from competition. This study suggests that one of the challenges of sport psychology is to find ways to help novices reach a level of proficiency that will enable them to feel and become successful, and thus enable them to tap into the synergy that success creates. Research then would find applications that could enrich lives and improve our understanding of the complex interactions of phenomena such as social facilitation, motivation, competition, home advantage, choking, and evaluation.

Appendix

Home Advantage and Choking Studies Not Appropriate for Analysis

Authors	Date	Type of Activity	Home Winning Percentage	Statistic	Meaning*
Agnew and Carron	1994	Ontario Hockey League	58.8 ties included	$X^2(2)=435.39, p<.001$	HA
			61.5 ties excluded	$X^2(1)=46.22, p<.001$	HA
Balmer et al.	2001	Winter Olympics 08-98		$H_1=4.35, p=.037$	HA
				$H_1=4.13, p=.042$	HA
				$H_{11}=17, p=.093$	NHA
				$H_{11}=15.17, p=.177$	NHA
Balmer et al.	2003	Summer Olympics 1896-1996		$X^2(1)=.22, =.64$	AA
		TFPRE		$X^2(1)=5.24, p=.022$	HA
		Gymnastics Pre-war		$X^2(1)=1.46, p=.23$	HA
		Weightlifting Pre-war		$X^2(1)=2.47, p=.12$	HA
		Boxing Pre-war		$X^2(1)=19.38, p<.001$	HA
		Team games Pre-war		$X^2(1)=.20, p=.66$	HA
		TF post		$X^2(1)=25.23, p<.001$	HA
		Gymnastics post		$X^2(1)=6.21, p=.013$	AA
		Weightlifting Post		$X^2(1)=42.92, p<.001$	HA
		Boxing Post		$X^2(1)=9.99, p=.0015$	HA
Baumeister and Steinhilber	1984	World Series	1.04/.65(V:H 1,2) .81/1.31(V:H 7) .727(elim); .375(champ)	$X^2(1,N=143 \text{ errors})=7.29, p<.001$	HC
		Basketball Championship	.701(games 1-4)/.463(last game)	$X^2(1,N=38 \text{ games})=4.72, p<.05$	HC
			Last game freethrows .69/.74	$X^2(1,N=2529 \text{ attempts})=7.78, p<.01$	HC
			H:V		
			Home first 4= .72, Last=.69	$X^2(1,N=5935 \text{ attempts})=4.31,$	HC

				p<.05	
Brown et al.		World Cup Soccer 87-98	39%	$X^2(4, N=3914)=206.9, p<.001$	HA
				$X^2(2, n=1342)=6.5, p<.04$	NHA
Courneya and Carron	1991	minor league double-A baseball	55.10%	$X^2(1, N=1812)=19.09, p<.001$	HA
			64.40%	$X^2(2, N=143)= 6.38, p<.05$	HA
Gayton et al.	1987	Hockey	games 1-4=5.38; last 5.25; 7=5.83	$X^2(1, N=60\text{games})=.15, p>.05$	NHC
Gregory and Goldstein	1990	Baseball pitching	63% of no hitters at home	$X^2(1)= 12.62, p<.001$	HA
Jones et al.	2001	Cricket	57% of decided games	$X^2(1, N=1449)=29.58, P<.01$	HA
Kornspan et al	1995	NFL championships 1970-1993	71% for home; 29% for away	$X^2(1)=16.67, p<.01$	HA; NHC
Leonard	1998	World Series	.359W/H; .132L/H; .329W/A; .180L/A	$X^2(3)=78.2, p=.0001$	HA
Madrigal and James	1999	Women's Big-10 basketball		$X^2(8)=155.45, p<.001$	HA
		Very strong home team	70%S; 86%M; 95% W		
		Moderate home team	33%S; 64%M; 81%W		
		Weak home team	25%S; 37%M; 60%W		
Nevill et al	1995	English and Scottish Soccer	60% excluding draws	$X^2(8)=61.4, p<.001$	HA
				$X^2(2)=2.01, p>.10$	HA*
Pollard	1986	Many Sports			
		North America Baseball		53.6% p<.001	HA
		North America football		55% p<.01	HA
		North America Hockey		59.9% p<.001	HA
		North America Basketball		63.6% p<.001	HA
		North America Soccer		65.2% p<.001	HA
		England Cricket		56.1% p<.05	HA
		England Soccer		63.9% p<.001	HA
Schlenker et al.	1995	Baseball			
		last game of world series	47%	$X^2(1, N=165)= 2.41, p<.15$	NHC
		7th game	48%	$X^2(1, N=139)= 1.29, p<.30$	NHC

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References marked with an asterisk indicate studies included in the meta-analysis

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