

EFFECTS OF SOCIAL FACILITATION AND SOCIAL COMPARISON ON THE
PERFORMANCE AND SELF-CONFIDENCE OF FEMALES PERFORMING A
MALE ORIENTED MOTOR TASK

by

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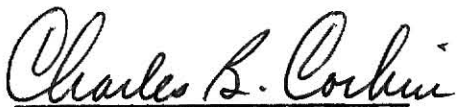
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Chapter 1

INTRODUCTION

The women's movement of the last decade has seen women striving for greater independence than ever before (Hoffman, 1977). In spite of this growing independence, there is evidence that underachievement in women is prevalent since women in some cases perform at levels lower than those of which they are normally capable (Lenney, 1977). This has been demonstrated throughout history in science, art, law, business, and many other fields where males have traditionally held most positions of responsibility (Birns, 1976). Women's underachievement has largely been attributed to the influences of society and culture (Birns, 1976; Harter, 1978; and Hoffman, 1977), with arguments by various researchers that deficits in performance by females may result from factors such as sex-role stereotyping, male dominance, fear of success, lack of motivation, learned helplessness, and other factors any or all of which may act to undermine performance and self-confidence.

More specifically attention has been recently drawn to reports that in cognitively oriented achievement situations such as tasks involving anagram solution and angle matching, women in some cases do not perform as well as men, and demonstrate less self-confidence than men in these situations (Darmofal and McCarbery, 1979; Deaux and Emswiller, 1974; Feather and Simon, 1973; and House, 1974). Very little evidence has been brought to light to support the existence of differences between the sexes in intelligence, intellectual ability, or achievement motivation (Maccoby and Jacklin, 1974). Behavioral differences when found

have most commonly been attributed to the socialization processes (Birns, 1976; Harter, 1978; and Hoffman, 1977).

In reviewing the literature related to underachievement by women, Lenney (1977) found evidence to support the effect of three environmentally imposed situational variables in undermining women's self-confidence. First, increasingly salient evaluation such as competition was found to lower women's self-confidence and performance relative to those of men in both cognitive (House, 1974) and perceptual (Ryan, 1978) tasks. In agreement, Scanlan (1978) suggested that the presence of a competitor perceived as an evaluator may affect self-confidence and performance, although sex of the evaluator of women's performance and sex of the opponent have not been considered by research. Second, ambiguous feedback has been found to impair the performance of a cognitive task by women. In a study by Argote, Fisher, McDonald and O'Neal (1976) female subjects in one group were rejected by a male after success while those in another group were accepted by a male after failure. Such feedback, being contrary to the expectations of the subjects, resulted in decreases in performance by females but not by males in a similar situation. Immediate, accurate feedback has generally been shown to facilitate performance (Scanlan, 1978). Finally, the performance of male oriented tasks has been found to lower self-confidence and sometimes performance by females (Corbin and Nix, 1979; Deaux and Emswiller, 1974; Montemayor, 1974; and Ryan, 1978). A game for example, involving the riding of a bicycle ergometer was perceived by both boys and girls to be male oriented in a recent study by Nix (1978) in which girls demonstrated less self-confidence than boys.

The situational variables studied in the past have dealt mainly with the performance of cognitive tasks. A few researchers have

investigated fine motor and perceptual motor task performance. One fine motor task was studied by Ryan and Pryor (1976). After working alone on a simple tiddly winks task, females formed lower future expectations and showed deficits in performance when in competition against either a male or against another female. Males however lowered their expectations and performance only when in competition with males. A subsequent study by Ryan (1978) involving a different fine motor task again found competition to reduce expectations and performance in females relative to a noncompetitive situation where subjects performed alone. Males increased their expectations and performance in the competitive situation. When the task was described as female oriented however, there was no performance difference between males and females.

The cross-sex labeling of a game involving fine motor manipulation was found by Montemayor (1974) to reduce the motivation of children aged six to eight years of age and also to reduce their attraction to the game although performance did not differ between the sexes. In a study by Deaux and Emswiller (1974) undergraduate females lowered their expectations of ability to perform a perceptual motor task when the task was labeled male oriented while males expected to outperform females regardless of the sex orientation label of the task. Actual performance was not measured.

Past studies have shown deleterious effects on self-confidence in cognitive and fine motor tasks but researchers have not examined performance outcomes in gross motor tasks.

This study was designed to investigate all three of the situational variables shown to affect self-confidence and performance in women under some circumstances. The situational variables of evaluation and information feedback were examined in relation to a gross motor task

requiring power and speed in order to determine whether a sample of college females attains physical performance levels commensurate with normal capabilities.

STATEMENT OF THE PROBLEM

The purpose of this study was to determine whether the situational factors of social facilitation and social comparison effect the performance and confidence about performance of women when performing a male oriented gross motor task. More specifically, the following were the objectives of this research:

1. To determine whether there was a difference in the performance of a motor task and in self-confidence (as measured by future performance prediction and confidence level rating), between a group of female subjects performing with social facilitation (in the presence of a male) and a group of female subjects performing alone.

2. To determine whether there was a difference in the performance of a motor task and in self-confidence (as measured by future performance prediction and confidence level rating), between a group of female subjects provided with a basis for social comparison (a male scored lower than the subject) and a group of female subjects performing without such information.

3. To determine whether there was an interaction between the principal independent variables, social facilitation and social comparison, on the dependent variables of performance, prediction and confidence rating.

A secondary purpose of this study was to determine whether there was a difference in the performance or self-confidence in the performance of a motor task between three groups of female subjects, each randomly assigned to one of three male confederates.

LIMITATIONS

The following were considered as possible limitations of this investigation:

1. The male confederates were perceived differently by female subjects which may have influenced the extent to which they reacted to the manipulation of the independent variables; however, random assignment of subjects to the three confederate males was made.
2. Subject motivation and personal experience was not controlled for, allowing for a possibility that effort over the three trials varied due to difference in motivational level or emotional state.

DELIMITATIONS

The delimitations that were made to define the limits of this study follow:

1. The study was limited to female undergraduate students attending Kansas State University during the Spring semester of 1980.
2. The male oriented motor task performed by subjects was a 15 second full speed ride on a bicycle ergometer set at a resistance of $4\frac{1}{2}$ kgs.
3. The questionnaire was assumed to have been interpreted correctly by subjects.

DEFINITION OF TERMS

The following terms are defined to facilitate a better understanding of this study by the reader:

Confederate

Confederates were three males who volunteered to participate

throughout this study making possible the following treatments to randomly assigned female subjects; 1) male present, 2) male present - information to the effect that past performance was superior to that of a male, and 3) information to the effect that past performance was superior to that of a male.

Performance

This term refers to the measurement of a subject's efforts expressed as a score on a standardized task.

Social Comparison

This term refers to comparison of personal performance to that of another individual.

Self-confidence

This term refers to the certainty indicated by a subject that a predicted score could be attained on a subsequent trial of the same task.

Social Facilitation

This term refers to the presence of others possibly resulting in either enhancement of performance or deficit in performance by subjects.

Somatotype

This term refers to classification of body type into mesomorphy (muscular), ectomorphy (thin) and endomorphy (rotund) as calculated by the inverse of an individual's ponderal index ($\text{height} / \sqrt[3]{\text{weight}}$) developed and widely used by Cureton (Cureton, 1951).

Underachievement

This term refers to performance at a level below that which an individual is normally capable of attaining.

Chapter 2

REVIEW OF THE LITERATURE

The literature in psychology and sport psychology has been reviewed to give the reader an overview of research related to underachievement in women. Different researchers have proposed different factors which may account for underachievement of women in specific situations. Among them are social facilitation, social comparison and the apparent lack of self-confidence of women in achievement situations. Accordingly, this review has been divided into the following areas; underachievement among women, self-confidence among women, and social facilitation.

UNDERACHIEVEMENT AMONG WOMEN

Underachievement for the purpose of this study has been defined as performance at a level below that which an individual is normally capable of attaining. This section was designed to examine whether there are differences between men and women that can explain differences in their achievement behavior.

The adult roles of men and women are becoming more alike with the traditional role of women as childbearers and housewives diminishing as evidenced by shifts in society towards increased employment of women. That women are physically different from men is obvious but whether psychological differences exist between the sexes has become an issue of concern in determining the suitability of women to take on roles traditionally considered exclusively for men. Even though 38% of the work force was comprised of women in 1976, 90% of the employment in fields of medicine, law, politics, and engineering was held by men,

leaving most women with positions in the helping professions (Birns, 1976). It has been questioned whether differences in intellectual abilities or personality exist between the sexes making different adult roles more or less appropriate for one sex or the other.

Much research has been done to examine infant, early childhood and adolescent behavior. A review by Birns (1976) concludes:

Although one cannot state absolutely that behavioral sex differences are not present at birth, the majority of studies suggest that they are not. Although future research may uncover important biological factors, the present data give more than sufficient evidence that environmental shaping of sex differentiated behavior does exist. At this time it seems evident that the environment in which all American children mature clearly projects sex-role stereotypes. These stereotypic expectations and the differential responses they elicit are sufficiently clear and unambiguous to account for the cognitive and personality differences in children that ultimately lead to the different roles that they fulfill.

Birns draws on the work of Maccoby and Jacklin (1974) to support her position. These researchers have extensively reviewed the literature finding scant evidence of sex differences in personality traits and ability. Support for the existence of sex differences was found for higher verbal ability in females after age 10 or 11; and in males for higher visual-spatial ability, higher math skills and greater aggressiveness from infancy throughout adolescence.

