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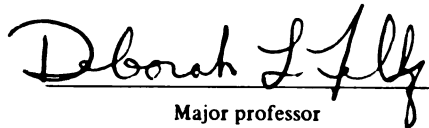
THE INFLUENCE OF MODEL GENDER, MODEL
PERCEIVED ABILITY AND SUBJECT PERCEIVED
ABILITY ON MUSCULAR ENDURANCE AND SELF-
EFFICACY

presented by

JANIE SPREEMAN

has been accepted towards fulfillment
of the requirements for

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THE INFLUENCE OF MODEL GENDER, MODEL PERCEIVED ABILITY
AND SUBJECT PERCEIVED ABILITY ON MUSCULAR
ENDURANCE AND SELF-EFFICACY

By
Janie Spreemann

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ABSTRACT

THE INFLUENCE OF MODEL GENDER, MODEL PERCEIVED ABILITY AND SUBJECT PERCEIVED ABILITY ON MUSCULAR ENDURANCE AND SELF-EFFICACY

By

Janie Spreemann

This study was designed to investigate the influence of model/observer similarity cues (gender and perceived task ability) on modeling and self-efficacy. This study employed a Model Gender by Model Athletic Ability by Subject Athletic Ability factorial design plus an external control group for each subject ability group. College-aged female athletes and nonathletes ($N = 150$) observed a videotape of either a female or male, athletic or nonathletic model perform a leg-endurance task, or were assigned to a no-model condition. Each subject was required to sit on a stool and extend her leg above a cord. The length of time the leg remained extended on three trials was recorded. Pre- and post-experimental questionnaires determined a) the effectiveness of model similarity/dissimilarity manipulations, and b) subjects' self-efficacy. Results indicated that athletes performed significantly longer and had stronger efficacy expectations than nonathletes. Subjects observing a female athletic model tended to perform better than subjects observing a male athletic model, although this difference was not significant. Athletes perceived themselves as significantly more similar to the athletic model, while nonathletes thought they were more similar to the nonathletic model. Both groups thought they were more similar to the female than male models.

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CHAPTER I

INTRODUCTION

Nature of the Problem

In many languages, the word for teach has the same meaning as the word for show (Reichard, 1938). This statement seems to have met with general acceptance in the physical education and athletic domain where the concept of modeling has become an inherent and focal part of the instructional system. Modeling can certainly facilitate the development of motor behavior by decreasing the inefficiency of trial and error learning that is often associated with the development of finely coordinated and complex sequences of motor skills.

One of the most plausible and encompassing theories of modeling appears to be the stimulus-contiguity or social learning theory of modeling proposed by Bandura (1969). Modeling, which refers to behavior that results from an observer's exposure to another individual's performance or behavior, is conceptualized by Bandura as primarily an informational process whereby the observer is cognitively engaged as a central information processor. That is, people process, weigh, and integrate diverse sources of information regarding their capabilities, and they regulate their choice behavior and effort expenditures accordingly (Bandura, 1977a). In order to effectively integrate the various

aspects of the modeling process into a common conceptual framework, Bandura has identified four basic components which are essential to modeling theory. Specifically, these four components are attention, retention, motoric capability and motivation. For an observer to subsequently display the modeled act, he or she must first attend closely to and retain what was demonstrated. In addition, the observer must possess the motoric capability to reproduce the modeled act and be motivated to do so.

The modeling process functions in several ways. According to Bandura (1977b), modeling influences can serve as instructors, inhibitors, disinhibitors, facilitators, stimulus enhancers and emotion arousers. In conjunction with this notion, Bandura (1971) has conceptualized three primary modeling functions. The first of these functions, observational learning, is mainly concerned with acquiring novel response patterns as the result of observing a model. Much of the modeling interest in physical education deals with the research and application of observational learning concepts. Motor behavior research dealing with observational learning has concentrated heavily on strategy-oriented laboratory tasks, such as the "shoot-the-moon" game and the Bachman ladder climbing task (Landers & Landers, 1973; Martens, Burwitz & Zuckerman, 1976).

The second function of modeling, response facilitation, is characterized by cues obtained as a result of observing a model perform non-novel, nonthreatening tasks. In this process, cues serve to enhance the performance of pre-existing responses (Bandura, 1971). For example, if a coach wanted to increase players' praising of their teammates, he

might have the team captain model the desired behavior. This behavior already exists in the players' repertoire, but the team captain's behavior facilitates the response.

The third function of modeling, the inhibitory/disinhibitory function, deals with performance decrements or increments as the result of observing a model's performance, as well as the subsequent consequences associated with that performance. The imitation of modeled behaviors are classified as inhibitory when the observer shows a decrement or general reduction of responsiveness as a result of seeing a model's behavior produce punishing or aversive consequences (Bandura, 1971). Examples of research investigating the inhibition effect are reflected by various studies centering on the topic of aggression (Bandura, 1973; Bandura & Walters, 1959). In contrast, disinhibitory effects occur when observers increase the performance of formerly inhibited behaviors as a result of observing models engage in threatening, persevering, or prohibited activities without experiencing aversive consequences (Bandura, 1971). Research investigating disinhibition effects of modeling has focused primarily on phobic reactions and avoidance behavior exhibited toward snakes (Bandura & Adams, 1977; Bandura & Barab, 1973; Bandura, Blanchard & Ritter, 1969; Borkovec, 1973; Kazdin, 1973, 1974; Kornhaber & Schroeder, 1975; Meichenbaum, 1971).

Another application of the disinhibition effect seems highly relevant to the field of physical education and athletics where fear, persistence, pain, and endurance are often evidenced in many physical activities. Although modeling tasks which require perseverance and endurance have not been traditionally categorized under the rubric of

disinhibition modeling effects, the fact that these tasks are experienced by some discomfort, would seem to qualify them under this category. A paucity of this type of disinhibition research directly related to the field of physical education and athletics exists, however, with only a few published studies to date examining this phenomenon (Feltz, Landers & Raeder, 1979; Gould & Weiss, 1981; Lewis, 1974).

Regardless of the type of modeling effects examined, two areas receiving a considerable amount of attention in the modeling research have been the attentional and motivational subprocesses of Bandura's (1969) theory. Of particular interest have been the influencing factors of both model and observer characteristics. Various manipulations of both model and observer characteristics have been employed in an attempt to define the optimal model/observer characteristics necessary for the enhancement of modeling. Research of this nature has focused upon such issues as competence, status, and similarity of the model. For instance, in the area of observational learning, it has been generally concluded that a model of higher competence, skill, and social status will more positively affect the observer's attention to the model and motivation to perform than will a less competent, lower skilled, and lower social status model (Bandura, 1969; Bandura & Walters, 1963; Baron, 1970; Flanders, 1968; Landers & Landers, 1973; Rosenbaum & Tucker, 1962; Zimmerman & Blotner, 1979).

In the area of inhibition/disinhibition research, the effects of various dimensions of model/observer similarity have become an integral focal point. According to Bandura (1977a), model similarity increases the personal relevance of the modeled performance to the observer and,

therefore, should increase the observer's motivation to perform. Model similarity exists along a number of dimensions such as gender, task ability, age, race, and I.Q. For example, the dimension of gender has been investigated by employing models of similar or dissimilar gender to the observer, in hopes of creating an enhanced condition of perceived similarity or dissimilarity between model and observer. The results of these investigations suggest that enhanced treatment effects become evident when similar-gender models are employed (Gould & Weiss, 1981; Kazdin, 1974; Perry & Perry, 1974; Rosekrans, 1967), although these effects have been confounded with other variables. Also, despite numerous conflicting reports related to model/observer similarity by gender effects (Flanders, 1968), most researchers seem to advocate the use of same-gender models when attempting to enhance the modeling process. Hence, much of the modeling research, regardless of academic discipline, has characteristically employed same-gender models.

Perceived similarity of the model (in terms of task ability or perceived ability in competence) has been another variable of interest in the inhibition/disinhibition function of modeling. However, this variable has been historically confounded by the inclusion of same-gender models in the majority of research designs, making it difficult to demonstrate the causality between perceived similarity in task ability and enhanced modeling effects. For instance, disinhibition studies investigating approach behavior by snake phobic subjects have examined perceived similarity of the model in terms of fear and its effect on subsequent approach behavior. The models used in these studies have always been of the same gender as the observer. Generally, it has been

concluded that subjects perceiving themselves as manifesting similar fear and approach behavior as the snake phobic model, displayed an increase in approach behavior and a decrease in fear as the result of observing this similar model cope with the situation and eventually approach the snake. These coping models have been found to be superior to mastery or fearless models, who immediately display successful approach behavior very confidently and with no apprehension (Bandura, 1977a; Bandura, Adams & Beyer, 1977; Meichenbaum, 1971). The effectiveness of these coping models may have been enhanced by the combined effects of similar gender and similar fear between model and observer. Kazdin (1974), in a similar type of investigation, also found support pointing to the superiority of a coping model; however as Kazdin noted, the similarity dimensions of age and gender significantly enhanced and contributed to the overall effects.

A series of investigations by Weinberg and his colleagues, although not viewed as modeling in the traditional sense, provide valuable speculations concerning the experimental manipulation of model (confederate) similarity and dissimilarity (Weinberg, Gould & Jackson, 1979; Weinberg, Gould, Yukelson & Jackson, 1981; Weinberg, Yukelson & Jackson, 1980). Using a more motorically-oriented task, similarity was manipulated by having nonathletic subjects compete against a confederate presented as a varsity track athlete (dissimilarity) or against a confederate presented as a nonathlete whose past history indicated a knee injury (similarity). This confederate did not serve as an instructional model; however, he did convey incidental information to the observer. Results revealed that subjects who were exposed to the nonathlete with

a knee injury, extended their legs significantly longer than subjects exposed to the varsity track athlete. The results of these investigations in the inhibition/disinhibition area of modeling including investigations in perseverance, offer support for Bandura's (1977a) contention that people's expectations of competence, or self-efficacy, which may be gained from their perceived similarity/dissimilarity to another individual in the same situation, influence how they behave, their choice of activities, how much effort they will expend, and how long they will persist in the face of obstacles and aversive experiences.

One of the most pertinent studies regarding perceived similarity in task ability was conducted by Gould and Weiss (1981). One aspect of this investigation manipulated the similarity dimension by having non-athletic female subjects observe either a confederate female presented as a nonathlete (similarity), or a confederate male presented as a varsity track athlete (dissimilarity) perform a leg-endurance task. Since it has been posited by Bandura (1977a) that model similarity increases the personal relevance of the modeled performance to the observer, it was predicted that subjects perceiving themselves as similar to the model would persist significantly longer at the leg endurance task than would subjects viewing themselves as dissimilar to the model, resulting in less persistence on the experimental task. This hypothesis was supported. Subjects observing a model of similar-gender, perceived to be similar in athletic ability, demonstrated greater leg endurance than subjects observing a dissimilar model of opposite gender perceived to be superior in athletic ability (Gould & Weiss, 1981). However, all of the

investigations examining the inhibition/disinhibition area of modeling have never attempted to dissect which dimension of model similarity--gender or perceived similarity in ability--is most salient to the observer. Although the modeling aspect of the Gould and Weiss investigation was one of the first studies specifically designed to manipulate perceived similarity in ability of a task related to the realm of physical education, the similarity dimension was designed with the inclusion of model/observer gender similarity in order to maximize possible experimental effects. Unfortunately, this investigation could not determine which dimension of similarity, gender or perceived task ability, was the most salient to the observers.

Most model similarity studies have been investigated within the conceptual framework of the disinhibition function of modeling. Thus, observers have generally been individuals who were trying to overcome a skills deficit. The use of similar models may also be an important technique for motivating already proficient performers to further improve upon their performance. However, this motivating function of modeling has not been investigated with competent observers. Consider for instance, the female actively engaged in sports tasks which have been viewed primarily as a male-oriented pursuit. Such women have typically overcome, or have learned to cope with, the social barriers and commonly held stereotypes concerning achievement-oriented women. It might be suggested that these women will not identify with the lower competency expectations for women, consciously or unconsciously held by society, but instead will perceive themselves as highly competent individuals aspiring to higher levels of performance and ability strivings.