Block (1976) reviewed Maccoby and Jacklin's work suggesting that small existing central tendencies were overlooked. These tendencies included higher affiliative needs in females and behavior more often motivated by affiliative needs, lower self-confidence in task performance, greater likelihood of dependency, and greater tendency towards compliance with adults. All studies reviewed by Hoffman (1977), 16 in all, found girls to be more empathetic than boys. In an extensive review of sex differences by Birns (1976) evidence was found during

the preschool years of greater exploration, manipulation of toys and aggression in boys, while girls were found to be more sedentary, imitative, persistent, attentive, and until the age of six more independent than boys.

Specifically with regard to achievement, Hoffman suggests that females do not differ from males in achievement motivation, but that females are more attuned to the negative consequences of success. Supporting evidence was drawn from Block (1976) and Romer (1975). Greater anxiety and less goal directed behavior by females were also reported to be related to underachievement among women (Hoffman, 1974). Harter (1978) found boys to be more intrinsically motivated towards mastery in the areas which they excel (spatial-visual and male oriented tasks) while girls were equally or more intrinsically motivated on tasks of verbal ability. She concluded that socialization shapes the child's self reward system resulting in motivational differences between the sexes. Girls are typically perceived as being more vulnerable than males (Birns, 1976; Darmofal and McCarbery, 1979; and Hoffman, 1977). In direct contrast it is generally held that male infants are more vulnerable, being weaker, less resistant to disease, and more prone to injury (Birns, 1976; and Hoffman, 1977). The vulnerability of girls has been documented in studies reviewed by Hoffman (1977) where parents have been found to worry more about daughters both during infancy and also in later years when premarital pregnancy becomes a concern especially of mothers.

Hoffman, in the same review (1977) suggested that girls are not necessarily more dependant than boys since evidence exists that boys are given more independence training while parents encourage girls to be followers and offer them toys and playthings that are not highly

movement inducing in design. The importance of role models in determining the acquisition of achievement behavior by differential rewarding of those behaviors has been emphasised by Hoffman (1977). Support for this view was also found by Birns (1976) in studies that show parents to respond to the stated sex of infants rather than the correct sex. It was suggested by Crandall, Katkowsky and Preston (1960) that differential rewarding of males and females for stating high expectations may discourage girls from admitting them since a low correlation between expectancy statement and intellectual ability was found for girls. For boys the correlation was highly significant.

In summary, most studies suggest that sex differences are not present at birth and there is evidence for the environmental shaping of behavioral differences between the sexes. The environment projects stereotypes that produce different responses in some situations, accounting for cognitive and personality differences consistent with traditional male and female roles currently accepted by society. If males and females are influenced as the literature suggests by role models, differential rewarding of achievement behavior by parents, the media, literature, and play materials, then differences between the achievement behavior of males and females may be accounted for.

SELF-CONFIDENCE AMONG WOMEN

This section was designed to present research concerning situational variables that occur within the social structure and influence achievement behavior, specifically the self-confidence of women. A growing amount of evidence has been found in the literature to suggest a lack of self-confidence in females as compared to males (Lenney, 1977). Many of these studies investigate the attribution of performance outcomes and

expectancy of outcomes in future performance of achievement oriented tasks.

Deaux and Emswiller (1974) investigated male and female attribution, finding both males and females to attribute men's performance to skill and women's performance to luck on a perceptual motor task regardless of whether the task was labeled as masculine or feminine in nature. Both males and females expected lower performance by females than by males despite equal performance by both sexes.

Similarly Feather and Simon (1975) found high school girls to attribute failure in occupations by women to lack of ability. The same girls indicated failure as being more acceptable than success for females. A previous study by Feather and Simon (1973) showed a tendency in females to report lower initial success expectations than males on an anagram task and their subsequent performance on the task was found to be in line with the initial expectations.

The attributions of fourth grade boys were found to be defensive in a failure situation with failure attributed to luck while females attributed failure to lack of ability (Nicholls, 1975). Girls also set lower initial expectations than boys and expected not to be able to do as well as boys. The task was an angle matching test, cognitive in nature. Nicholls suggested that a lack of self-confidence in girls as compared to boys might explain the results found.

Crandall, Crandall and Katkowsky, (1965) administered an achievement responsibility questionnaire to elementary and high school students finding girls to accept blame for negative consequences more often than boys do. This finding suggests that girls see themselves as being at fault more often than boys and may be a reflection of lower self-confidence in girls.

Seppo (1979) found females to attribute success to luck and reasoned that such attribution was a logical product of low expectancy followed by low performance scores. Failure was attributed to the ability of opponents whether those opponents were male or female. These recent findings concur with past research of the same nature. A motor task involving high ability in hand-eye coordination was employed in the study.

It was suggested by Lenney (1977) that the self-confidence of women as reported in the literature is affected negatively by at least three situational variable present in most achievement situations including:

1. It was hypothesized that when evaluation is not perceived by females, their self-confidence is not lowered. As the salience of evaluation increases, the self-confidence of women decreases as compared with that of men. Women's expectations should be lower than those of men when they perceive their performance to be compared to that of others as is the case in competitive situations.

2. It was hypothesized that clear feedback about performance equalizes self-confidence in women. Confusing feedback and the absence of feedback should lower the self-confidence of females.

3. Women's self-confidence tends to be lower than that of men when the task performed is male in orientation. It was hypothesized that on female oriented tasks females have as much self confidence as men.

Support for Lenney's suggestions has been found in the literature. Evidence follows for each of the three variables. Actual performance has been compared between males and females where such data was available.

Evaluative Cues

The expectancies, confidence, and minimal goal levels of male and female undergraduates in the performance of an anagram task was investigated by House (1974). Findings by House indicated that women solving anagrams in a competitive situation were lower in expectancies, confidence and minimal goal levels than women working alone, males working alone, and males in a competitive situation. These findings suggest that competition may be a factor in determining women's self-confidence. No significant performance differences were found between males and females.

Ryan (1978) found the same pattern as found by House (1974) to emerge in subjects performing a fine motor task. Females formed higher expectancies and performed better in a noncompetitive situation where evaluation and comparison were minimized than females in a competitive situation, males working alone, or males in a competitive situation. Conversely, males set highest expectations and performed best in competition.

Scanlan (1978) has considered both the evaluative and feedback components involved in competitive situations. She suggests that evaluation of a social nature or comparative appraisal of one's own ability is a key element in competition. Comparative appraisal involves a comparison of personal performance to some standard or to the performance of another individual. This phenomenon has also been termed social comparison and has been defined as a form of social facilitation.

Ryan and Pryor (1976) found both undergraduate men and women to estimate and perform lowest on a simple tiddly winks task when previously provided with an average male referent score. Knowledge of the results of others provided a basis for social comparison. Females' estimates of

performance and scores were lower even when average female referent scores were provided. It was suggested that in at least some competitive situations involving social comparison, females make lower estimates of their abilities than males and perform consistently with those estimations.

Although evaluative cues in the form of competition have been found to influence women's self-confidence, different forms of evaluative feedback may operate depending on the nature of the competitive situation. Scanlan (1978) suggests that success experiences decrease the threat of evaluative feedback as evidenced by decreased A-state anxiety, indicating probable greater threat to self and decreased self-confidence when some form of failure is either anticipated or experienced.

Nicholls (1975) created an evaluative situation by giving the label of "test" to a cognitive task for one group of subjects, while another group's task was labeled as "practice". The fourth grade students involved in the study set higher standards for themselves when given manipulated success treatment as opposed to failure feedback in both test and practice situations. Females however, were found to set lower standards than males in the test situation. Support for decreased self-confidence in females in the more competitive situation was suggested since girls in the practice situation expressed more positive feelings about their performance.

Feedback

A study by Argote, Fisher, McDonald and O'Neal (1976) found the performance of an anagram task by undergraduate females to be lowest in a situation where consequences of outcome were contrary to expectations. Females in one group were accepted by a male after failure and those in

another group were rejected after success. Females performed better if the acceptance was mediated by a female. The same tendency was observed in males but was not significant. The investigators suggested that consequences mediating social disapproval, rather than the subjects' success or failure was related to performance.

Pheterson, Kiesler and Goldberg (1971) found that identical paintings done by men and women were rated by students less highly when assumed to be painted by women. It is interesting to note that when the paintings were all labeled as winners of a contest, women were rated as highly as men suggesting that women must be thought of as competent in the eyes of others in order to obtain recognition in performance. Darmofal and McCarbery (1979) suggest that lower self-confidence may in part result from societal expectations of greater competence in males generally. Females need to obtain clear feedback that is not subject to sex-role generalization. Absence of feedback over time may be perceived by women as lack of competence.

Dweck and Reppucci (1973) and Dweck (1975) suggest that even more important than success feedback, is feedback which facilitates understanding of the role of effort in performance. They have found that attribution by subjects of performance to effort rather than to external factors facilitates greater persistence and improved performance in children.

Male-Female Task Orientation

Although boys and girls six to eight years of age performed similarly in playing a simple game, sex inappropriate labeling of the activity reduced motivation and attractiveness of the game (Montemayor, 1974). Deaux and Emswiller (1974) found undergraduate females to predict higher

expectations of ability to perform a task when labeled female oriented than the same task when labeled male oriented. Males expected to outperform females regardless of the sex orientation of the task. In a study by Ryan (1978), despite competitive conditions which have been suggested as lowering the confidence of females (House, 1974; and Lenney, 1977), equal performance in males and females was evidenced when a fine motor task was described as female oriented. Description of the same task as male oriented resulted in lower expectancy in females than in males.