It seems reasonable to suggest that women engaged in higher levels of athletics (i.e., intercollegiate competition) have experienced numerous reinforcing successful experiences; otherwise, they would have probably discontinued sports participation long ago and would not have aspired to such a high level of participation. Although purely speculative in nature, females categorized by the above description would probably perceive themselves as more similar in task ability to an athletic (male or female) model than a nonathletic model. In fact, these females may perceive themselves as more similar in task ability to an athletic male model than an athletic female model due to the high achievement-orientation often identified with such woman. Athletic females may also be more motivated to perform by viewing an athletic male model who may provide more of a perceived challenge to them than an athletic female model.

Statement of the Problem

The purpose of this investigation was to partially replicate and extend the modeling aspect of the 1981 study by Gould and Weiss. Specifically, the study investigated the differential effects of model similarity across two dimensions, gender and perceived task ability, on the performance of a leg-endurance task. A secondary aim was to investigate the effects of observers' athletic ability on modeling the leg-endurance task. Because Gould and Weiss (1981) also measured self-efficacy in their study, a third aim was to examine the effects of model similarity on self-efficacy.

Hypotheses

The following hypotheses were investigated:

1. Female nonathletic subjects performed longest on the leg-endurance task when viewing the female nonathletic model.
2. Female athletic subjects performed longest on the leg-endurance task when viewing either the female or male athletic model.
3. Subjects viewing a model of similar athletic ability extended their legs longer than control subjects.

No predictions were made concerning the most salient similarity cue--gender or perceived similarity in task ability--modeled by subjects due to a lack of previous knowledge concerning this issue.

Delimitations

This study was delimited to college-aged athletic and nonathletic female volunteers attending the Michigan State University. The differential effects of model similarity on the performance of a leg-endurance task were investigated across two dimensions, gender and perceived task ability.

Definitions

The following operational definitions apply to the present investigation:

Modeling--behavioral modifications resulting from an observer's exposure to another individual's performance or behavior (Bandura, 1969).

Perceived similarity in task ability--either subjects viewing themselves as athletic and capable of performing up to the ability level

of the athletic model, or subjects viewing themselves as nonathletic and capable of a performance only comparable to that of the nonathletic model.

Athletic experience--past or present athletic involvement, such as, membership on a high school athletic team, intercollegiate team, or any other organized sporting league excluding intramural participation.

Male or female athletic model--a male or female introduced to subjects as a current member of the Michigan State University Soccer Club team who lifts weights three times a week.

Male or female nonathletic model--a male or female introduced to subjects as a fellow student with no previous athletic experience.

Athletic female subjects--females currently participating (1982-1983) on one of the Michigan State University varsity athletic teams or club athletic teams undergoing the same degree of rigor in practice and game schedules as that of the varsity athletic teams.

Nonathletic female subjects--females indicating no organized athletic experience, currently enrolled in the Michigan State University basic instructional physical activity program.

Control group--subjects performing the experimental task without prior exposure to a model.

Limitations

A few limitations existed in this study. First of all, the number of female athletic subjects obtained was limited by the number of female varsity athletic teams at Michigan State University and by the number of female club athletic teams with practice and game schedules comparable to that of the varsity athletic teams at Michigan State University.

This study was also limited by the fact that subjects were volunteers and were not randomly selected. Another limitation may have existed due to the gender of the experimenter. A female experimenter conducted this investigation which might have affected the results obtained, as well as possible experimental effects due to the exclusion of a male experimenter. An additional limitation of this study may have been imposed by the use of four different models.

A final limitation of this study concerns the pre-experimental measurement of subjects' self-efficacy. A pre-performance measure of self-efficacy was obtained immediately before subjects engaged in the experimental task. For subjects exposed to the modeling conditions, this constituted a measurement of self-efficacy after having had observed the models. No measurement of self-efficacy was obtained before subjects were exposed to the models, making it impossible to determine initial self-efficacy changes in the subject as a result of observing the models.

CHAPTER II

REVIEW OF THE LITERATURE

Modeling influences have been explained through associative theories (Allport, 1924), reinforcement theories (Gewirtz & Stingle, 1968) and affective feedback theories (Aronfreed, 1969). One of the most plausible and encompassing theories of modeling, however, is Bandura's (1969) stimulus-contiguity or social learning theory of modeling. Bandura's social learning theory includes informational as well as motivational explanations for the modeling process. The purpose of this chapter is to review social learning theory in terms of the informational and motivational components of the modeling process. This chapter presents a) the observational learning function of modeling, b) the response facilitation function of modeling, and c) the inhibition/disinhibition function of modeling on model/observer similarity.

In its broadest sense, human behavior and performance can be viewed in terms of social learning theory (Bandura, 1969). The emphasis in social learning theory is on the vicarious, symbolic and self-regulatory processes involved in human psychological functioning. Bandura (1969) believes that human thought, affect and behavior can be influenced by observation (vicarious acquisition) as well as by direct experiences. In addition, symbolic processes are utilized by humankind

to represent events, analyze, plan, create and to engage in various other subsequent behaviors. According to Bandura, humans actively engage in numerous self-regulatory processes. People are active processors of their environments, selecting, organizing, and interpreting afferent stimuli (Bandura, 1969). Bandura acknowledges the self-directing capacities of humans which produce self-generated incentives and outcomes allowing a certain degree of perceived individual control over their own lives (Bandura, 1977b).

Social learning theory can also be applied to the modeling process. The concepts of vicarious, symbolic and self-regulatory psychological processes are evidenced in four basic components which Bandura (1969) has identified as essential to modeling theory. These four components are attention, retention, motoric capability and motivation. Bandura contends that for an observer to subsequently display the modeled act, he or she must first attend closely to and retain what was demonstrated. In addition, the observer must possess the motoric capability to reproduce the modeled act and be motivated to do so.

Of particular relevance to this investigation are the attentional subprocesses. The modeling process is greatly affected by observers' attentional styles and capacities, as well as a variety of other variables both internal and external to the observers. Observers must attend to, recognize and discriminate between the distinctive features of the modeled act if effective reproduction is to be enhanced. Selective attention is a key component of the attentional subprocesses, requiring the observer to know what must be attended to, how much of the act must be attentively observed, etc. For example, various model

characteristics may elicit differing amounts of selective attention from the observers. Characteristics such as competence and status of the model, and the degree of model/observer similarity along a number of dimensions such as gender and perceived similarity in task ability, may greatly influence the attentional subprocesses (Landers & Landers, 1973; Kazdin, 1974; Brown & Inouye, 1978).

In order for an observer to subsequently display some aspect of the modeled act, the modeled response must be remembered by the observer. Cognitive processes play a vital role in the retention of modeled behaviors. According to Bandura (1969, 1971, 1977b), behavior patterns are coded and symbolically represented in memory. This symbolic representation can take two forms, imaginal and/or verbal representation. Once formed, these symbolic constructs are stored in the memory and are later called upon to guide future actions.

Behavioral reproductions of modeled acts are achieved by the utilization of symbolic representations which aid in the guidance of the desired performances. Successful reproduction is dependent upon the task, the amount of spatial and temporal organization required, as well as the observer's physical and developmental limitations and capabilities (Bandura, 1971).

The motivational subprocesses of Bandura's (1969) theory are significantly applicable to this study. The motivational subprocesses of modeling theory are concerned with the factors needed to facilitate or motivate the observer toward attention, retention and reproduction of the modeled response. Although the conditions of the other subprocesses may be met, the observer may not reproduce the desired act unless

sufficiently motivated by at least one of the following motivational sources: extrinsic incentives, self-incentives, and/or vicariously based incentives. Once again model/observer characteristics such as status and competence of the model and dimensions of model/observer similarity reflect variables which may influence this motivational component. It must be realized that the full impact of the modeling process will not be achieved if severe deficiencies are evidenced in any of the four modeling subprocesses.

As proposed by Bandura (1969), each of the modeling subprocesses has an influence over the nature and degree of modeling. These subprocesses are evidenced in different degrees when considering the various functions of modeling. The following sections will discuss the observational learning, response facilitation and inhibition/disinhibition functions of modeling as they relate to Bandura's four subprocesses of social learning theory.

Observational Learning Function of Modeling

The observational learning function of modeling is evidenced when models elicit novel behavior in the observer; behavior which has been previously absent from the observer's repertoire of responses. The observational learning function has been demonstrated through the modeling and subsequent performance of strategy-oriented tasks by the observer, such as the "shoot-the-moon" game and the Bachman ladder climbing task. Examples of observational learning are also commonly demonstrated through studies utilizing specially constructed novel modes of response. Bandura (1971) illustrates this phenomenon by referring to the unique, nonsensical words 'lickitstickit' and

'wetosmacko' and concludes that these words would not have been expressed by subjects had these expressions never been modeled.

Much of the research examining this observational learning function of modeling is related to the retentional and the attentional/motivational subprocesses proposed by Bandura. An example of research related to the retention subprocesses of observational learning was conducted by Gerst (1971) who examined the role of symbolic coding in the learning and retention of the deaf manual language through the observation of a model. Gerst employed a 4 x 2 (Symbolic Code x Time of Performance) experimental design. Specifically, college-aged male and female subjects having no knowledge of the deaf manual language, observed a filmed model perform a series of complex movements taken from this language. After observing the model, subjects spent 1 minute performing one of four activities. The first symbolic activity, summary labeling, involved the coding of the modeled language into concise items representing the actual shape of the manual movement. The second form of symbolic representation, imaginal coding, required the subjects to form a picture in their heads of the actual manual movement. The third form of symbolic coding required the subjects to provide a detailed verbal description of the movement, while the fourth group of subjects served as a control condition, engaged in a distraction task of counting the beats of a metronome. After engaging in one of these four activities, subjects were asked to reproduce the modeled movements immediately after the 1 minute coding or distraction activity and again after a period of 15 minutes. All three of Gerst's coding conditions facilitated motor reproduction of the manual language of the deaf as

compared to the poorer performances reproduced by the control subjects who did not engage in any form of symbolic or verbal coding. In addition, all subjects performed better on the immediate test than on the delayed test; and subjects employing summary labeling reproduced approximately twice as many correct responses on the delayed (retention) test as compared to the reproduction capacities of the other groups. The major findings of the Gerst investigation offered support for the hypothesis that some form of symbolic coding serves an important function in observational learning.

The observational learning function of modeling has also been researched in relation to the attentional/motivational subprocesses. Numerous social factors and characteristics of the model have been found to exert influence on the attention and/or motivation of the observer. For example, it has been demonstrated that models similar to the observer in terms of interests (hobbies) and background (membership in a mutual organization) are attended to and imitated more often than models dissimilar in these qualities (Rosekrans, 1967).

The attentional and motivational effects arising from the observation of a model are further demonstrated when considering the status and competence of the model. Rosenbaum and Tucker (1962) noted a significant effect on adult imitative behavior when varying the competence of a model. Specifically, adult observers matched the behavior of a successful (competent) model more rapidly than that of an unsuccessful (incompetent) model in a series of experimental horse-racing games. Similar results were reported by Zimmerman and Blotner (1979) in an investigation with first and second grade children on the performance of a wire puzzle task.

Baron (1970) extended the Rosenbaum and Tucker (1962) studies with the addition of another independent variable--attraction toward the model. Attraction toward the model was induced by varying the degree of attitude similarity between the subjects and model. Results indicated an interactive effect between level of attraction toward the model and the model's competence. A high degree of attitude similarity between model and subject enhanced imitation when the model displayed high task competence (success), but hampered imitation when the model exhibited low task competence (unsuccessful model). The results of this investigation suggested that one variable influencing adult imitative behavior is the level of competence shown by a model; however, variations in level of attractiveness toward the model may have produced specific rather than generalized modeling effects (Baron, 1970). These investigations offer support for Bandura's (1969) contention that models who are considered experts, models demonstrating a high degree of competence and skill, as well as high status models are more likely to elicit attention and act as more salient sources of potential observer behavior than models not possessing these qualities.