Further support that male orientation of a task is related to decreases in the confidence of females was found by Corbin and Nix (1979). They found that females made lower predictions of success for the performance of a task perceived to be male oriented than for a task perceived to be female oriented. Since very few activities, games and sports are likely to be labeled as female oriented (Metheny, 1979) girls who participate in these activities may have low expectations for success in them.

In summary, females seem to be vulnerable in situations where evaluative aspects are made salient, in situations where feedback about performance is unclear, contrary to expectations, or provides disapproval and in situations where the task to be performed is male oriented in nature (Lenney, 1977). General support in the literature has been found for Lenney's hypotheses. That females tend to attribute their performance outcomes and their expectancy of future outcomes to luck after success and to lack of ability after failure (Deaux and Emswiller, 1974; Nicholls, 1975; and Seppo, 1979) further substantiates a lack of self-confidence in females as compared to males. Performance of subjects has in some cases been found to be consistent with subjects' expectations

and self-confidence. (Argote, Fisher, McDonald and O'Neal, 1976; Feather and Simon, 1975; Ryan, 1978; and Ryan and Prior, 1976), however other studies have found no evidence of decrements in the performance of females where self-confidence appeared to be low as compared to that of males (Deaux and Emswiller, 1974; and House, 1974). Situational variables involved in achievement situations need to be examined more thoroughly in the future (Darmofal and McCarbery, 1979) since the literature shows them to be related to the achievement behavior of women.

SOCIAL FACILITATION

The current research in social facilitation is largely based on the hypothesis developed by Zajonc (1965) which states that the dominant response is elicited in a performer by the presence of others which stimulates increased drive. Initial learning of a task involves the dominance of incorrect responses. During the early stages of learning it would follow that observation by others might be less conducive to learning than is working alone. The performance of an individual would be expected to improve with the presence of others once the task is well learned.

This hypothesis has found support in studies involving quantitative tasks that require speed and endurance wherein performance has been found to be facilitated by the presence of others. There has been difficulty however, in assessing the point at which the dominant response is no longer the incorrect one, or the point of habit formation. Further, there are certain skills in which a ceiling is reached in terms of performance and facilitation effects can not be measured. (Landers and McCullough, 1976)

Extensive research and review of social facilitation provided by Cottrell (1972) mainly suggests the importance of evaluation apprehension in social facilitation (Landers and McCullough, 1976). This apprehension was thought by Cottrell (1972) to be learned from past experiences involving positive and negative outcomes of performance. Evaluation perceived as a threat to subjects was reasoned by his theory to lead to anticipation of negative outcomes although not many studies have investigated this possibility. In motor performance however, one study by McDonald, O'Neal and Bleichfeld (1974) compared the pretest scores of subjects provided with norms manipulated to induce anticipation of either high or low ability. The presence of others facilitated the performance only of subjects' anticipating success (cited in Landers and McCullough, 1976).

Coaction and audience effects have been found to differ in their effects on performance (Evans, 1971). Audience effects were described by Evans as effects on an individual of being observed during performance. The observer is simply present and offers no comments or reactions to a subject's performance. Since such a situation involves no implicit evaluation Cottrell might reason that unless the subject perceives that he or she is being evaluated there would be no social facilitation effected. Coaction, or the presence of others performing the same activity, may also effect the performance of an individual. Subjects in a coaction situation may perform with or without knowledge of each other's results introducing yet another variable.

Evans (1971) investigated a coaction situation involving the performance of a puzzle task by subjects either with or without rivalry instructions. No difference was found in performance between the two groups. Martens and Landers (1972) found a difference between subjects

provided with knowledge of results and visual evaluation opportunity, while subjects receiving knowledge of the coactor's results and a control group performed alone. The group directly evaluated did not perform as well as the other two groups. There was no difference between the group receiving only knowledge of results and the control group. Thus it can be observed that manipulation of evaluation potential in situations has sometimes effected social facilitation. Other studies have considered the expertise of evaluators, task nature, whether the evaluator is liked or disliked by the subject, whether he or she is known or unknown, and the stage of learning of the subject in the performance of a given task.

SUMMARY

It has been established in the literature that sex differences in intelligence, intellectual ability and achievement motivation are not present at birth but that environmental shaping becomes instrumental throughout childhood and adolescence. Influences such as differential rewarding of achievement behavior by parents, teachers and peers, and even the availability of different play materials to children of each sex have been suggested to account for differential responses and behaviors by males and females in achievement situations. Evidence for different responses by each sex has been found in studies where females were found to attribute performance outcomes to luck after success or to lack of ability after failure, while males conversely attributed success to ability and failure to bad luck (Deaux and Emswiller, 1974; and Seppo, 1979). Behaviorally, women have been found to have been traditionally excluded from many fields of high achievement (Birns, 1976). Achievement orientation among females has been suggested by Lenney (1977) to be influenced negatively in situations where evaluation is made salient, feedback is lacking or contrary to expectations,

and where the task to be performed is male oriented in nature. It has generally been found that in these situations females are less confident about their abilities than in situations where these variables do not exist. Less consistent results have been found in studies examining the situational vulnerability of females in relation to performance with tasks examined being primarily cognitive in nature. A few studies have found that subjects' expectations and self-confidence are related to their performance of cognitive tasks (Feather and Simon, 1973; and Argote, Fisher, McDonald and O'Neal, 1976), and fine motor tasks (Ryan, 1978; Ryan and Prior, 1976). There is still a need however, to examine gross motor skill performance in an achievement situation. Since most sports and games requiring gross motor efficiency involve strength, speed and power they might be perceived by females as male oriented or at least some what masculine in nature. Such activities are usually competitive and involve salient factors that may influence self-confidence or performance including socially facilitating circumstances where participants compare performance (social comparison) and/or evaluation by an audience. If females are vulnerable in evaluative situations, it may be that evaluation from a male would further inhibit their performance instead of producing a facilitating effect. Thus social facilitation (male audience) and social comparison (a male scores lower than the subject) have been examined in relation to the performance and self-confidence of females in performing a male oriented gross motor task.

Chapter 3

PROCEDURES

This chapter presents the procedures followed in this study. The procedures are presented under the following headings: a) selection of subjects, b) selection of confederates, c) questionnaire, d) the task, e) treatments, f) experiment design, g) procedures, h) manipulation check and debriefing, and i) pilot study.

SELECTION OF SUBJECTS

Forty-eight female Kansas State University students volunteered to participate as subjects for this experiment. Volunteers were solicited from the basic physical education classes.

SELECTION OF CONFEDERATES

Of 13 male volunteers from one physical education class at Kansas State University, three males were selected to act as confederates on the basis of somatotype as determined by calculation of the reciprocal of their ponderal index (RPI) or $\text{height} / \sqrt[3]{\text{weight}}$. Studies have used RPI as an accepted measure of somatotype (Cureton, 1951). All young men measured fell within the bounds of mesomorphy, represented by RPI's greater than 12.0 and less than 14.0. Cureton (1951) points out that an RPI greater than 14.0 with extremes around 14.8 is indicative of ectomorphy while that less than 12.0 with extremes around 11.2 indicates endomorphy. The three males chosen were confederate I at 13.18 closest to the mean of mesomorphy, confederate II at 13.81 least ponderous and

tending towards ectomorphy, and confederate III at 12.4 most ponderous and tending towards endomorphy. Table 1 shows the somatotypes of the three confederates and the measurements from which they were derived.

TABLE 1

Somatotypes of Confederates

Confederate	height/ $3\sqrt{\text{weight}}$	height	weight
I	13.18	5'10"	150 pounds
II	13.81	6'3"	160 pounds
III	12.40	5'8"	165 pounds

QUESTIONNAIRE

The questionnaire used in this study is found in Appendix A. This questionnaire was designed by the researcher to record the performance scores, predictions for subsequent performance, and confidence in attaining predicted scores. On each of three consecutive days the subject completed the corresponding page of the three page questionnaire after performing the bicycle task.

On each of the three pages, question one was designed simply to record the subject's performance score. Question two was constructed to measure self-confidence as determined by the score that the subject thought she could attain in performing the same task the next day. Question three was to determine on a seven point scale, how much confidence the subject had that she could reach the score predicted in question two.

THE TASK

A bicycle ergometer task was used in the study. Previous studies have found that tasks involving strength, speed and power are male oriented in nature and achievement is not as highly predicted by females in such tasks (Herkowitz, 1978). In a study by Corbin and Nix (1979) a game involving a bicycle ergometer was perceived as an activity that boys were more likely to excel in than girls. To insure that the task would require strength and power the resistance of the bicycle ergometer was preset at $4\frac{1}{2}$ kgs, a relatively heavy workload. That speed was important in the task was specified in the instructions for each subject.

A specially designed counter-timer displayed a 15 second countdown on one side of a large scoreboard and the accumulation of points scored for pedal revolutions was displayed on the other side. Subjects scored .5 points for each pedal revolution completed during the 15 second ride. The counter allowed for a manipulation of the percentage of total score displayed. In experimental treatments social facilitation-social comparison and social comparison only, a male confederate's score was decreased to provide information to the effect that the subject's past performance was superior to that of the confederate male. The manipulation of the score was allowed for by decreasing the percentage of the total score he accumulated. Discretely pressing one control button allowed the experimenter to readjust the percentage setting before the subject performed the task.

TREATMENTS

Treatments consisted of performing the bicycle task either in the presence or absence of a confederate male, either with or without

information to the effect that past performance was superior to that of a confederate male. Thus the four treatments were as follows: social facilitation-social comparison (female performing in the presence of a confederate male and having information to the effect that her past performance was superior to that of a confederate male), social facilitation (female performing in the presence of a confederate male), social comparison (female performing alone and having received information to the effect that her past performance was superior to that of a confederate male), and control (female performing alone).

EXPERIMENT DESIGN

The experiment design was a 2 x 2 factorial. Subjects were randomly assigned with the stipulation that 12 be assigned to each of four treatment cells. Each group of four subjects, with one from each of the four experimental treatments was randomly assigned one of the three male confederates by the use of a table of random numbers. The subjects were tested in four blocks, with each block of 12 subjects tested on three consecutive days within the two week period between February 24 and March 7, 1980. The experimental design with treatment conditions is outlined in Table 2.

TABLE 2
Treatments by Experimental Cell

		SOCIAL COMPARISON	NO SOCIAL COMPARISON
SOCIAL FACILITATION	Social Facilitation-Social Comparison	Performing in the presence of a confederate male (Social Facilitation) Information that past performance was superior to that of a confederate male (Social Comparison)	Social Facilitation Performing in the presence of a confederate male (Social Facilitation) No information regarding the performance of a confederate male (No Social Comparison)
	NO SOCIAL FACILITATION	Social Comparison Performing alone (No Social Facilitation) Information that past performance was superior to that of a confederate male (Social Comparison)	Control Performing alone (No Social Facilitation) No information regarding the performance of a confederate male (No Social Comparison)

PROCEDURES

Each subject reported to the Motor Development Lab at the Kansas State University campus at her assigned time on the first of three consecutive days. A consent form (see Appendix B) was given to the subject to be read and signed while seated at a table directly facing the bicycle ergometer and the score board.

The subject was directed to stand right beside the bicycle while the experimenter explained and demonstrated the task in the presence of the subject. The seat of the bicycle was then adjusted to the subject's leg length and the pedals were moved to the starting position with both pedals equidistant from the floor and the right pedal forward.

The following directions were repeated for each subject:

Have you ever ridden a bicycle like this before? Since the resistance is preset at a fairly high amount you will really have to get your weight down on the pedals to get started. It will be like getting started on a steep uphill slope. You may raise your seat up off the saddle to help you on the first few pedals if you want to. The signal to start will be ready, set, go. The 15 on the right side of the score board will count down the seconds to zero and your score will accumulate on the left side. The faster you go the higher your score will be. This is like a race so don't try to stop on the finish line; keep going until you see the time at zero and the score stop changing. You may then lift your feet up from the pedals and rest them on the bar at the front of the bike. Do you have any questions? This is a test of power and speed. Try your hardest.

At this time the experimenter moved to the control panel behind the bicycle and signaled the subject to start. On the word "GO" the timer switch was pushed. At the end of the 15 second ride the subject was shown back to the table and asked to complete the three items on the first page of the questionnaire. The experimenter read the directions aloud and then gave the subject adequate time to complete the questionnaire while busied with resetting the equipment for the next subject. On completion of the form the subject was thanked for participating and

was reminded about her appointed time for the following day. The subject was told that if asked about the experiment it could be mentioned that a 15 second ride on a stationary bicycle was performed but that scores should be kept strictly private.

The next day the subject returned to the same testing room. The subject was directed to observe as the experimenter quickly adjusted the resistance setting. The height of the seat was adjusted for the subject and the following directions were repeated:

The test will be exactly the same as it was yesterday. On the word "GO" the timer on the right will count down 15 seconds and your score will accumulate on the left. Remember to really get your weight down on the first few pedals. This is your score from yesterday and your prediction for today (indicated on questionnaire). This is a test of power and speed. Try your hardest.

On completing the task the subject was asked to fill out the second page of her questionnaire. It was explained that the questions were exactly the same as those on the first page but that all information available should be considered in making a new prediction for the final trial the following day. The subject was thanked for coming and reminded about her appointed time for the next day.

The third testing session differed for each of the four treatment cells. Each subject in the social facilitation-social comparison group (performing in the presence of a male confederate - information that past performance was superior to that of a confederate male) was admitted to the testing room as soon as she arrived and was asked to be seated at the table directly facing the bicycle and the score board. A male confederate was taken through the same procedure that all subjects experience in their second session with the exception that scores shown on the confederate's questionnaire were calculated. The counter was also preset to record a percentage of the confederate's true score that

would be approximately five points below the subject's lowest score. When finished the confederate was asked to sit at the table and the subject moved to wait beside the bicycle. It was explained to the confederate that the last page of the questionnaire was to be filled out as if one more trial were to be repeated the next day. The experimenter turned her attention to the subject, quickly adjusting the resistance and indicating that she was making sure the bicycle was still set at the $4\frac{1}{2}$ mark. This made it quite obvious to the subject that the resistance had not been set higher for the confederate. The height of the seat was adjusted and the standard instructions were repeated. The questionnaire with previous scores and predictions was then shown to the subject while the confederate's lower score was still up on the score board directly in front of the subject. The experimenter returned the percentage setting of the score counter back to its original position, returned the timer to 15 seconds, and cleared the confederate's score. It was explained to the confederate that there were just a couple more questions that would be asked of him as soon as the subject had finished. The experimenter made certain that the subject was aware of observation by the male. The subject completed her ride and was instructed to fill out the last page of the questionnaire while a couple of questions were asked of the confederate in an adjoining room. The experimenter left the room for a minute with the male and then returned alone to run a manipulation check and to debrief the subject.

Each subject in the social facilitation treatment (performing in the presence of a confederate male - no information regarding the performance of a confederate male) was admitted to the testing room just as a male confederate was completing the final page of his questionnaire. The male's score was already cleared from the score board.

Procedures following were exactly the same as for subjects in the social facilitation-social comparison treatment.

In the social comparison treatment (performing alone - information that past performance was superior to that of a confederate male), each subject received the same instructions as in the social facilitation-social comparison treatment up to the point where the confederate was instructed as to the completion of the questionnaire. At that point he was thanked for his participation and told that results would be made available to him on completion of the study. After the confederate's departure the standard testing procedure was followed as in the second session.

Each subject in the control treatment (performing alone - no information regarding a male confederate), was given the same test procedures as in the second session. The final page of the questionnaire was explained and completed by the subject. No manipulation check was necessary in this treatment. The subject was debriefed.

MANIPULATION CHECK AND DEBRIEFING

For the three experimental treatments a manipulation check was conducted after the experimental procedures of the third testing session. Subjects in the social facilitation-social comparison treatment were asked the following questions:

1. Did you notice the score of the boy who rode before you did?
2. What did you think about his score?
3. Why do you think you did better than he did?
4. Do you think he was watching you while you rode?
5. Do you think he noticed your score?

In the social facilitation treatment only questions 4 and 5 were asked of the subjects, while for the subjects in the social comparison treatment only questions 1, 2 and 3 were used as necessary to check on manipulations employed in the respective treatments.

In answer to question 1, only one subject in the social comparison treatment did not notice the confederate's score. In answer to question 2, there were two subjects who indicated that they did not believe the male's score could be lower than their scores. Although one of these subjects was in the social facilitation treatment and the other in the social comparison treatment, both were tested with confederate I. For all subjects asked questions 3, 4 and 5, replies were all positive. When necessary, new subjects were tested before the next testing block was started. The manipulation of the male confederate's score was also miscalculated in two instances where the outcome for the confederate was higher than the subject's score. These subjects were also replaced by new subjects tested before the following block of subjects. For the 12 control subjects there was no need to run a manipulation check since no treatment was applied.

Subjects were debriefed the same way across all four treatments. The subject was thanked for participating in the study and was asked not to mention the presence of a male or anything about scores until all testing was completed. It was explained that results of the experiment and details involved in all procedures would be shared with all subjects on completion of the study.

PILOT STUDY

A pilot study was conducted to test the bicycle task and to standardize procedures to be used in testing. Twelve subjects randomly

assigned to one of four treatment cells, were scheduled to be tested on three consecutive days. The three confederates were randomly assigned to females in the three experimental treatments.

On the first two days all subjects rode the bicycle ergometer for 15 seconds. The resistance was set at 3.5 kgs for all subjects and multiples of flywheel revolutions were counted by an electronic recording device. Subjects were able to watch the 15 seconds counting down and their score accumulating on a portable scoreboard set up directly in front of the bicycle ergometer.

Subjects one and three did not attend their first scheduled time and subject five dropped out after the first day. The remaining nine subjects were tested on all three days. No problems were encountered with regard to equipment or procedures on the first day, however on day two it became apparent that the scores of stronger subjects were lower despite better performance.

The equipment was later checked with the finding that when subjects rode at high speeds the resistance setting on a bicycle ergometer did not remain constant, the resistance decreasing for each subsequent subject unless readjusted. Further, the counting device was unable to record scores when speeds attained were higher than about 40 kilometers per hour. Many of the subjects who were sure they had done better were surprised to see that their scores were significantly lower on the second day. The experimenter made no comments to subjects about their performance.

On the third day subjects in the three experimental treatments performed the same task; 1) social facilitation-social comparison (in the presence of a male confederate and with information that past performance was superior to that of the confederate male), 2) social

facilitation (in the presence of a confederate male), 3) social comparison (with information that past performance was superior to that of a confederate male); while a control group performed the task as they had on the first two days.