Due to the interactive effects of numerous variables and the differing degrees of modeling influences, it may be suggested that certain models or modeling conditions may also elicit a motivational as well as attentional effect upon observers. Landers and Landers (1973) provided elementary school children with either a highly skilled teacher, highly skilled peer, unskilled teacher, or unskilled peer as a model. Subjects watched the model perform on a Bachman ladder climbing task and were then asked to perform this same task. Results indicated that children

observing the skilled teacher performed better than children observing the unskilled teacher or the skilled peer. The attentional/motivational effects of an older, more highly skilled and higher status model appeared to be evident. However, children who had observed the unskilled peer performed better than children who had observed the unskilled teacher model. Perhaps this finding can be related to motivational conditions introduced when competing against a peer perceived as equal or lesser in ability, possibly mediated by the thought, "if he/she can do it, so can I". Hence, modeling may not only provide a means of relaying motor performance information, but may, in fact, play an equally significant role in observer attention/motivation.

Response Facilitation

Another function of modeling proposed by Bandura is that of response facilitation. Through response facilitation, the behaviors, actions and performance of others provide cues or prompts designed to stimulate the performance to one's own pre-existing responses (Bandura, 1971). Due to the facilitory nature and enhancing properties of this function, response facilitation can be classified under the motivational subprocesses outlined by Bandura (1969). Many examples of the response facilitation function of modeling offer a great degree of applicability to the sporting world. In addition to the example offered in Chapter I, Landers and Landers (Note 1) provide additional "real-life" examples of response facilitation, such as a young child exaggerating in his/her own style of play the qualities (stance, etc.) of a famous, idolized athlete. However, more laboratory-oriented and tightly controlled field

studies need to be conducted in order to determine the viability of this influence in sport.

Inhibition/Disinhibition of Responses

The inhibition/disinhibition function of modeling deals with performance decrements or increments as the result of observing a model's performance, as well as the subsequent consequences associated with that performance. This function of modeling has been the recipient of a great deal of attention; however, much of the inquiry and systematic investigation of this modeling function has been conducted in disciplines other than physical education or athletics. The inhibition research in the area of modeling has been conducted primarily by Bandura and his associates (Bandura, 1973; Bandura & Walters, 1959). As noted by the above authors, examples of the inhibitory effects of modeling include observers who show decrements in a modeled class of behaviors as a result of observing the model's behavior produce punishing consequences. As noted by Bandura (1973), observing the aggressive acts of others being punished usually results in less imitative aggression by the observers than seeing the aggressive behavior rewarded or unaccompanied by any obvious consequences.

The disinhibitory function of modeling is evidenced when the observation of models engaging in threatening, persevering, or aversive behavior without negative consequences, results in the observer's increased performance of these formerly inhibited or discomforting behaviors. Research of this nature has produced very interesting results when considering phobic reactions and avoidance behavior patterns

emitted by snake-phobic subjects (Bandura & Adams, 1977; Bandura & Barab, 1973; Bandura, Blanchard & Ritter, 1969; Kazdin, 1973, 1974; Kornhaber & Schroeder, 1975; Meichenbaum, 1971). Much of the research in this area suggests that coping models are the most effective means of reducing fear in phobic subjects. Coping models who are initially portrayed as displaying a similar degree of fear as the observer but then overcoming that fear and eventually approaching the feared object without harmful consequences elicit substantial approach behavior by the fearful observer. This type of coping model has been found to be superior to a mastery model who immediately displays approach behavior toward a phobic object with no apparent fear or hesitancy. For example, Meichenbaum (1971), employing 36 female, snake-phobic undergraduates, found coping models to be more effective in reducing subjects' fear than mastery models. In addition to the superiority of the coping models, models who engaged in self-verbalization were found to be more effective in reducing fear than were silent models. Bandura (1977a) reasons that coping and self-verbalization models are superior to mastery and silent models because they convey greater efficacy information to the observer by providing a strategy for accomplishing the task.

Research in the disinhibition function of modeling as it is related to the physical education domain has largely been concerned with perceived task competence, or self-efficacy, and the effects of participant-modeling. In participant-modeling, a model first demonstrates the task, then engages in the task together with the learner or offers physical guidance whenever necessary with the purpose of increasing successful experiences for the learner. The few investigations that

have been conducted in this area have employed tasks considered "risky", "unpleasant", possibly "dangerous", or in other words, "high-avoidance" tasks (Feltz, Landers & Raeder, 1979; Lewis, 1974; Weinberg, Sinardi & Jackson, 1982). All of this research has indicated that participant-modeling is superior to live or video-tape modeling conditions. For instance, as a result of participant-modeling, subjects of initially low perceived task competence have been found to increase in efficacy and task competence and subsequent participation in "high-avoidance" type physical education and athletic skills, such as found in gymnastics (Weinberg, Sinardi & Jackson, 1982), swimming (Lewis, 1974) and diving (Feltz, Landers & Raeder, 1979).

When considering the disinhibition literature, it seems plausible that the disinhibition function of modeling is closely related to the attentional/motivational subprocesses proposed by Bandura. It can be suggested that the attentional/motivational subprocesses are highlighted throughout the disinhibition function of modeling by increasing the personal relevance of the modeled performance to the observer (Bandura, 1969), thus perhaps increasing the observer's attention to the model and motivation to perform. The disinhibition function of modeling may enhance the attentional/motivational subprocesses by increasing the personal relevance of the modeled performance to the observer through a perceived condition of model/observer similarity.

Regardless of the type of modeling function investigated (observational learning, response facilitation, inhibition/disinhibition), the relationship between and effect of model/observer similarity has been the topic of much interest. Therefore, a more detailed discussion of the literature directly related to model/observer similarity is addressed in the following section.

Model/Observer Similarity

Conditions of perceived similarity between model and observer can exist along a number of dimensions. Models may be similar to observers in age, gender, perceived task ability, fear, I.Q., etc. The examination of gender effects in the modeling literature has been concerned with the employment of models either of similar or dissimilar gender to the observer. However, the influence of similar or dissimilar gender models is far from clear. In his review on imitative behavior research, Flanders (1968) noted that some investigators (Bandura & Kupers, 1964; May, 1966; O'Connell, 1965) found that the gender of the model produced little or no main effects on observers' modeling behavior, while other investigators (Bandura & Huston, 1961; Bandura, Ross & Ross, 1963; Hetherington & Frankie, 1967; Hicks, 1965) have found interactive effects with regard to gender of the model and observer. For instance, Bandura & Kupers (1964) found that on a bowling task, 7- to 9-year-old boys and girls displayed patterns of self-reinforcement as the result of observing male and female models. Specifically, older, higher status models of either gender were imitated to a greater extent than were peer models of either gender. It was also determined that generosity of self-reward was in no way related to gender of the models or observers. On the other hand, Bandura et al. (1963), when investigating the learning and performance of aggression through modeling, found subject gender to be a highly significant factor, as well as some modeling effects attributable to model gender. Specifically, boys exhibited more total aggression than girls, and subjects observing a male model exhibited more aggressive "gun play" than subjects exposed to a female model.

In his review, Flanders (1968) also noted that most experiments usually exposed observers to the same model, or employed same gender, model/observer pairs without taking into account the gender of the model as a source of variance. Flanders concluded that, due to this frequent lack of concern regarding model gender as a significant source of variance, few dependable conclusions can be drawn when considering model/observer gender effects. According to Gould and Roberts (1982), models of the same gender as the observer will, at times, have a greater influence on the observer's motor performance than will models of the opposite gender. Many investigations have suggested that enhanced treatment effects are facilitated when same gender models are employed (Gould & Weiss, 1981; Kazdin, 1974; Perry & Perry, 1974; Rosekrans, 1967). However, in order to maximize treatment effects, much of the research in this area has employed multiple similarity variables making it difficult to differentiate the separate influences of the specific variables. In any case, most researchers seem to agree with the contention of social learning theory that model/observer characteristics such as similarity between model and observer will affect imitation in terms of the potential influence on the attentional and motivational subprocesses. Bandura (1971) noted that because similarity exists on numerous dimensions, interrelated factors can be attributed to the occurrence of many noted modeling effects. Similarity in terms of gender may not be the sole factor underlying the results. It is possible that other conditions of perceived similarity between model and observer combined with similarity along the dimension of gender may have produced many of the reported findings (and vice versa).

For example, another source of similarity between model and observer, that of perceived task ability, has become an intriguing topic of concern. In this respect, the focus of much of the research into the disinhibition function of modeling has been concerned with a more abstract dimension of task ability, that of "approach" ability in fearful situations (Bandura & Adams, 1977; Borkovec, 1973). Approach ability, here, refers to the ability (or perceived task competence) of an individual to overcome fear exhibited toward an object or situation, approach that object and eventually handle or confront the situation. Research investigating this form of perceived task ability or task competence, has concluded that modeling can significantly help phobic individuals overcome their fear (Kazdin, 1973, 1974; Meichenbaum, 1971). Specifically, a condition of perceived similarity between model and observer in terms of initial fear towards a phobic object is a facilitatory factor greatly contributing to the success of treatment effects. However, it must be borne in mind that all of the phobic-behavior investigations, and the majority of modeling research, regardless of domain, has employed same gender models and observers.

This notion was supported by Kazdin's (1973, 1974) investigations. Kazdin, in line with other disinhibition researchers, employed snake-phobic subjects, coping models and mastery models. In Kazdin's earliest study it was found that coping models led to greater avoidance reduction than mastery models. Similar results were found in Kazdin's 1974 study which also took into account similarity in terms of gender and age, besides similarity of initial fear of snakes. Kazdin noted that although beneficial effects provided by a coping model enhanced the reduction of

avoidance behavior, the inclusion of numerous dimensions of the model/observer similarity variable (age, gender and amount of initial fear) may have significantly contributed to the overall effects. In any case, it can be suggested that a coping model, who may be perceived by the observer as similar to him/herself in terms of initial fear and avoidance behavior may raise efficacy expectations by instigating the, "if he/she can learn to overcome fear, so can I", motivational set of the observer. Meichenbaum (1971) concluded that the effectiveness of the coping model in reducing fear may be based on a) the condition of "perceived similarity between the observer and the model which facilitates imitation, that is the 'appropriateness' of the model for the observer" (Meichenbaum, 1971, p. 304) and/or b) demonstration of a specific strategy for approach-behavior which is conveyed to the observer as being an effective means of learning to overcome fears.

Similarity in perceived task ability has also been demonstrated in a number of investigations employing more "concrete" tasks, such as the word anagram task employed by Brown and Inouye (1978). Brown and Inouye (1978) randomly assigned 40 male college students to one of four social comparison situations. The first situation was referred to as a "similar competence" condition. In this condition subjects were led to believe that they were as equal in word-anagram competence as a male model whose failure on the word anagram task they had observed. A "higher competence" condition existed in which subjects were led to believe that they were superior in task competence to the unsuccessful male model. The third social comparison situation was a "no-feedback" condition in which subjects were given no task ability information

regarding their own word anagram performance in relation to the performance of the unsuccessful male model. Lastly, a control condition was established in which subjects worked on the experimental word anagram task without prior exposure to the male model. Following the above manipulations, subjects engaged in another series of word anagram tasks with the main dependent measure being the number of seconds the subjects persisted before giving up on the tasks.

The results of this investigation led Brown and Inouye (1978) to confirm their hypothesis that a state of learned helplessness can, in fact, be induced through modeling, and that this condition of learned helplessness was mediated by the observers' perceptions of similarity to a model in terms of task competence. This learned helplessness phenomenon can be considered from a social learning theory perspective which purports that lowered performance expectations can be a consequence of direct failure or vicariously experienced failures (Bandura, 1977b). Vicariously induced helplessness occurs through the observation of a model who is perceived as similar in competence to the observer and continuously fails at a task.

According to Brown and Inouye (1978), observing a successful model perceived as similar in ability to the observer would tend to create success expectations in that observer facilitating the observer's motivation to perform, and to perform well. On the other hand, observing someone similar in competence to oneself continually failing at a task would facilitate failure expectations in the observer, resulting in lack of motivation and persistence at the task. This is exactly what happened; subjects perceiving themselves as similar in ability to the

unsuccessful model persisted the least amount of time at the experimental word anagram task, while subjects perceiving themselves as more competent than the model persisted the longest when engaging in the word anagram task.