The pilot study enabled the three confederates to practice their roles for each of the experimental treatments, and the experimenter to become familiar with procedures, equipment and the script. It was decided that an accurate device to count pedal revolutions would be employed in order that performance differences could be calculated with confidence. Changes were made accordingly.

Chapter 4

RESULTS

This chapter presents the results of the study. For clarity, the results are presented under the following headings: a) performance changes across trials, b) performance, prediction and confidence differences among treatment groups (objectives 1-3), c) performance, prediction, and confidence differences among groups of subjects paired with different male confederates, d) performance, prediction and confidence differences among subjects tested in different blocks, and e) information concerning debriefing.

PERFORMANCE CHANGES ACROSS TRAILS

In this study all 48 subjects were tested for performance on three consecutive days. This procedure was followed to allow subjects to become familiar with the task on the first two days to minimize the efforts of learning on the possible effects of experiment treatments employed during the third trial. Since predictions for future performance were made after each trail, familiarity with the task and with past performance would also provide subjects with a basis to form realistic predictions of future performance. An analysis of variance was used to determine performance differences across the three trails. The results of the analysis are show in Table 3.

TABLE 3
ANOVA Summary Table for Performance Across Trails

Source of Variation	df	SS	MS	F	P
Trials	2	328.85	164.42	34.21	.0001
Error	94	451.82	4.81		
Total	143	4575.99			

A post F test was necessary because the F value for trials was significant at the .05 level as noted in Table 3. The results of a Least Squares Means analysis for multiple means comparisons is presented in Table 4.

TABLE 4
Least Squares Means Table*

Time	Trial 1	Trial 2	Trial 3
Score	40.42	<u>43.17</u>	<u>43.94</u>

* Means not underlined are statistically different

As noted in Table 4, the Least Squares Means results indicated that a significant change in performance occurred from trial 1 to trial 2, while no overall difference was observed from trial 2 to trial 3. This suggests that any difference between subjects observed from trial 2 to trial 3 would not be accounted for by learning.

PERFORMANCE, PREDICTION AND CONFIDENCE DIFFERENCES

As outlined in research objectives 1-3, this study was designed to study differences in task performance, and self-confidence (predicted by both performance prediction and perceived confidence in attaining predicted performance scores), of subjects administered different experiment treatments (social facilitation-social comparison, social facilitation only, social comparison only and control). Because there were three dependent variables (performance, prediction and confidence) a Multivariate ANOVA, specifically the Hotelling - Lawley Trace procedure (SAS Packaged Program), was used to compare trial 3 group means. A summary of F values resulting from this analysis is presented in Table 5.

TABLE 5
Multivariate ANOVA Summary Table

Independent Variable	F value
Social facilitation	.5016
Social comparison	.2046
Social facilitation x social comparison	.0656

As noted in Table 5, F values indicate that there was no overall effect for social facilitation, social comparison, or social facilitation-social comparison interaction using a selected .05 level of significance. Since no significant differences were found using a Multivariate ANOVA there is no need to explore individual objectives 1-3 for specific sources of variance. Univariate analyses of variance were conducted and summary tables are presented in the Appendix for those

readers interested in this information (Appendixes C, D and E).

Although no significant differences were found in performance or self-confidence measures as a result of either social facilitation or social comparison, there was a near significant interaction between the two. A closer look at the trend toward the interaction seems warranted. For each dependent variable, the interactions for trial 3 are graphically illustrated in Figures 1 to 3 as presented by the solid lines only.

Figure 1

Mean Performance Scores for each of the Four
Treatment Cells on Trials 2 and 3

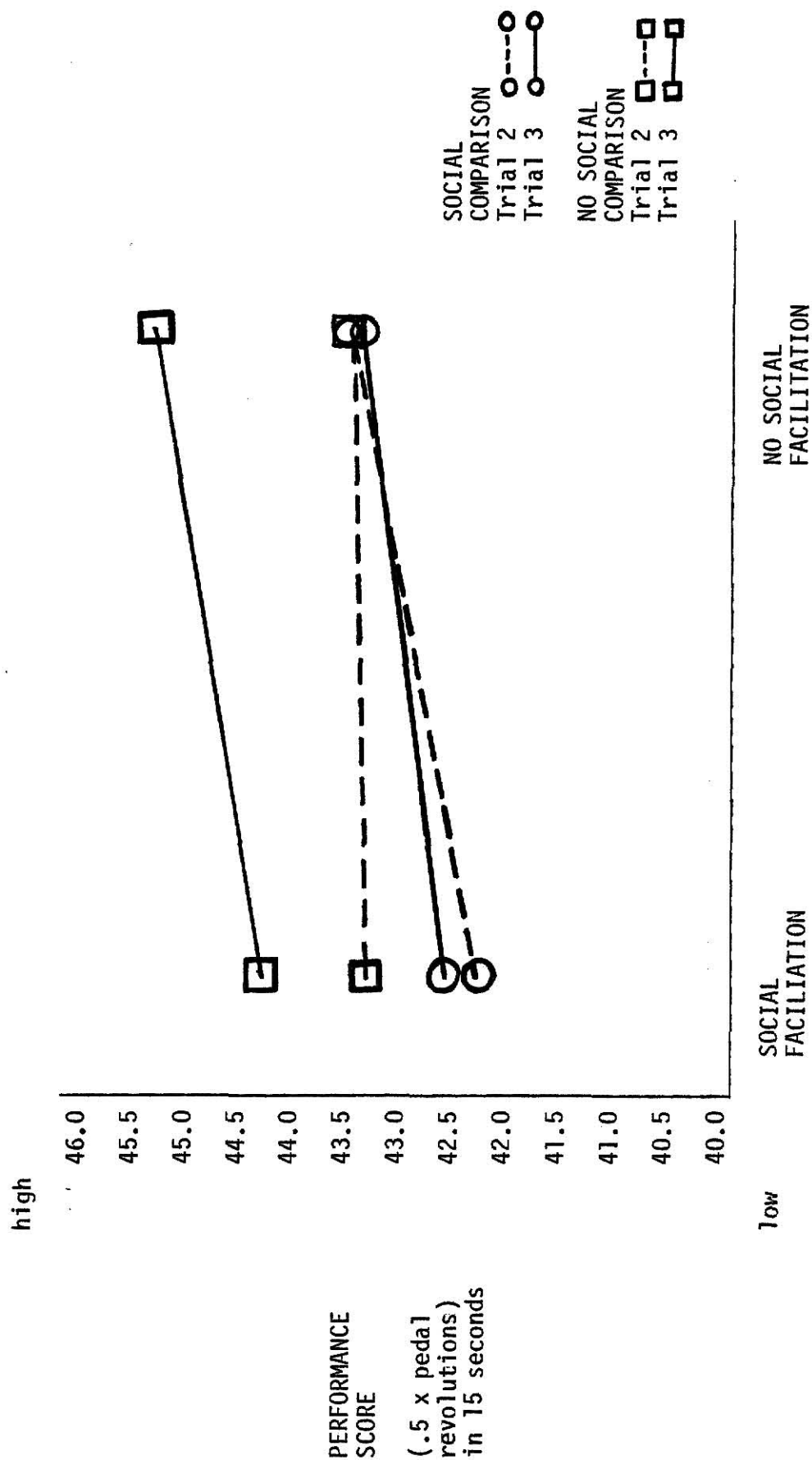


Figure 2

Mean Predicted Scores for Each of the Four
Treatment Cells on Trials 2 and 3

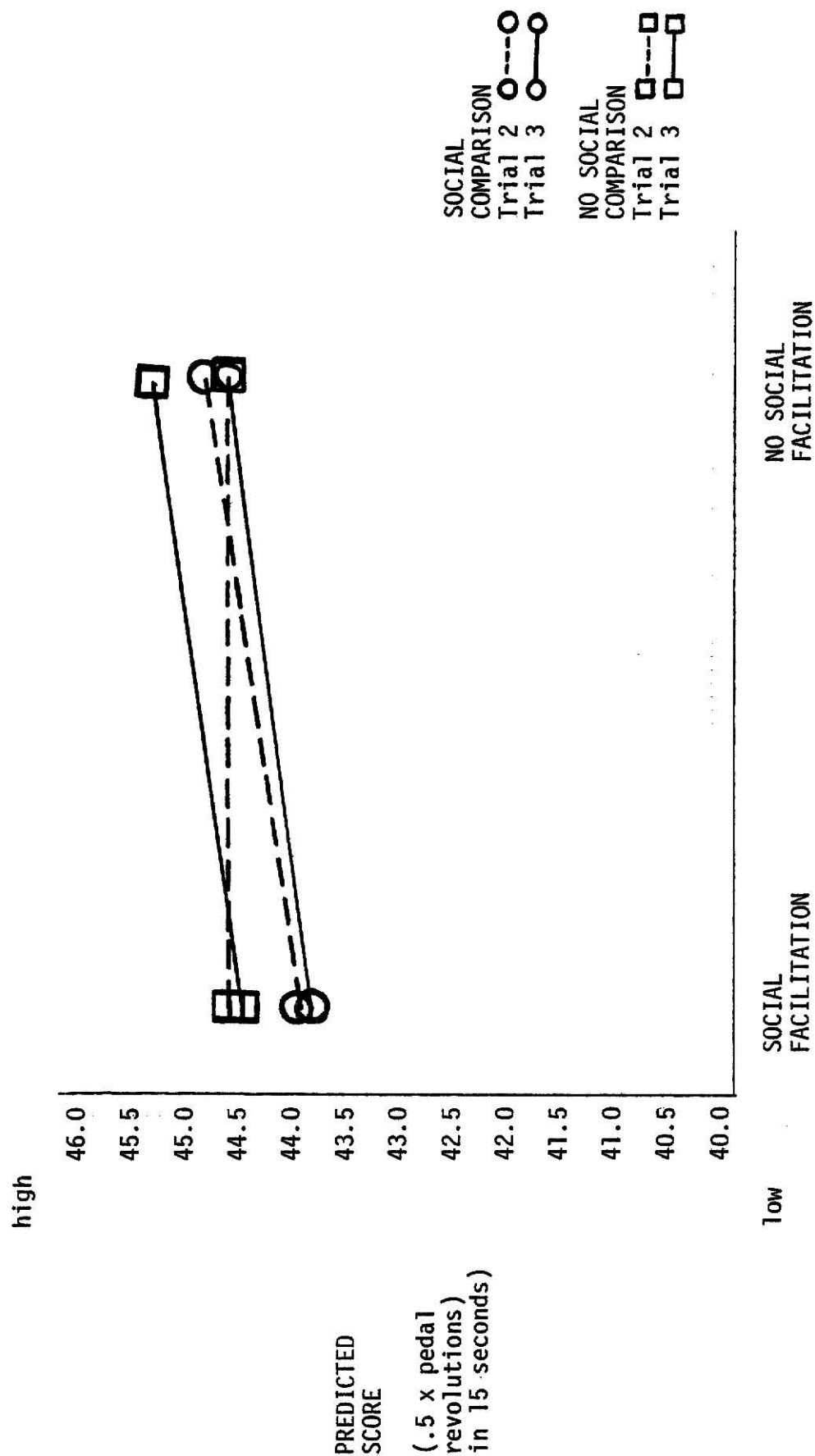
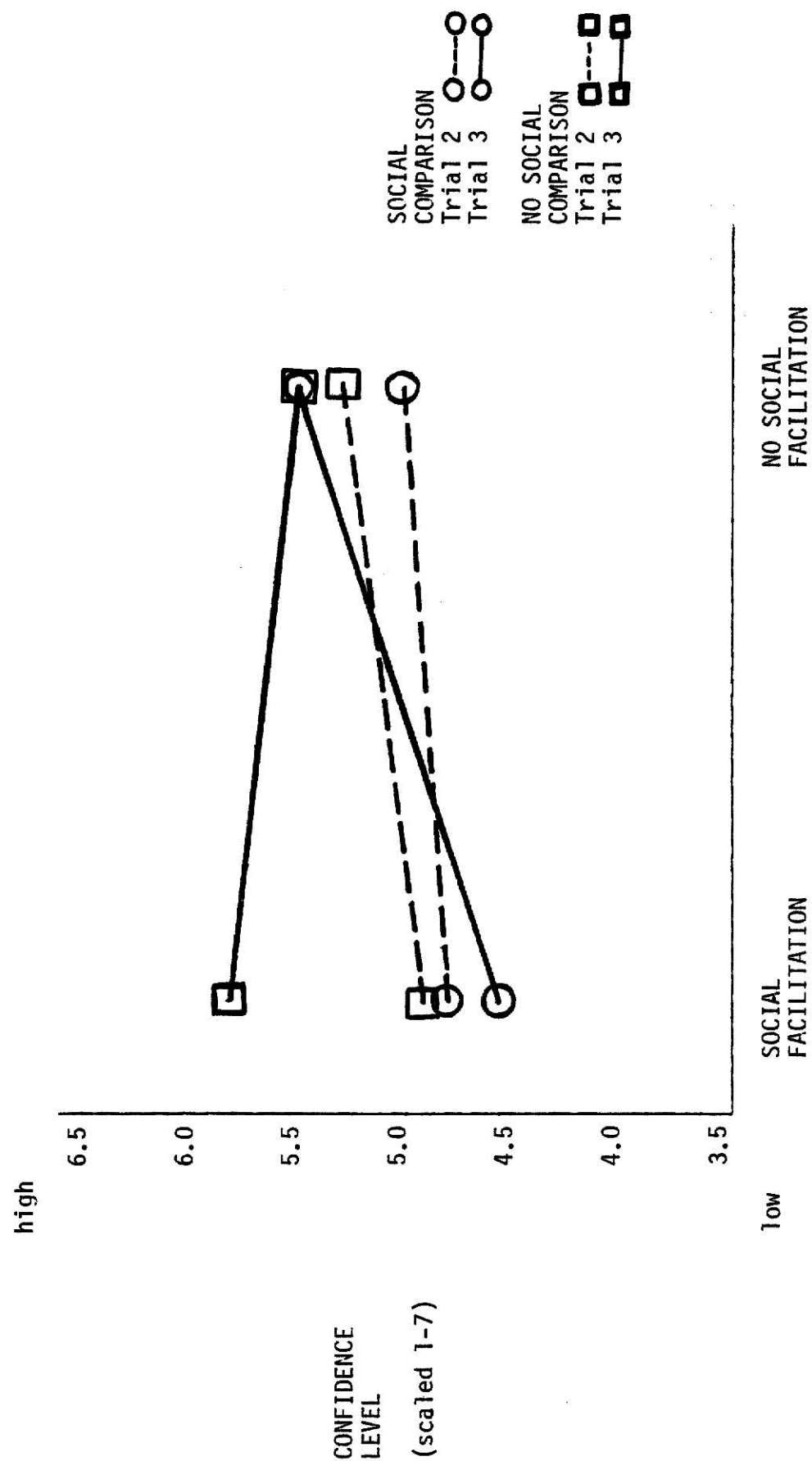


Figure 3

Mean Confidence Level for Each of the Four
Treatment Cells on Trials 2 and 3



The near significant interaction of trial 3 group means for the performance and self-confidence effect between the social facilitation and social comparison variables (solid lines only) is illustrated by the consistently low means for the combined social facilitation-social comparison group and the relatively high control group means or the tendency of these lines to converge. Since it was possible that similar subtle but nonsignificant differences may have already existed before the treatments were introduced, group means for trial 2 were also presented (dotted lines). A comparison of trial 2 to trial 3 lines indicates that the near significant trial 3 interaction between the independent variables may have been as much a result of pretrial 3 differences as of any trend toward significance. Observation of the three figures suggested a Multivariate ANOVA for trial 2 to 3 difference to be in order. A summary of F values resulting from the analysis is presented in Table 6.

TABLE 6
Multivariate ANOVA Summary Table

Independent Variable	F value
Social facilitation	.9672
Social comparison	.1550
Social facilitation x social comparison	.1428

As can be seen in Figure 1, expected decrements in performance from trial 2 to 3 were not observed for groups experiencing experimental treatments on trial 3. Though significant differences did not exist,

the nonsignificant trial 2 to 3 differences seem worthy of discussion. Contrary to expectations, the group experiencing both social facilitation and social comparison treatments demonstrated a very slight increase in mean performance score. The only treatment where a mean performance score decrement was observed was in the social comparison only group. While experiment treatments did not depress performance, the mean control group performance score increased more from trial 2 to 3 than that of any group receiving treatment. It can be seen that the group receiving social facilitation treatment increased in performance about half as much as the control group. The other two groups (social facilitation - social comparison and social comparison only) showed only very slight changes from trial 2 to 3 as compared to the control group.

With respect to performance score predictions for a future trial, it can be seen in Figure 2 that except for the control group, changes from trial 2 to 3 were small and decremental. Predictions for future performance were similar to actual performance scores though the social facilitation group mean for performance prediction was not higher on trial 3 as was the mean performance score.

Mean stated confidence level on a scale of one (low confidence) to seven (high confidence) is illustrated in Figure 3. While confidence levels for three of the groups increased from trial 2 to 3, for the group experiencing combined treatments the mean confidence level was depressed on the third trial. Increases in stated confidence were by far the greatest for the social facilitation group. The increase for the social comparison group is also noted to be higher than that for the control group. It must be emphasised that these observations reflect tendencies only and that no difference was found between the dependent variables of performance, prediction and confidence, nor was the

interaction between variables significant at the .05 level of significance.

DIFFERENCES BETWEEN GROUPS PAIRED WITH DIFFERENT MALE CONFEDERATES

Given that three confederate males were selected on the basis of somatotype, with confederate 1 at the midpoint of mesomorphy (muscular build), confederate 2 tending toward ectomorphy (thin), and confederate 3 tending toward endomorphy (rotund); subjects may have perceived them as more or less threatening because of physical appearance. In order to determine whether the three males differently effected the performance, predictions or confidence of subjects, a Multivariate ANOVA was used. A similar analysis using trial 2 to trial 3 differences was also done. The summary of F values resulting from these analyses is presented in Table 7.

TABLE 7
Multivariate ANOVA Table

Independent Variable	F value
Male effect (trial 3)	.2821
Male effect (trial 2 to trial 3)	.0729

Table 7 shows by the F values that there were no overall male effects at the .05 level of significance. However, the trial 2 to 3 difference neared significance. Casual observation of the data suggested that though mean scores for performance, prediction, or confidence did not differ, a frequency count of positive versus negative changes from trial 2 to 3 might yield different results. Frequency counts for

the changes in performance, prediction and confidence are presented in Tables 8, 9 and 10 respectively. A summary table of frequency changes for all effects is found in Table 11.