A major difference between the Brown and Inouye (1978) study and other investigations employing a coping model perceived as similar (snake-avoidance studies) is that the model in the Brown and Inouye study never succeeded at the task, whereas all of the coping models in the phobic-behavior investigations eventually succeeded at the task. This observed difference may have influenced the observers' subsequent performance and beliefs regarding competence and the effects of perceived similarity in competence between model and observer since self-reflective thoughts may very well intensify an individual's efficacy beliefs by raising or lowering efforts concerning his or her task capabilities (Bandura, 1978).

In the area of physical activities, the Lewis (1974) investigation is one of the few studies that employed coping models similar to the observer in initial task ability, in the investigation of participant-modeling. Lewis' study focused on the reduction of childrens' fear and avoidance of water and swimming activities. Forty elementary school-aged boys exhibiting fear of the water were assigned to one of four experimental conditions. These conditions consisted of a model plus participation condition, a model only condition, a participation only condition and a control condition. The modeling plus participation treatment exposed subjects to a film of similar models in terms of age, race, gender and initial fear of the water. The models in the film displayed coping behavior by overcoming their initial fear of the water and

eventually, participating fearlessly in a variety of swimming activities. After viewing this film, subjects spent 10 minutes in the pool accompanied by the instructor. Subjects exposed to the model-only condition observed the same film but did not engage in subsequent water activities. As a substitute, these subjects played a 10-minute game of poolside checkers with the instructor. Participant-only subjects viewed an irrelevant film and then engaged in the 10-minute swimming activities with the instructor. Control subjects also viewed the irrelevant film and then participated in the 10-minute session of poolside checkers.

Results of this investigation indicated that the modeling plus participation condition resulted in the most anxiety reduction and increase in swimming behavior, followed by the participation only treatment and then the modeling only treatment. Lastly, all of the treatment conditions were more effective than the control condition. Lewis' (1974) investigation supports the effectiveness of participant-modeling and the general consensus of similarity research which suggests that model/observer similarity along a number of dimensions produces the greatest modeling effects.

Although designed for the purposes of self-efficacy research and not for the specific investigation of model similarity, a series of investigations by Weinberg and his colleagues provide pertinent information regarding the experimental manipulation of perceived similarity/dissimilarity between model and observer in terms of task ability or task competence (Weinberg et al., 1979; Weinberg et al., 1981; Weinberg et al., 1980). The way in which self-efficacy was manipulated in Weinberg's studies was by having nonathletic subjects compete against a

confederate presented as a varsity track athlete (dissimilarity in task ability) or against a confederate presented as a nonathlete whose past history acknowledged a knee injury (similarity in task ability). Results revealed that subjects exposed to the nonathlete with a knee injury extended their legs significantly longer than subjects exposed to the varsity track athlete. In other words, perceived similarity along the dimension of task ability (competence) seemed to have enhanced the observers' subsequent performance, while perceived dissimilarity between model and observer in task ability had a negative effect upon observers' performance. However, it must be remembered that other variables may have influenced the experimental results, as the purpose of these investigations was not to isolate the amount of influence exerted by various dimensions of similarity cues.

One investigation employing the same task as Weinberg and his colleagues, was designed by Gould and Weiss (1981) for the purpose of examining the effects of model/observer similarity. Specifically, this study was designed to determine whether the observation of a similar or dissimilar model who emitted varying self-efficacy statements (self-talk) influenced the observers' efficacy expectations and motor performance. Gould and Weiss contended that efficacy appraisals may be greatly influenced by perceived similarities between observer and model on characteristics such as gender, motor skill level, etc., thus affecting the observers' subsequent performance (Gould & Weiss, 1981).

One hundred and fifty nonathletic, college female volunteers enrolled in elective physical activity courses, served as subjects for this investigation. The design consisted of a Model Similarity x Model

Talk x Trials factorial design and a No Model Control condition. Model/observer similarity was induced by having the nonathletic females observe either a confederate female presented as a nonathlete (similarity), or a confederate male presented as a varsity track athlete (dissimilarity). The four conditions of model talk consisted of a) a positive self-talk model who performed and emitted positive self-efficacy statements, b) a negative self-talk model uttering negative self-confidence statements, c) an irrelevant-talk model who performed and spoke of items unrelated to the task, and d) a no-talk model who performed in silence. Pre-and post-self-efficacy questionnaires assessed the subjects' levels and strength of self-efficacy concerning the task. Results of this investigation revealed that subjects exposed to the model who was similar in task ability and gender (the nonathletic female), extended their legs significantly longer than subjects exposed to the dissimilar model (the athletic male). Results of the exposure to the model talk-no talk conditions revealed that the similar-positive and similar-no talk groups extended their legs significantly longer than the dissimilar-positive or negative talk groups and also longer than the no-model control group. However, subjects' self-efficacy levels were not found to be the major variable affecting performance changes.

Although the modeling aspect of the 1981 Gould and Weiss investigation was one of the first studies specifically designed to manipulate perceived similarity in ability of a task related to sport, the similarity dimension was designed with the inclusion of model/observer gender similarity in order to maximize experimental effects. As a result, this investigation could not determine which dimension of

similarity, gender or perceived task ability, was the most salient to the observers.

As demonstrated by previous studies (Weinberg et al., 1979; Weinberg et al., 1981; Weinberg et al., 1980; Gould & Weiss, 1981), the influencing role of personal cognitions must be considered when examining human behavior studies. Bandura (1977a) provides a theory of self-efficacy which addresses the issue of how cognitions may mediate performance. Bandura (1977a) perceives self-efficacy as a situationally specific construct influencing one's particular choice of activities and the degree of effort and persistence generated when dealing with a certain task. Bandura (1977a) views modeling as providing a medium through which personal expectations and feelings of self-efficacy can be influenced. Vicarious experiences can alter expectations. For example, within the inhibition/disinhibition modeling function, observing others engaging in threatening behavior unaccompanied by observable adverse consequences can generate persistence efforts and alter expectations among observers that they, also, can be successful at the same activity, perhaps mediated by the notion, "if he/she can do it, so can I".

Modeling can affect expectations of personal efficacy, which in turn can affect subsequent behavior. Increasing the personal relevance of the modeled act to the performer (e.g., by manipulating model/observer similarity) can alter observers' perceptions of their own performance capabilities. For instance, modeling techniques such as those techniques successfully used in reducing avoidance behavior, may modify behavior through the mediating influence of efficacy expectations.

In conclusion, the mediating role that cognitions such as self-efficacy exert on performance must not be overlooked; modeling is a process which influences self-efficacy (and expectations) which in turn intervenes to influence performance.

Perceived similarity and proficient performers. The majority of model similarity studies have examined variables that influence the disinhibition function of modeling, dealing with observers possessing low expectations concerning their capabilities. In sport tasks, which typically have been viewed as male-oriented, many women do perceive themselves as low in ability. When dealing with research of this nature the socialization process must be considered.

According to the conflict-enculturation model (Roberts & Sutton-Smith, 1962), every social system must consider the 'cultural maintenance' problems encountered which must be resolved in order for the system to survive as an intact and continuing entity (Birrell, 1978). One remedy utilized by the system is the employment of socialization practices. These are used to "ease individuals into necessary roles or perspectives" (Birrell, 1978, p. 63). As a result, the by-products of these socialization practices include commonly held gender-role stereotypes and myths, attribution, achievement-motivation and success-failure theories, which have attempted to offer plausible explanations concerning the lower levels of strivings, competence and achievements noted among a large number of females (Deaux & Ferris, 1977; Feldman-Summers & Kiesler, 1974; House, 1974; Kidd & Woodman, 1975; Lenney, Browning & Mitchell, 1980; McHugh, Duquin & Frieze, 1978). However, the literature has recently noted that not all women are underachievers who hold low expectations of their

capabilities (Lenney, 1977; Ogilvie, 1978). This has become increasingly evident as represented by the upsurge of women holding positions of high status, as well as the increase of women entering the upper echelon of the sporting world.

The use of similar models may also provide important cues and motivational properties for further enhancing the performance of these already proficient performers. This function of modeling has not been investigated with competent observers. For example, competent female athletes have very rarely been provided with similar role models. It might be suggested that these women will not identify with the lower female competence expectations held by society, but will perceive themselves as highly competent and will aspire to higher levels of performance.

Females in higher levels of athletics probably have had numerous successful and reinforcing experiences. These females are experiencing higher and higher levels of personal status and competence. Such women probably perceive themselves as more similar in task ability to a competent model (athletic) than to an incompetent (nonathletic) model. Although purely speculative in nature, some female athletes may perceive themselves as more similar in task ability to a male athlete than to a female athletic model due to the high achievement strivings typifying many women actively engaged in athletic competition. A male athletic model may in fact, provide many athletic women with more of a perceived challenge than would the observation of a female athlete, resulting in a higher amount of motivation to out-perform a male athlete. Of course, the saliency of the similarity cues provided--gender and perceived task

competence--will most probably determine the amount and type of modeling effects encountered.

Thus, in view of the complexity and controversy of the mitigating effects of model/observer similarity along the dimensions of gender and perceived task ability, the following study was undertaken to examine the saliency of these two dimensions of the similarity domain. In addition, this investigation was conducted to determine the most salient similarity modeling cue necessary for different populations of observers (e.g., athletic and nonathletic observers), as well as the inclusion of more research on female athletes.

CHAPTER III

METHODS AND PROCEDURES

The inhibitory/disinhibitory function of modeling was investigated by studying the differential effects of model similarity upon motor performance of a leg-endurance task across two dimensions, gender and perceived task ability. Because previous investigations were designed for the purpose of maximizing experimental outcomes rather than dissecting the similarity dimension, the question still remains as to which dimension of model similarity--gender or perceived similarity in ability--is most salient to the observer. This investigation was conducted to answer the preceding question in hopes of contributing more information to the current store of knowledge concerning this issue. Since the self-talk dimension of the Gould and Weiss (1981) investigation revealed that the similar positive-talk modeling condition elicited the same degree of beneficial effects as the similar no-talk modeling condition, the self-talk dimension was eliminated from this investigation. Also, in addition to the inclusion of a male nonathletic model and a female athletic model, the present replication and extension of the modeling aspect of the Gould and Weiss (1981) study investigated the effects of observers' athletic ability on modeling the leg-endurance task.

Subject and Design

The subjects were 150 female students enrolled at the Michigan State University. Subjects were composed of athletic volunteers currently participating (1982-1983) on one of the Michigan State University varsity athletic or club athletic teams. The varsity athletic teams represented in this study included the volleyball, softball, basketball, gymnastic, swimming and tennis teams. Female athletes who participated on the Michigan State University Rugby Club team were chosen as potential subjects due to the rigorous practice and game schedule of this team which is comparable to the game and practice schedules of female varsity athletic teams at Michigan State University. The only reason the Rugby Club team has not achieved varsity status is that they do not possess the necessary financial backing needed to qualify as a varsity team. Subjects were also composed of nonathletic volunteers enrolled in the Michigan State University elective physical activity courses. Only volunteers indicating no physical limitations which might prevent them in any way from reproducing the modeled demonstration were selected as subjects. In addition, only volunteers indicating no previous contact with or knowledge of the experimenter and her background were selected as subjects.

The study employed a 2 x 2 x 2 factorial design, with the first factor being the gender of the models: males versus females; the second factor being the athletic ability of the models: athletic models and nonathletic models; and the third factor being the athletic ability of the observers: athletic and nonathletic observers. A table of random numbers was used to assign each of the 75 athletic and 75 nonathletic subjects to one of the four treatment conditions, or a no-model control,

with the restriction that there be no more than 15 athletic and 15 nonathletic subjects per condition.

Experimental Task

Subjects were asked to perform a modified version of a muscular endurance task (Gould & Weiss, 1981) which required the subject to extend her dominant leg in a horizontal position, maintaining that position for as long as possible (see Figure 1). The subject sat on an adjustable swivel stool, thus allowing a lower leg-length correction to be made prior to performance. This was done to avoid differing angles of the subject's non-lifting leg. The subject folded her arms across her chest and sat upright with her back against the wall. The shoeless dominant leg was extended above and across a white cord that was suspended by a wooden apparatus specifically designed for this investigation. The height of the cord was adjusted to each subject so that it was equal to the height of the stool. The subject's performance was timed, using a Singer Industrial Timer Corporation electronic stopclock (model SC-100). In preparation for the task, the experimenter supported the subject's extended leg in a horizontal position above the cord. When the subject was ready to begin the task, the subject lifted her leg off of the experimenter's supporting hand. As soon as the subject's leg was no longer in contact with the experimenter's hand, the clock was started. When the subject could no longer hold the extended leg above the cord, the leg lowered, contacting the cord, automatically stopping the timer. As a precautionary measure, the adjustable stool which had wheels on the bottom of all four legs, was placed on a piece of matting to prevent any possible slipping or rolling of the stool.

Model Similarity/Dissimilarity Manipulations

A 60-second video-taped demonstration of one of the four models performing the experimental task was employed in this investigation. A video-taped demonstration was used instead of a live demonstration in order to control for consistency of model performance; furthermore, research has shown that televised models are as effective as live models on observers' imitative behavior (Bandura & Menlove, 1968; Bandura, Ross & Ross, 1963; Klinger, 1967). All models were filmed using an Hitachi (model VK-C 1000) color video camera. Each model's performance was recorded on a separate Sony Dynamicron L-250 color video-cassette. Each model was filmed extending his/her right leg, and a 3/4 view of the model was taken from the model's right side. Subjects randomly assigned to the modeling conditions observed one of the following video-taped demonstrations:

1. A nonathletic female model--who was introduced as a fellow student with no previous athletic experience.
2. An athletic female model--who was introduced to subjects as a current member of the Michigan State University Soccer Club team who also lifted weights three times a week.
3. A nonathletic male model--who was introduced as a fellow student with no previous athletic experience.
4. An athletic male model--who was introduced to subjects as a current member of the Michigan State University Soccer Club team who also lifted weights three times a week.

Athletic or nonathletic introductions of the models were provided in order to manipulate and enhance a condition of similarity/dissimilarity

along the dimension of perceived task ability between the subject and the model. In addition, the athletic manipulations were achieved by selecting two models (male and female) each of whom possessed well-defined musculatures and healthy, athletic-looking physiques. Both models were matched on personal characteristics as much as possible. The two models were both sport psychology graduate students and former athletes with similar physical appearances. They were also both brunettes, approximately the same age, height, build and coloring. They both performed in running shorts and emitted similar nonverbal gestures. The two nonathletic models were matched on personal characteristics as much as possible. Both were nonathletic graduate students, somewhat slight in stature and thin. The two nonathletic models were both the same age, build and coloring, with very undefined musculature. They performed in longer-length, baggy shorts and emitted similar nonverbal gestures. Lastly, all four models were depicted as successful on the leg-endurance task; that is, none of the video-taped films showed a model lowering his/her leg onto the cord, stopping the clock. Models were depicted as successful in order to eliminate any confounding effect due to the observation of an unsuccessful model.

The use of only two models, one female portrayed as both athletic and nonathletic, and one male portrayed as both athletic and nonathletic, may have decreased the number of possible confounding variables due to the individual characteristics of each of the models. However, the decision to use four models was made in order to maximize the experimental athletic/nonathletic manipulations by providing models of differing body types instead of relying solely on verbal descriptions of the models' athletic (or nonathletic) backgrounds. To check whether or not

model body type was one of the main characteristics that differentiated one model from another, or whether the models were perceived as differing on numerous other characteristics, fourteen members of an undergraduate physical education majors class were shown the video-tapes of all four models performing the experimental task and asked to rate them on the following 10 characteristics: self-esteem, intellectual ability, attractiveness, athletic ability, self-confidence, autonomy (independence), emotional control, muscular endurance, outgoing personality and affiliation (group-oriented). Students rated the models on a 7-point scale ranging from "below average (low)" to "above average (high)" on each one of the 10 characteristics.

In order to determine which of the 10 characteristics differentiated the four models, students' responses were submitted to a discriminant function analysis. Results indicated that only the first discriminant coefficient was significant, $\chi^2 (21) = 125.20$, $p < .00001$. The characteristics that discriminated the four models the most were athletic ability and muscular endurance. These results supported the athletic/nonathletic manipulation of models. However, it should be noted that the subject to variable ratio was not very high. The discriminant function coefficients as well as the means and standard deviations are contained in Table 1 (on the following page).

Manipulation Check

A manipulation check was used to determine the effectiveness of the similarity/dissimilarity manipulations. This was assessed by asking the subjects to respond to the question, "How similar do you perceive yourself to be to the person who demonstrated this task?" on a 7-point scale ranging from very dissimilar to very similar.

Table 1

Means, Standard Deviations and Discriminant Function Coefficients for the Ten Model Characteristics by Model Type

Model Characteristics	Male Athletic Model		Male Non-athletic Model		Female Athletic Model		Female Non-athletic Model		Standardized Coefficients
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	
Self-esteem	4.50	(.94)	3.38	(.74)	4.21	(.58)	3.93	(.27)	.017
Intellectual Ability	4.29	(.61)	3.57	(.76)	4.14	(.53)	4.00	(.39)	.024
Attractiveness	4.29	(.61)	3.29	(.83)	4.14	(.36)	3.93	(.27)	.034
Athletic Ability	6.71	(.47)	2.07	(.83)	5.93	(.92)	2.36	(.63)	.681
Self-confidence	4.36	(.63)	3.29	(.91)	4.21	(.58)	3.79	(.43)	-.280
Autonomy (independence)	4.29	(.61)	3.43	(.65)	4.14	(.53)	3.93	(.27)	.161
Emotional Control	4.29	(.61)	3.43	(.65)	4.14	(.53)	3.93	(.27)	*
Muscular Endurance	6.64	(.50)	2.14	(.86)	5.71	(.83)	2.43	(.65)	.368
Outgoing Personality	4.29	(.61)	3.43	(.65)	4.14	(.53)	3.93	(.27)	*
Affiliation (group-oriented)	4.29	(.61)	3.43	(.65)	4.14	(.53)	3.93	(.27)	*

*Three characteristics failed the tolerance test and were, therefore, not entered for discriminant function analysis.

Questionnaires

Pre-experimental and post-experimental questionnaires were distributed to all subjects. In addition to determining the effectiveness of the similarity/dissimilarity manipulation, these questionnaires assessed level and strength of efficacy expectations as well as assessing subjects' perceptions of competition with the model, subjects' sense of model influence and subjects' perceptions of their own performance in relation to the models' performance. The test/retest reliability of the self-efficacy questionnaire items, determined by another subject population, ranged from $r = .81$ to $r = .99$.

Pre-experimental questionnaire. The pre-experimental questionnaire, administered just before attempting the task, consisted of three background information items as well as 18 items designed to assess level and strength of efficacy expectations. The background items and the first three self-efficacy questions were answered by checking the appropriate response and by circling the number best reflecting the subject's feelings on a likert-type scale. The 15 remaining self-efficacy items consisted of 15 specific time designations ranging from 30 seconds to 4 minutes; at 15-second intervals. Subjects were required to place a check mark next to each time designation that they felt capable of performing as well as checking their percent certainty of performance for each time designation checked. The actual questionnaire is contained in Appendix A.

Post-experimental questionnaire. The post-experimental questionnaire, administered to subjects upon the completion of the leg-lift task, was designed to assess level and strength of efficacy expectations

for future performance of the experimental task. The first self-efficacy question was answered by checking the appropriate response and by circling the number best reflecting the subject's feelings on a likert-type scale. The 15 remaining efficacy items consisted of the same time designations as found on the pre-experimental questionnaire and were answered by subjects in the same manner. Also, subjects were asked to respond by placing a check mark on the appropriate line indicating who they thought would perform best on the experimental task, males or females. Four additional questions (two open-ended items) appeared on the questionnaires of the subjects exposed to the modeling conditions. These questions dealt with the subject's perception of similarity to the model, the subject's perception of her performance in relation to the model's performance, as well as assessing the subject's sense of competition with the model. The actual questionnaire is contained in Appendix B.

Pilot Study

A pilot study was conducted prior to the actual testing of the experimental subjects. Twelve Michigan State University female graduate students (six athletic and six nonathletic) were randomly assigned to one of the modeling treatment conditions. The pilot subjects performed the experimental task, simulating actual experimental procedures and conditions. The purpose of the pilot study was to determine the subjects' understanding of the instructions and questionnaires, the effectiveness of the similarity/dissimilarity manipulation, performance variations in the amount of time subjects maintained their legs in the extended position, and the amount of time necessary for each subject to complete the

entire experimental procedure. The pilot study was also conducted as a practice run for the experimenter to ensure smooth administration of actual testing procedures, as well as identifying any necessary procedural adjustments.

Results obtained from the pilot study indicated that all subjects understood experimental instructions and questionnaires. The similarity by athletic ability manipulation was effective, in that all athletic subjects exposed to an athletic model rated themselves as "somewhat" to "very similar" to that model and all nonathletic subjects exposed to a nonathletic model rated themselves as "somewhat" to "very similar" to the nonathletic model. Regarding the dissimilarity athletic manipulation, subjects exposed to a dissimilar model in terms of athletic ability did in fact indicate that they perceived themselves to be very dissimilar to the observed model. In addition it was determined from the pilot study that 25 to 30 minutes were necessary for each subject to complete the entire experimental procedure, and that performance variations in the amount of time subjects maintained their legs in the extended position ranged from 34 seconds to 4 minutes and 15 seconds. Lastly, it was concluded that no procedural adjustments were necessary before the initiation of the testing of actual experimental subjects.

Procedure

Testing environment. The subjects were individually tested in the sport psychology laboratory at the Michigan State University. The laboratory contained a table and pencils for the completion of the informed consents and questionnaires, a NEC Auto color television, a Sony Betamax portable videocassette recorder and a Sony AC power adaptor

for viewing the modeled performance, the experimental task (adjustable stool and leg-lift apparatus with clock) and the experimenter's data collection sheets (see Figure 2). The number of trials (three) and the length of rest periods were determined from the pilot study and from previous research (Gould & Weiss, 1981). A 60-second rest period was selected by Gould and Weiss in the 1981 investigation. Gould and Weiss selected 60-seconds because it was not an adequate recovery time period between trials and felt that the motivational component provided by the model would be maximized when the subject experienced an unpleasant and adverse performance environment. The 60-second rest period between trials was timed using a stopwatch.

Administration of test. Upon arrival at the testing room, the subject was greeted by the experimenter and given a brief verbal explanation of the experimental task. The following explanation was read to the subjects:

This is a simple muscular endurance task, much like situps or pushups, designed to assess the muscular endurance of college students throughout the United States. You are to sit on this stool, fold your arms across your chest and keep your back flat against the wall. Please make sure you keep the foot of your nondominant leg flat on the floor. You are to extend your dominant leg above and across the white cord and hold your leg above the cord for as long as possible. Initially, I will support your extended leg with my hand. When you are ready, you will lift your leg off of my supporting hand. As soon as your leg is no longer in contact with my hand, I will start the clock. When you can no longer hold your leg in the extended position above the cord, your leg will lower, contacting the cord and stopping the clock. You will have three trials with a 60-second rest between trials. Remember, you are to keep your dominant leg extended for as long as possible.