TABLE 8
Changes in Performance Score from
Trial 2 to Trial 3

	Male 1 (midpoint of mesomorphy)	Male 2 (mesomorph tending toward ectomorphy)	Male 3 (mesomorph tending toward endomorph)	No Male
Condition 1				
+	2	2	0	
-	1	1	1	
0	1	1	3	
Condition 2				
+	2	4	1	
-	1	0	2	
0	1	0	1	
Condition 3				
+	2	2	1	
-	0	2	2	
0	2	0	1	
Condition 4				
+				8
-				0
0				4
Totals				
+	6	8	2	8
-	2	3	5	0
0	4	1	5	4

TABLE 9
Changes in Prediction of Score from
Trial 2 to Trial 3

	Male 1 (midpoint of mesomorphy)	Male 2 (mesomorph tending toward ectomorphy)	Male 3 (mesomorph tending toward endomorph)	No Male
Condition 1				
+	2	3	0	
-	1	1	3	
0	1	0	1	
Condition 2				
+	2	4	1	
-	2	0	2	
0	0	0	1	
Condition 3				
+	2	2	0	
-	1	2	2	
0	1	0	2	
Condition 4				
+				7
-				3
0				2
Totals				
+	6	9	1	7
-	4	3	7	3
0	2	0	4	2

TABLE 10
Changes in Confidence Rating from
Trial 2 to Trial 3

	Male 1 (midpoint of mesomorphy)	Male 2 (mesomorph tending toward ectomorphy)	Male 3 (mesomorph tending toward endomorph)	No Male
Condition 1				
+	0	0	1	
-	1	1	2	
0	3	3	1	
Condition 2				
+	4	3	1	
-	0	0	1	
0	0	1	2	
Condition 3				
+	2	0	2	
-	0	0	0	
0	2	4	2	
Condition 4				
+				4
-				4
0				4
Totals				
+	6	3	4	4
-	0	1	3	4
0	6	8	5	4

TABLE 11
Summary of Changes for all Effects

Dependent Variables		Performance	Prediction	Confidence	Totals	
Male 1	+	6	6	6	+	18
	-	2	4	0	-	6
	0	4	2	6	0	12
Male 2	+	8	9	3	+	20
	-	3	3	1	-	7
	0	1	0	8	0	9
Male 3	+	2	1	4	+	7
	-	5	7	3	-	15
	0	5	4	5	0	10
No Male	+	8	7	4	+	19
	-	0	3	4	-	7
	0	4	2	4	0	10

As noted in Tables 8 and 9, the totals for mean performance, and prediction score changes from trial 2 to trial 3 indicate that of the 12 subjects paired with male confederate 3, performance scores increased in only two cases and predictions increased in only one case. For both of the other males and in the control group, at least half of the subjects increased their scores and predictions. Totals for all effects as noted in Table 11, show that twice as many subjects paired with confederate 3 changed in a negative direction as compared to the other three groups. Only one-third as many positive changes were observed for confederate 3.

This observation suggest that subjects may have been influenced differentially by male confederate 3. Although differences between males were not found in the statistical analysis, the direction of change in scores, predictions, and stated level of confidence, seems to be substantially different in the case of male 3 when frequency of direction of change is considered. For the combined treatment tested with male 3, only one score improved on any of the three dependent variables, six decreased and five stayed the same. The differences for male 3 are apparent for all treatments but especially so for the combined treatment.

DIFFERENCES AMONG SUBJECTS TESTED IN DIFFERENT BLOCKS

Subjects were tested in four time blocks over a two week period. All of the subjects in one block were tested before the next block was started. A block consisted of one trial on each of three consecutive days. Since there were three dependent variables, a Multivariate ANOVA was used to determine whether there was a difference between groups of subjects tested in four different blocks. A summary of F values resulting from this analysis is presented in Table 12.

TABLE 12
Multivariate ANOVA Summary Table

Independent Variable	F Value
Block effect	.4024

As noted in Table 12, the F value indicates that there was no overall effect at the .05 level of significance. Subjects in different blocks do not appear to have been affected differentially by treatments.

DEBRIEFING INFORMATION

Following the experiment procedures, after the third task trial, subjects were debriefed. Refer to Chapter 3, heading Manipulation Check and Debriefing for specific details.

Of the 24 subjects receiving social comparison treatment, two subjects indicated that the low performance score attained by a male confederate must have been somehow rigged. These two subjects were replaced by new subjects. All other subjects explained their higher performance scores with some rational; for example "Well, I jog a little", or I guess I'm just stronger than he is".

It was also noted that most subjects did not seem to be upset or concerned about having scored higher than a male. One subject casually mentioned that she hoped she had not hurt the male's feelings. Several subjects indicated that they felt nervous about having a male watch them perform the task and subjects generally expressed a desire to do well when observed by a male.

Based on the responses to debriefing questions by all subjects for whom data was kept, the manipulations involved in the experiment treatments seemed to be effective in producing social facilitation and/or information providing a basis for social comparison.

DISCUSSION

In this study an attempt was made to determine whether performance and self-confidence in females is affected by the evaluative situations

of social facilitation (observation by a male), social comparison (information of having beaten a male), or both (social facilitation - social comparison) in the performance of a male oriented task. A Multivariate ANOVA revealed no difference between treatments and no interaction for the dependent variables of performance and self-confidence.

It was expected that deficits in self-confidence would be effected by evaluative situational variables and that those deficits would be paralleled by decreased performance of a male oriented bicycle task. Possible explanations have been investigated to account for the lack of differences in the results of this study. Scanlan (1978) suggested that success experiences decrease the threat of evaluative situations as evidenced by decreased A-state anxiety. Thus if some form of failure is either anticipated or experienced, threat to self would be expected to increase and self-confidence to decrease. In this study when information providing a basis for social comparison was provided, females were made aware that they were more successful in performing the task than a male. It was expected that females would perceive this situation as a failure to conform to the accepted role of being or at least acting as the weaker sex. Since females in this study did not show deficits in performance it may be that perceived success in the performance of the task decreased the threat of the evaluative situations of social facilitation and social comparison. Perhaps the evaluation involved in this study was not threatening enough or was not important enough to the subjects or perhaps they did not perceive the situation to be competitive. Nicholls (1975) investigated a cognitive task in which success by females was manipulated in a cross-sex competition situation. When the task was labeled as "practice" there was no difference found between males and females in prediction of future performance but when

the task was labeled "test" females made lower predictions than males. Unfortunately, actual performance scores were not examined by Nicholls.

Lack of differences in this study may have been due to the nature of the task. In studies by Ryan (1978) where a fine motor task was examined, and by Corbin and Nix (1979) in which a gross motor task was considered, females made lower predictions for ability to perform tasks perceived to be male oriented than for tasks perceived to be female oriented. Herkowitz (1978) suggested that tasks involving strength, power and speed are male oriented in nature and that females generally do not make performance predictions as high as those of males for such activities. A bicycle task was perceived by fourth grade children to be one that boys could perform better than girls (Nix, 1978). Since bicycles are a popular mode of transportation and form of recreation, and since bicycle ergometers are easily accessible to college students for exercise purposes, it may be that this task was not perceived by this sample of college females as one in which males should excel over females. The social facilitation literature suggests that on a well learned task, performance can be expected to be enhanced by the presence of an observer since the dominant response mainly evoked is the correct response (Zajonc, 1965). The performance and self-confidence of females in this study were not found to be enhanced by social facilitation although the tendencies were in the expected direction. Cottrell (1972) suggested that when an observer is present, evaluation perceived as threatening might lead to anticipation of negative outcomes. It may be that subjects in this investigation perceived the situation as slightly threatening thereby keeping the enhancement of performance minimal. An alternative possibility is that subjects may have reached a performance ceiling on the second trial of the task so that facilitation

effects on the third trial could not be measured.

The behavior of the male confederates might have been a factor in reducing the perception of the situation as being evaluative in this study. In an investigation by Argote, Fisher, McDonald and O'Neal (1976) female subjects in one group were rejected by a male after success at a task, while females in another group were rejected by a female. It was suggested that lowered performance was related to the mediation of social disapproval when rejection was imparted by a male. It is also possible that the social comparison treatment in this study was not salient enough since it did not directly mediate social disapproval to the subjects. The male confederate here acted as a cooperative subject and did not express surprise, embarrassment or indignation at having been beaten by a female. Greater variability in somatotype may have effected females differently since all three male confederates were mesomorphs. Interestingly, groups of subjects tested in this study with three different confederate males, did not differ significantly in effecting subjects as determined by the use of a Multivariate ANOVA. However casual observation of the frequency of positive and negative changes in performance from trial 2 to trial 3 revealed that subjects paired with confederate 3 (the male tending toward endomorphy) especially those in the combined social facilitation-social comparison treatment demonstrated a tendency to perform lower and to predict lower future scores than subjects paired with the other confederates or control subjects. It may be that some types of males present more of a threat to females than do others in the performance of a male oriented task under evaluative conditions.

It is also a possibility that initial differences in self-confidence between female subjects were such that high and low confidence levels

cancelled out treatment effects. Lenney (1977) has suggested that females low in confidence might be more situationally vulnerable. Perhaps performance decrements might have been effected in a sample of females known to have low self-confidence. College females do not seem to fall into this category. Samples of females from other populations may behave differently than the college females in this study; for example, high school females or older females may have more traditional views of female appropriate behavior.