After listening to the explanation, the experimenter clarified any questions; the subject completed an informed consent and the experimenter

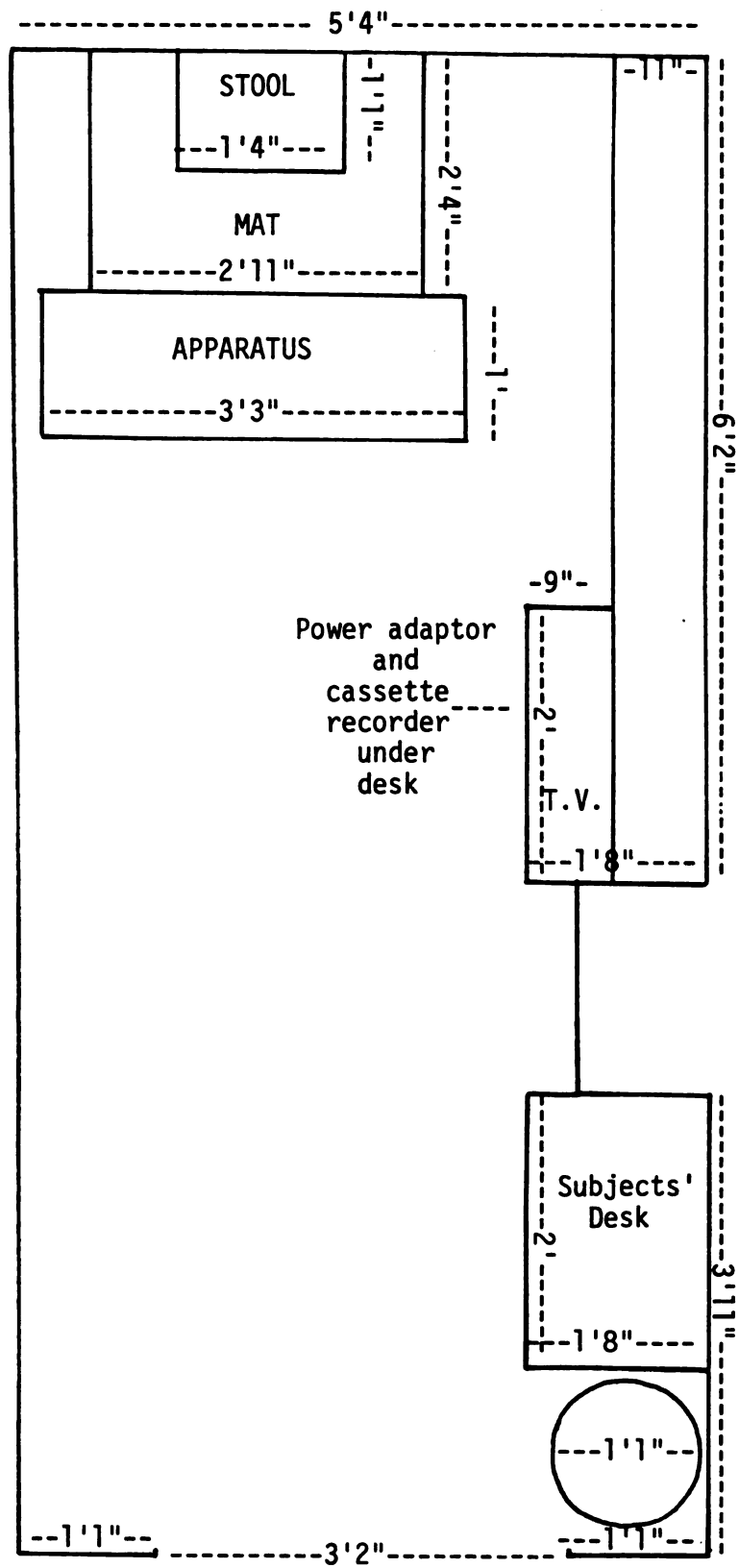


Figure 2. Testing room.

obtained and recorded the subject's background and information (i.e., age, year in school, major).

A subject in the control condition received a brief explanation of the pre-experimental questionnaire directions, completed the pre-experimental questionnaire, and was then asked to remove her shoes in order to eliminate any variations between subjects due to shoe heel-height of the nonlifting leg, and to eliminate any excessive weight on the lifting leg. The swivel stool was adjusted to each subject so that the lower leg formed a right angle with the upper leg, and the bottom of the nonlifting leg rested flat on the floor. The control subject was then asked to fold her arms across her chest, reminded to keep the foot of her nondominant leg flat on the floor and her back flat against the wall. The control subject extended her dominant leg above and across the white cord while the experimenter supported the extended leg. The control subject was instructed to begin whenever she felt ready. Upon completion of the three trials, the control subject was given a brief explanation of the post-task questionnaire directions and then given the post-task questionnaire to complete. Upon completion of the questionnaire, the subject was told that she had done a fine job, was thanked for her participation and was asked not to discuss the experiment with anyone.

After the experimental subject listened to the task explanation and received any clarifications of questions, completed the informed consent and provided the experimenter with background information, the experimenter read the following statement:

In order to show you how the task is to be done, I want you to carefully observe a videotaped demonstration of another person who was asked to perform this task. Please watch closely how

this person positions himself (herself) and the way in which he (she) approaches this task.

Then depending upon the subject's assigned modeling condition, one of the following statements was presented:

1. The woman (man) you will see performing is a fellow student at Michigan State University with no previous athletic experience. She (he) has never participated on a high school athletic team, intercollegiate team, or any other organized sporting league, excluding intramural participation.

2. The woman (man) you will see performing is a current member of the Michigan State University Soccer Club team who also lifts weights three times a week.

After the experimental subject was provided with one of the above statements, the appropriate video-tape was turned on and the experimental subject observed the performing model. The video-tape was then turned off and the subject was asked if she knew the model she had observed. Subjects indicating no previous knowledge of the model received a brief explanation of the pre-experimental questionnaire directions and then proceeded to the pre-experimental questionnaire. Any subject having prior knowledge of the model was thanked for her help and dismissed with the explanation that only subjects having no knowledge of the model could be used in this experiment. The experimental subject with no knowledge of the model was asked to remove her shoes and the necessary stool adjustment was made. The experimental subject was then asked to fold her arms across her chest, reminded to keep the foot of her nondominant leg flat on the floor and her back flat against the wall. The subject then extended her dominant leg above and across the cord, received the same amount of leg support as did the control subject, and completed the experimental procedure in the same manner as the control subject.

Upon completion of the entire experiment (data analyses and conclusions) all subjects were fully debriefed by means of a brief summary report which was mailed to each one of the subjects.

Treatment of Data

Motor performance scores for the experimental groups were analyzed within a $2 \times 2 \times 2 \times 3$ (Model Gender x Model Athletic Ability x Subject Athletic Ability x Trials) analysis of variance (ANOVA) with repeated measures on the last factor. In the event of significant differences for the interactions, post hoc tests were performed by means of the Tukey WSD procedure.

A separate ANOVA was conducted to compare the experimental subject modeling conditions to the athletic and nonathletic subject control groups. This was accomplished by means of a $2 \times 2 \times 3$ (Experimental/Control Groups x Subject Athletic Ability x Trials) ANOVA. Similarly, post hoc tests were performed using the Tukey WSD procedure for equal n comparisons and Behren's Fisher t' tests (Kohr, 1970) for unequal n comparisons, in the event of significant differences for the interactions. In order to directly test the hypotheses stated in Chapter I, a priori contrasts were conducted for each hypothesis.

Questionnaire items concerning self-efficacy as well as the questionnaire item asking experimental subjects to rate their perceived similarity to the observed model, were analyzed within separate ANOVAs. Specifically, for the experimental groups, self-efficacy was analyzed within a $2 \times 2 \times 2$ (Model Gender x Model Athletic Ability x Subject Athletic Ability) ANOVA or within a $2 \times 2 \times 2 \times 2$ (Model Gender x Model Athletic Ability x Subject Athletic Ability x Pre/Post Scores) ANOVA.

To compare the experimental subject modeling conditions to the athletic and nonathletic control groups, self-efficacy was analyzed with a 2 x 2 (Experimental/Control Groups x Subject Athletic Ability) ANOVA or within a 2 x 2 x 2 (Experimental/Control Groups x Subject Athletic Ability x Pre/Post Scores) ANOVA. Perceived similarity for the experimental-only groups was analyzed by means of a 2 x 2 x 2 (Model Gender x Model Athletic Ability x Subject Athletic Ability) ANOVA. Post hoc tests were performed (Tukey WSD or Behren's Fisher t' tests for unequal n 's) in the event of significant differences for the interactions. Lastly, descriptive statistics (frequency distributions and percentages) by means of a crosstabs analysis were performed for all other questionnaire and background information items.

CHAPTER IV

RESULTS

Seventy-five athletic and 75 nonathletic college-aged females were selected for this study. Subjects were randomly assigned to one of four modeling conditions or were assigned to a no-model control condition to investigate the influence of two dimensions of model/observer similarity cues (gender and perceived task ability) on the motor performance and self-efficacy of a leg-endurance task. The effects of observers' athletic ability on modeling the experimental task and self-efficacy was also examined. A $2 \times 2 \times 2 \times 3$ (Model Gender $\times$ Model Athletic Ability $\times$ Subject Athletic Ability $\times$ Trials) factorial design plus an external control group for each subject ability group was employed. The task required subjects to sit on a stool and extend their legs for as long as possible above and across a cord for three trials with a one-minute rest between trials. The length of time the leg remained extended above the cord was recorded. Pre- and post-experimental questionnaires were administered to all subjects to determine the effectiveness of the model similarity/dissimilarity manipulation, level and strength of subject self-efficacy, subjects' perceptions of competition with the model and subjects' perceptions of their own performance in relation to the model's performance.

The results of this study have been organized into two sections. The first section presents the motor performance results. The second section is concerned with subjects' questionnaire data. All of the results in this chapter are reported at the .05 level of significance.

Motor Performance Results

Motor performance scores on the leg-endurance task for the experimental-only groups were analyzed within a $2 \times 2 \times 2 \times 3$ (Model Gender x Model Athletic Ability x Subject Athletic Ability x Trials) ANOVA with repeated measures on the last factor. The means and standard deviations for motor performance in each condition plus the control group on all three trials are reported in Table 2. Results from this analysis indicated that the main effect for subject athletic ability was significant, $F(1, 112) = 39.87$, $p < .0009$. This main effect indicated that athletic subjects extended their legs significantly longer ($M = 101.25$, $SD = 46.54$) than nonathletic subjects ($M = 59.03$, $SD = 23.57$). In addition, there was a trend toward a significant interaction ($p > .059$) between Model Gender and Model Athletic Ability. Subjects observing a female athletic model tended to extend their legs longer ($M = 89.17$, $SD = 46.12$) than subjects observing a male athletic model ($M = 72.76$, $SD = 24.83$). This trend can be seen in Figure 3. In addition, this trend toward an interaction is probably better interpreted by examining the trend ($p > .087$) toward the Model Gender by Model Athletic Ability by Subject Athletic Ability interaction. The two-way trend toward an interaction was mainly due to the motor performance of athletic subjects. Athletic subjects observing a female athletic model tended to extend their legs longer ($M = 115.16$, $SD = 39.52$) than athletic subjects

Table 2

Means and Standard Deviations for Motor Performance of
Experimental versus Control Subjects

	Male Models				Female Models				Controls	
	Athletic Model		Nonathletic Model		Athletic Model		Nonathletic Model			
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
Trial 1										
Athletic Subjects	105.60	(31.07)	132.93	(89.04)	147.47	(76.14)	120.73	(41.39)	118.27	(55.92)
Nonathletic Subjects	72.40	(35.10)	61.87	(26.89)	79.73	(67.43)	66.67	(31.51)	89.73	(50.04)
Trial 2										
Athletic Subjects	74.60	(30.31)	103.20	(67.37)	105.80	(29.15)	82.53	(27.01)	88.33	(38.04)
Nonathletic Subjects	57.80	(22.10)	54.33	(18.03)	62.53	(32.93)	52.87	(12.36)	65.53	(36.91)
Trial 3										
Athletic Subjects	72.40	(21.09)	98.80	(73.78)	92.20	(31.02)	78.73	(25.92)	84.73	(38.92)
Nonathletic Subjects	53.73	(28.58)	52.13	(16.32)	47.27	(21.67)	47.00	(14.26)	71.40	(44.56)

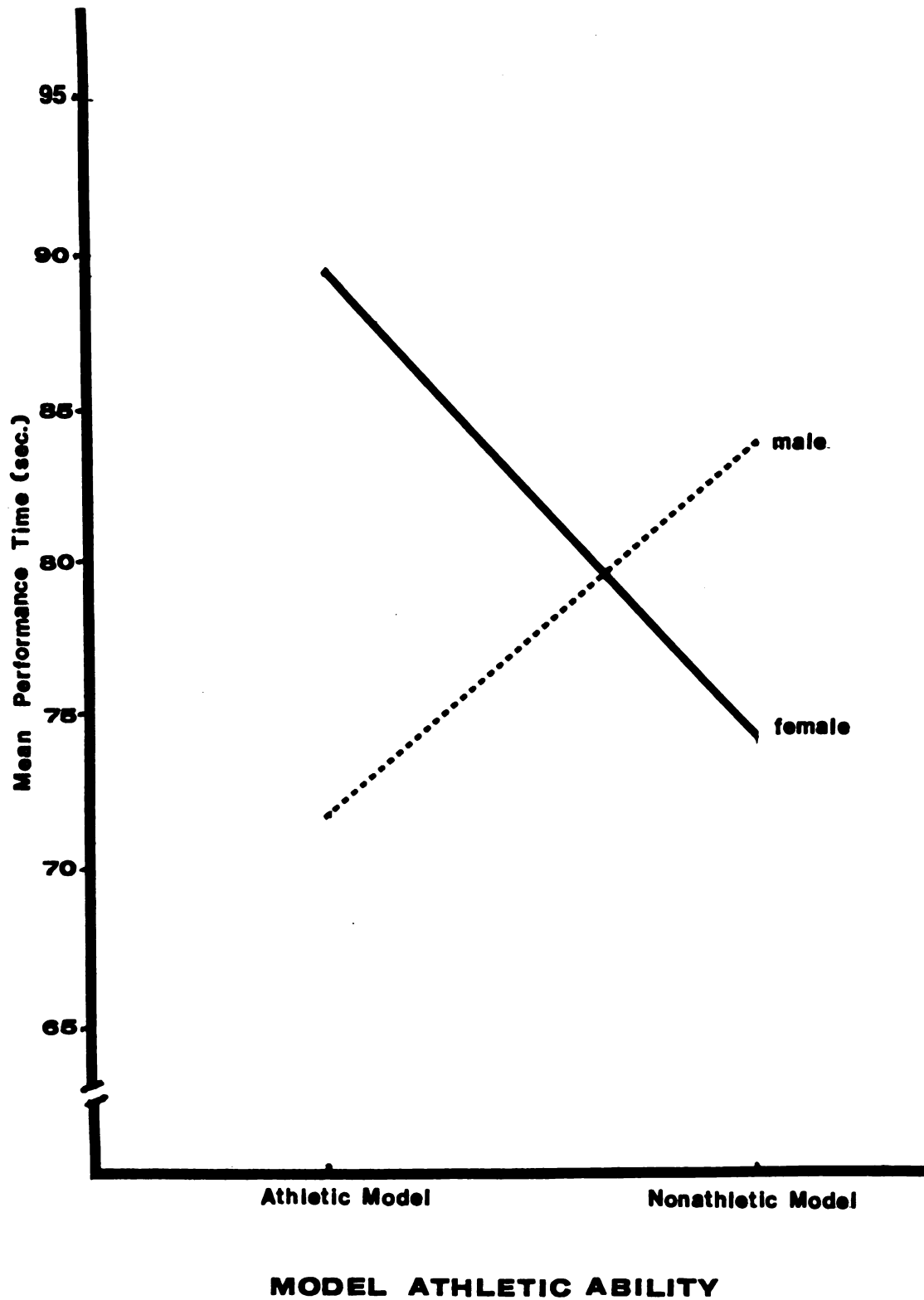


Figure 3. Model Gender by Model Athletic Ability Interaction on performance.

observing a male athletic model ($\underline{M} = 84.20$, $\underline{SD} = 23.20$). There was very little difference in motor performance between the four modeling conditions for the nonathletic subjects (see Figure 4).

The Trials main effect was significant ($\underline{p} < .0009$), $\underline{F} = 49.78$, $df = 1,158$ ¹. Post hoc analysis using a Tukey WSD procedure (Winer, 1971), indicated that performance times significantly decreased from Trials 1 to 2 and from Trials 1 to 3. Although performance times decreased from Trials 2 to 3, this was not a significant decrease.

In addition, a Subject Athletic Ability by Trials interaction $\underline{F} (1,158)$ (see Footnote 1) = 7.31, $\underline{p} < .008$, yielded significance. Post hoc analysis indicated that athletic and nonathletic subjects performed significantly longer on Trial 1 than on Trials 2 or 3. Also, athletic subjects extended their legs longer than nonathletic subjects on every trial. No other interactions with trials were significant. The results of this analysis for the experimental-only groups are summarized in Appendix C, Table 3.

A separate ANOVA was conducted to compare the experimental subject modeling conditions to the athletic and nonathletic subject control groups. This was accomplished by means of a 2 x 2 x 3 (Experimental/Control Groups x Subject Athletic Ability x Trials) ANOVA. Results of this analysis yielded a significant main effect for Subject Athletic Ability $\underline{F} (1,146) = 38.94$, $\underline{p} < .0009$. The means and standard deviations for the control groups are contained in Table 2. This main effect indicated that both experimental and control athletic subjects extended their legs significantly longer ($\underline{M} = 100.42$, $\underline{SD} = 45.56$) than nonathletic experimental and control subjects ($\underline{M} = 62.33$, $\underline{SD} = 27.36$). This main

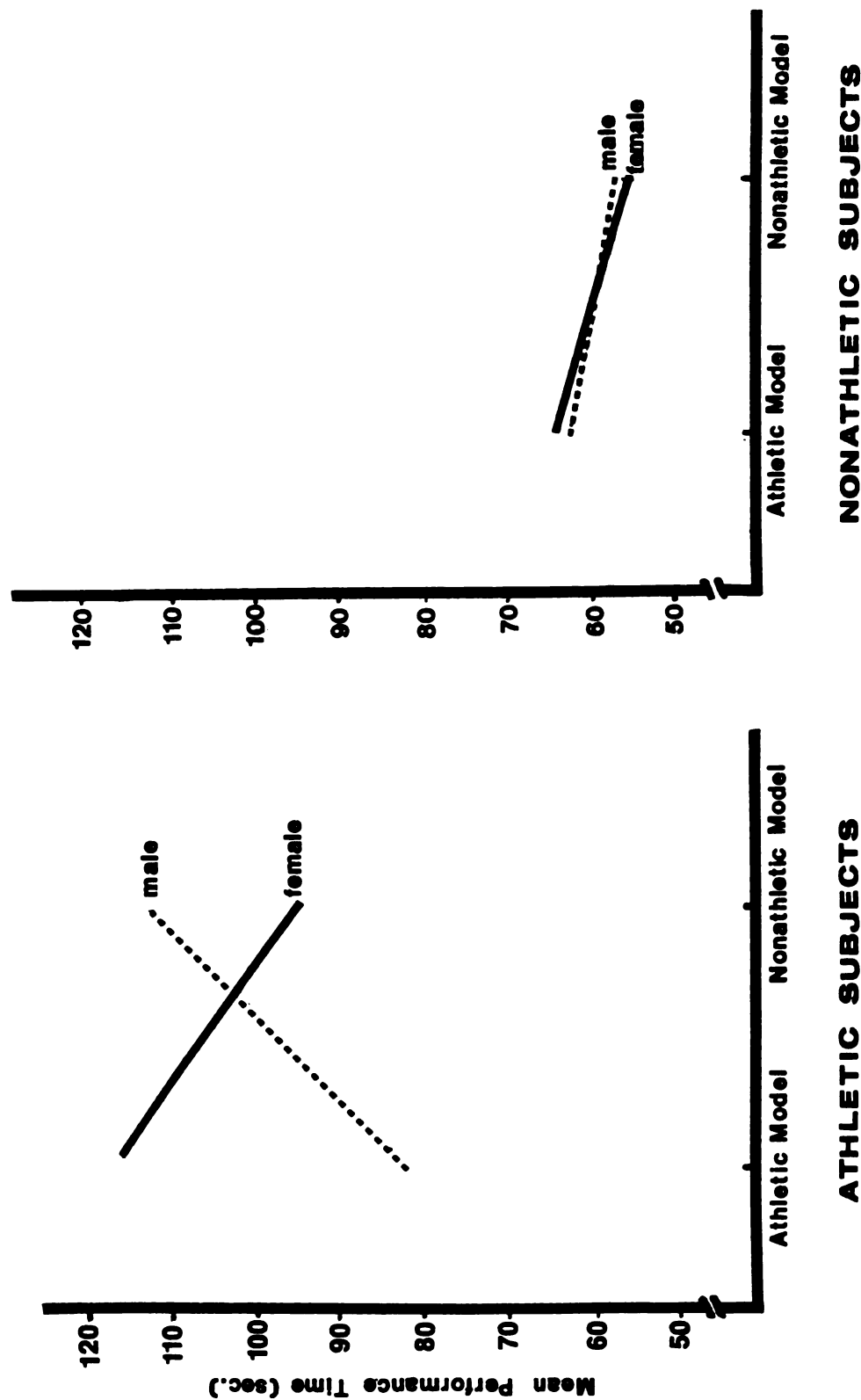


Figure 4. Model Gender by Model Athletic Ability by Subject Athletic Ability Interaction on performance.

effect is consistent with the $2 \times 2 \times 2 \times 3$ ANOVA findings for the experimental groups which indicated that athletic subjects performed longer than nonathletic subjects. In addition to the Subject Athletic Ability main effect, a Trials main effect was evidenced $F(2,222)$ (see Footnote 1) = 60.83, $p < .0009$. Post hoc analysis (Tukey WSD) yielded the same results as the $2 \times 2 \times 2 \times 3$ experimental-only groups analysis; motor performance scores on Trial 1 ($M = 99.54$, $SD = 59.81$) significantly differed from motor performance scores on Trials 2 ($M = 74.75$, $SD = 38.26$) and 3 ($M = 69.84$, $SD = 39.09$) with Trial 2 not significantly differing from Trial 3. Lastly, a significant Subject Athletic Ability $\times$ Trials interaction $F(2,222)$ (see Footnote 1) = 7.43, $p < .001$ resulted. This was again similar to the $2 \times 2 \times 2 \times 3$ experimental-only Subject Athletic Ability $\times$ Trials interaction. Post hoc analysis (Tukey WSD) indicated that athletic experimental and control subjects extended their legs longer ($M = 125.00$, $SD = 62.44$) than nonathletic experimental and control subjects ($M = 90.89$, $SD = 41.83$) on the first trial only. Post hoc analysis (Tukey WSD) also indicated that all subjects performed longer on Trial 1 than on Trial 2, and longer on Trial 2 than on Trial 3. No other interactions with trials were significant. The results of this analysis for experimental and control subjects are summarized in Appendix C, Table 4.

In order to directly test the hypotheses stated in Chapter I, a priori contrasts were conducted for each hypothesis. This required a separate analysis for athletic and nonathletic subjects because of the way in which the hypotheses were stated. In analyzing each hypothesis,

The motor performance scores over trials were averaged to represent one motor performance score.

Hypothesis 1. The first hypothesis stated that female nonathletic subjects performed longest on the leg-endurance task when viewing the female nonathletic model. To test this hypothesis, the motor performance of the nonathletic subjects viewing the female nonathletic model was compared to the nonathletic subjects' average group motor performance scores of the female athletic model, male athletic model, male nonathletic model and control groups. Results from this analysis indicated that the nonathletic subjects viewing a female nonathletic model did not differ significantly from the nonathletic subjects viewing all other conditions, $t(70) = 1.09$. The first hypothesis was, therefore, not supported.

Hypothesis 2. The second hypothesis predicted that female athletic subjects performed longest on the leg-endurance task when viewing either the female or male athletic model. This hypothesis was tested by averaging group motor performance scores of the female nonathletic model group, the male nonathletic model group and the control group for the athletic subjects and comparing this averaged score against the averaged score for the female athletic and male athletic model groups. Results indicated no difference between the two averaged groups, $t(70) = -.12$, and thus, did not support the second hypothesis. Results of the experimental-only group ANOVA did indicate a trend ($p > .087$) which showed that for female athletic subjects observing a female athletic model resulted in the longest performance; however, female athletic subjects observing a male athletic model exhibited the shortest performance.