A final consideration in explaining the lack of difference found in this study is that females may be less situationally vulnerable than the current literature suggests. Traditional sex-roles are less in evidence than in the past (Hoffman, 1977). Widely generalizing, the results of this study may be reflective of a trend toward achievement by females commensurate with their known capabilities, at least by college females, in motor task performance.

Chapter 5

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

SUMMARY

The hypothesis put forward by Lenney (1977) suggests that salience of evaluation in the performance of a male oriented task may be an important factor in decreasing the self-confidence of females. Other researchers have examined the effects of such situational factors on the performance of cognitive tasks (Feather and Simon, 1975), fine motor tasks (Ryan, 1979; and Ryan and Pryor, 1976), and perception of male oriented motor tasks (Corbin and Nix, 1979). The purpose of this study was to determine whether the situational factors of social facilitation and social comparison effect the performance and confidence about performance of women performing a male oriented gross motor task.

Subjects were 48 female Kansas State University students randomly assigned to one of four experiment treatments: social facilitation - social comparison, social facilitation only, social comparison only, and control. The task was a 15 second ride on a bicycle ergometer. In order to provide social facilitation and/or basis for social comparison, one of three male confederates was randomly assigned to one-third of the subjects in each of the first three treatment groups. Subjects repeated the bicycle task on three consecutive days to establish a baseline performance and experiment treatments were administered during a third trial on the third day. A Multivariate ANOVA revealed no differences between treatments and no interaction between the independent variables.

CONCLUSIONS

The lack of significant differences between treatment groups and the lack of a significant interaction between the independent variables leads to the conclusion that females, at least those tested in this sample, do not underachieve nor do they lack self-confidence in performing a male oriented motor task in evaluative situations thought to be less than optimal. However, the frequency of performance and confidence decreases for subjects tested in groups with a specific confederate and similar data noting possible individual differences between subjects in responding to various treatments suggests that future research controlling for additional factors may find results supportive of underachievement and lack of confidence in at least some females performing a male oriented motor task while both observed by a male and informed about the male's performance ability. Some of the factors that need to be considered include the nature of both the evaluative situation and the task employed. Further, based on frequency data (Tables 7, 8 9 and 10), the fact that one male confederate effected females differently than other males, suggests that the personality or physical characteristics of the male with whom female subjects are paired may effect the extent to which underachievement or lowered self-confidence is effected in the performance of a male oriented task.

RECOMMENDATIONS

Futher research in this area seems warranted. Several factors which might identify important treatment differences and which might be examined in future research are listed below:

1. The nature and intensity of evaluation needs to be considered so that the salience of treatments is insured. The type of competition (direct, social comparison, rivalry), instructions (low key, competitive, implied success or failure), and audience (passive, interested, evaluative, supportive) need to be considered.

2. Before a task is selected it must be certain that a performance ceiling is not already reached before experiment treatments are employed.

3. Examination of the characteristics (evaluating, mediating social disapproval, supportive, passive), or different males in effecting the performance and self-confidence of females might be worthy of consideration.

4. It might be fruitful to examine the same treatment effects for a sample of females known to be low in self-confidence, or for samples of females younger and older than college females.

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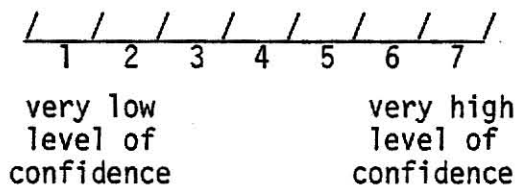
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APPENDIX A

QUESTIONNAIRE

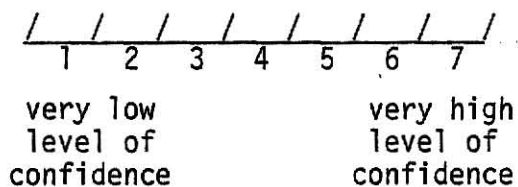
SESSION I _____

1. Your score today _____.
2. Tomorrow you will be repeating the same test. Predict the score you think you can reach tomorrow when you perform the bicycle task.
_____.
3. How confident are you that you can reach the score you predicted in question 2 above? Indicate with an x on the scale below.



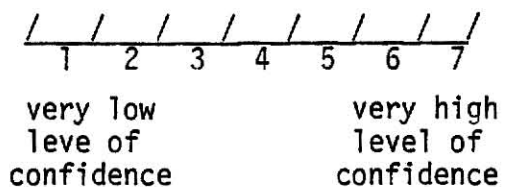
SESSION II _____

1. Your score today _____.
2. Tomorrow you will be repeating the same test. Predict the score you think you can reach tomorrow when you perform the bicycle task.
_____.
3. How confident are you that you can reach the score you predicted in question 2 above? Indicate with an x on the scale below.



SESSION III _____

1. Your score today _____.
2. Predict the score you think you can reach if you were to repeat the same bicycle test again tomorrow.
_____.
3. How confident are you that you could reach the score you predicted in question 2 above? Indicate with an x on the scale below.



APPENDIX B

CONSENT FORM

Kansas State University

Investigator: Barbara Chmielowicz, Department of Health, Physical
Education and Recreation (phone 532-6240)
: Advisor - Dr. Charles B. Corbin

Title of Investigation: Factors Related to the Performance of a Simple
Motor Task

This is to certify that I, _____
print name

volunteer to participate in a research investigation at Kansas State
University under the supervision of the Department of Health, Physical
Education and Recreation.

The procedures involved in the study, their risks and discomforts appear
on the reverse side of this form. I have read them and understand the
nature of the study.

I understand that all results will be kept confidential with data processed
using code numbers. If the results of the study are prepared for publi-
cation no participants will be identified by name.

I understand that in the event of physical injury resulting from the
research procedures involved in this experiment, no financial compensa-
tion will be available, since state regulations prohibit Kansas State
University from carrying insurance for such purposes.

I understand that questions I might have will be answered immediately
on completion of the study, that the results of the study will be made
available to me, and that I can withdraw my consent at any time.

I understand the procedures, potential risks and agree to voluntarily
take part in this study.

Date

Signature of Student

EXPLANATION OF THE INVESTIGATION

Purpose of the Study:

This study is designed to investigate the ability of female undergraduate students to perform a simple motor task and will consider the way you feel about your ability both before and after your performance of the task.

Procedures to be Followed:

You will be asked to make some predictions both before and after participating in a simple 15 second ride on a stationary bicycle on three consecutive days. An electronic counter will record your performance scores. The findings of the study will be available to you at the completion of the investigation and any questions you might have about the study will be answered.

Discomforts and Risks:

The motor task involves riding a stationary bicycle, set at a moderate resistance similar to riding uphill, for 15 seconds as fast as you can. The risk is no greater than riding an ordinary bicycle. It is the experimenter's opinion that you can learn about your ability and factors relating to performance of a motor task by participating in the study.

APPENDIX C

ANOVA Summary Table for the Dependent
Variable of Performance

Source of Variation	df	SS	MS	F	P
SF	1	9.19	9.19	.34	.5621
SC	1	38.52	38.52	1.43	.2381
SF x SC	1	.19	.19	.01	.9339
Error	44	1184.92	26.93		
Total	47	1232.81			

SF - social facilitation
SC - social comparison

APPENDIX D

ANOVA Summary Table for the Dependent
Variable of Prediction

Source of Variation	df	SS	MS	F	P
SF	1	1.02	1.02	.04	.8509
SC	1	17.52	17.52	.61	.4376
SF x SC	1	2.52	2.52	.09	.7678
Error	44	1256.25	28.55		
Total	47	1277.31			

SF - social facilitation
SC - social comparison

APPENDIX E

ANOVA Summary Table for the Dependent
Variable of Confidence

Source of Variation	df	SS	MS	F	P
SF	1	.75	.75	.55	.4635
SC	1	4.08	4.08	2.98	.0914
SF x SC	1	4.08	4.08	2.98	.0914
Error	44	60.33	1.37		
Total	47	69.25			

SF - social facilitation
SC - social comparison

EFFECTS OF SOCIAL FACILITATION AND SOCIAL COMPARISON ON THE
PERFORMANCE AND SELF-CONFIDENCE OF FEMALES PERFORMING A
MALE ORIENTED MOTOR TASK

by

BARBARA CHMIELOWICZ

B.P.E., University of Manitoba, 1974

AN ABSTRACT OF A MASTER'S THESIS

submitted in partial fulfillment of the
requirements for the degree

MASTER OF SCIENCE

Department of Health, Physical Education and Recreation

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1980

The purpose of this study was to determine whether the situational factors of social comparison and social facilitation effect the performance and confidence about performance of women performing a male oriented gross motor task. An attempt was made to determine if there were differences in the dependent variables of performance and confidence between groups performing in the presence or absence of a male; to determine if there were differences in the dependent variables between groups performing with or without information providing subjects with a low referent score attained by a male; and to determine if there was an interaction between the independent variables, social facilitation and social comparison.

Subjects were forty-eight female Kansas State University students randomly assigned to one of four experiment treatments: social facilitation-social comparison, social facilitation only, social comparison only, and control. A 15 second, all out ride on a bicycle ergometer served as the task. One of three male confederates was randomly assigned to one-third of the subjects in each of the first three experiment conditions to provide social facilitation and/or a basis for social comparison. Subjects repeated the bicycle task on two consecutive days to establish a baseline performance and experiment treatments were administered during a third trial on the third consecutive day. Subjects recorded their performance scores, predictions for a subsequent trial, and level of confidence in ability to attain their predicted score after each trial. A multivariate analysis of variance revealed no significant differences in treatments and no interaction between the dependent variables.