Hypothesis 3. The third hypothesis stated that subjects viewing a model of similar athletic experience extended their legs longer than control subjects. To test this hypothesis for the athletic subjects, the averaged group motor performance score of the female athletic model and the male athletic model was compared to the averaged motor performance score of the athletic control group. Results indicated no difference between the two groups, $t(70) = .18$. The third hypothesis for athletic subjects was, therefore, not supported.

To test this hypothesis for the nonathletic subjects, the averaged group motor performance score of the female nonathletic model and the male nonathletic model was compared to the averaged motor performance score of the nonathletic control group. Results again indicated that the nonathletic subjects viewing a model of similar athletic experience did not differ significantly from nonathletic control subjects, $t(70) = -2.30$. Therefore, the third hypothesis for nonathletic subjects was not supported.

Questionnaire Results

Two questionnaires were administered to each subject in this study; a pre-experimental and a post-experimental questionnaire (see Appendices A and B). These questionnaires obtained background information regarding subjects' past competitive sports history as well as information concerning subjects' present involvement in any non-organized sports on a regular basis. In addition, subjects were asked whether or not they had any leg injury. Any subject indicating a leg injury was eliminated from the study. None of the volunteer subjects indicated any

leg injuries. The questionnaires were also used to assess level and strength of subjects' self-efficacy, as well as subjects' opinions of whether males or females would perform best on the leg-extension task. Subjects exposed to the modeling conditions were asked to rate their perceived similarity to the model and to provide an explanation for their ratings. Subjects exposed to the modeling conditions were also asked to compare their performance to the model's performance, whether or not subjects felt that the model had an influence on their own performance (and why) and whether or not subjects competed with the model.

The questionnaire results are divided into self-efficacy results; model/observer similarity results; descriptive analysis results concerning model/observer competition, perceived model influence, model/observer motor performance comparisons; and lastly, background information results.

Self-efficacy results. On the efficacy questionnaires, Items 3, 4 and 5 were assessed for both level and strength of self-efficacy. The level of efficacy was assessed by asking the subject to rate her athletic ability a) in general, b) on muscular endurance tasks, and c) specifically on the leg-extension task, on 7-point, likert-type scales. Strength of efficacy was assessed by asking the subject to rate how certain she was of her athletic ability a) in general, b) on muscular endurance tasks, and c) on the experimental task, from zero to 100% certainty.

On the pre-experimental questionnaire, self-efficacy Items 3, "general athletic ability" and 4, "ability to perform muscular endurance tasks" were each analyzed by means of a Model Gender x Model Athletic Ability x Subject Athletic Ability ($2 \times 2 \times 2$) ANOVA for both level and

strength of self-efficacy for the experimental-only groups. Results for the level of self-efficacy concerning subjects' general athletic ability and ability to perform muscular endurance tasks, indicated a significant main effect for Subject Athletic Ability on Item 3, $F(1,112) = 170.15$, $p < .0009$ and on Item 4, $F(1,112) = 84.78$, $p < .0009$. These main effects indicated that athletic subjects possessed higher pre-performance levels of efficacy concerning their motor abilities than the pre-performance efficacy level of the nonathletic subjects. Specifically, athletic subjects were more confident in their general athletic ability ($M = 6.00$, $SD = .78$) and their ability to perform muscular endurance tasks ($M = 5.27$, $SD = .88$) than were the nonathletic subjects ($M = 3.58$, $SD = 1.23$; $M = 3.53$, $SD = 1.14$, respectively). In addition, a significant main effect for Model Gender was evidenced on Item 3, general athletic ability, $F(1,112) = 5.06$, $p < .026$. Subjects who were exposed to a female model indicated a higher level of perceived general athletic ability ($M = 5.00$, $SD = 1.47$) than the level of perceived general athletic ability indicated by subjects exposed to a male model ($M = 4.58$, $SD = 1.68$).

Results for strength of self-efficacy, again indicated a significant Subject Athletic Ability main effect for general athletic ability $F(1,112) = 139.86$, $p < .0009$, and ability to perform muscular endurance tasks $F(1,112) = 73.80$, $p < .0009$. In conjunction with the level of self-efficacy results, strength of self-efficacy results also revealed that athletic subjects were more certain of their general athletic ability ($M = 8.13$, $SD = 1.36$) and their ability to perform muscular endurance tasks ($M = 7.07$, $SD = 1.68$) than were the nonathletic subjects

for certainty of general athletic ability ($\underline{M} = 4.35$, $\underline{SD} = 2.11$) and certainty of ability to perform muscular endurance tasks ($\underline{M} = 4.15$, $\underline{SD} = 2.02$). In addition, a significant main effect for Model Gender $\underline{F} (1,112) = 5.50$, $\underline{p} < .021$ was again evidenced for strength of general athletic efficacy expectations. Subjects who were exposed to a female model, indicated a stronger degree of perceived ability to perform muscular endurance tasks ($\underline{M} = 6.62$, $\underline{SD} = 2.50$) than subjects exposed to a male model ($\underline{M} = 5.87$, $\underline{SD} = 2.65$). Results of these analyses for the experimental-only groups, are summarized in Appendix D, Tables 5, 6, 7 and 8.

A separate ANOVA was conducted to compare the experimental subject modeling conditions to the athletic and nonathletic subject control groups for efficacy Items 3 and 4. This was accomplished by means of a 2×2 (Experimental/Control Groups $\times$ Subject Athletic Ability) ANOVA for both level and strength of self-efficacy. Results for the level of self-efficacy concerning subjects' general athletic ability and ability to perform muscular endurance tasks also indicated a significant main effect for Subject Athletic Ability. On Item 3, $\underline{F} (1,146) = 187.97$, $\underline{p} < .0009$ and on Item 4, $\underline{F} (1,146) = 86.22$, $\underline{p} < .0009$. These main effects indicated that athletic subjects were more confident in their general athletic ability ($\underline{M} = 6.00$, $\underline{SD} = .84$) and their ability to perform muscular endurance tasks ($\underline{M} = 5.20$, $\underline{SD} = .93$) than were the nonathletic subjects ($\underline{M} = 3.67$, $\underline{SD} = 1.21$) ($\underline{M} = 3.64$, $\underline{SD} = 1.13$) respectively. In addition, an Experimental/Control Groups by Subject Athletic Ability interaction $\underline{F} (1,146) = 4.26$, $\underline{p} < .041$, yielded significance on Item 4. However, post hoc analyses (using Behren's Fisher $\underline{t}$ ' test for

unequal n's) indicated that viewing a model did not change level of efficacy for muscular endurance of the athletic subjects (Experimental Group $\bar{M} = 5.27$, $\underline{SD} = .83$; Control Group $\bar{M} = 4.93$, $\underline{SD} = 1.10$) or of the nonathletic subjects (Experimental Group $\bar{M} = 3.53$, $\underline{SD} = 1.04$; Control Group $\bar{M} = 4.07$, $\underline{SD} = 1.03$). Experimental and control athletic subjects again had higher levels of efficacy for muscular endurance than experimental and control nonathletic subjects.

Results for strength of self-efficacy in the experimental versus control groups ANOVA, indicated a significant Subject Athletic Ability main effect for general athletic ability $F(1,146) = 150.19$, $p < .0009$, and ability to perform muscular endurance tasks $F(1,146) = 75.15$, $p < .0009$. In conjunction with the level of self-efficacy results, strength of self-efficacy results also revealed that athletic subjects were more certain of their general athletic ability ($\bar{M} = 8.09$, $\underline{SD} = 1.41$) and their ability to perform muscular endurance tasks ($\bar{M} = 6.92$, $\underline{SD} = 1.71$) than were the nonathletic subjects for certainty of general athletic ability ($\bar{M} = 4.56$, $\underline{SD} = 2.09$) and certainty of ability to perform muscular endurance tasks ($\bar{M} = 4.35$, $\underline{SD} = 1.96$). In addition, a significant interaction between Experimental/Control Groups and Subject Athletic Ability $F(1,146) = 5.35$, $p < .022$ was again evidenced for strength of muscular endurance efficacy expectations. Post hoc analyses (using Behren's Fisher t' tests) again indicated that for athletic subjects, viewing a model ($\bar{M} = 7.07$, $\underline{SD} = 1.14$) did not increase the strength of their efficacy to perform muscular endurance tasks compared to controls ($\bar{M} = 6.33$, $\underline{SD} = 1.76$). However, viewing a model did decrease the strength of efficacy for nonathletic subjects

($\underline{M}$ = 4.15, $\underline{SD}$ = 1.96) compared to controls ($\underline{M}$ = 5.13, $\underline{SD}$ = 1.55).

Again, athletic experimental subjects had higher efficacy strength scores than nonathletic experimental subjects on muscular endurance measures. Results for general athletic ability efficacy strength revealed a trend ($p > .085$) towards this same interaction. Results of these analyses for the experimental and control subjects are summarized in Appendix D, Tables 9, 10, 11 and 12.

Self-efficacy Item 5 which asked, "How well do you think your overall performance will be on this task?" on the pre-experimental questionnaire and "How well do you think your overall performance would be on this task in the future?" on the post-experimental questionnaire, was analyzed by means of a $2 \times 2 \times 2 \times 2$ (Model Gender x Model Athletic Ability x Subject Athletic Ability x Pre/Post Scores) ANOVA for both level and strength of self-efficacy for the experimental-only groups. Results for level of self-efficacy indicated a main effect for Subject Athletic Ability $F(1,112) = 86.80$, $p < .0009$. This main effect indicated that athletic subjects possessed higher levels of self-efficacy concerning the experimental task across both pre-and post-experimental measures ($\underline{M}$ = 5.20, $\underline{SD}$ = .83) than the level of self-efficacy (across pre- and post-measures) of nonathletic subjects ($\underline{M}$ = 3.70, $\underline{SD}$ = .92).

Strength of self-efficacy results for Item 5 also indicated a Subject Athletic Ability main effect $F(1,112) = 48.02$, $p < .0009$. Athletic subjects possessed stronger efficacy feelings ($\underline{M}$ = 6.77, $\underline{SD}$ = 1.67) across both pre- and post-strength of efficacy measures than the strength of self-efficacy (across both pre- and post-measures of the nonathletic subjects ($\underline{M}$ = 4.57, $\underline{SD}$ = 1.76). In addition to the Subject Athletic Ability main effect, a significant Pre/Post main effect

($p < .009$) was evidenced for strength of self-efficacy $F(1,112)$ (see Footnote 1) = 7.08. Specifically, strength of self-efficacy increased from pre-experimental measures of self-efficacy ($M = 5.48$, $SD = 2.19$) to post-experimental measures of self-efficacy ($M = 5.86$, $SD = 2.19$). More interestingly, however, these main effects were superseded by a three-way (Model Gender x Subject Athletic Ability x Pre/Post Measures) interaction $F(1,112)$ (see Footnote 1) = 5.90, $p < .017$. Post hoc analysis (Tukey WSD) of this interaction indicated that there were no significant differences for athletic subjects; however, for nonathletic subjects, viewing a female model produced stronger efficacy expectations ($M = 4.87$, $SD = 1.94$) prior to performance than viewing a male model ($M = 3.83$, $SD = 1.91$). Also, nonathletic subjects who saw a male model, significantly increased their efficacy expectations after performing the task ($M = 4.87$, $SD = 2.24$) (see Figure 5). The self-efficacy results of Item 5 for the experimental-only groups are summarized in Appendix D, Tables 13 and 14.

A separate ANOVA was conducted to compare the experimental subject modeling conditions to the athletic and nonathletic subject control groups for self-efficacy Item 5. This was accomplished by means of a $2 \times 2 \times 2$ (Experimental/Control Groups x Subject Athletic Ability x Pre/Post Scores) ANOVA for both level and strength of self-efficacy. Results for level of self-efficacy again indicated a main effect for Subject Athletic Ability $F(1,146) = 77.23$, $p < .0009$. This main effect indicated that athletic subjects possessed higher levels of self-efficacy across both pre- and post-efficacy measures ($M = 5.12$, $SD = .91$) than the level of self-efficacy (across pre- and post-measures) of nonathletic

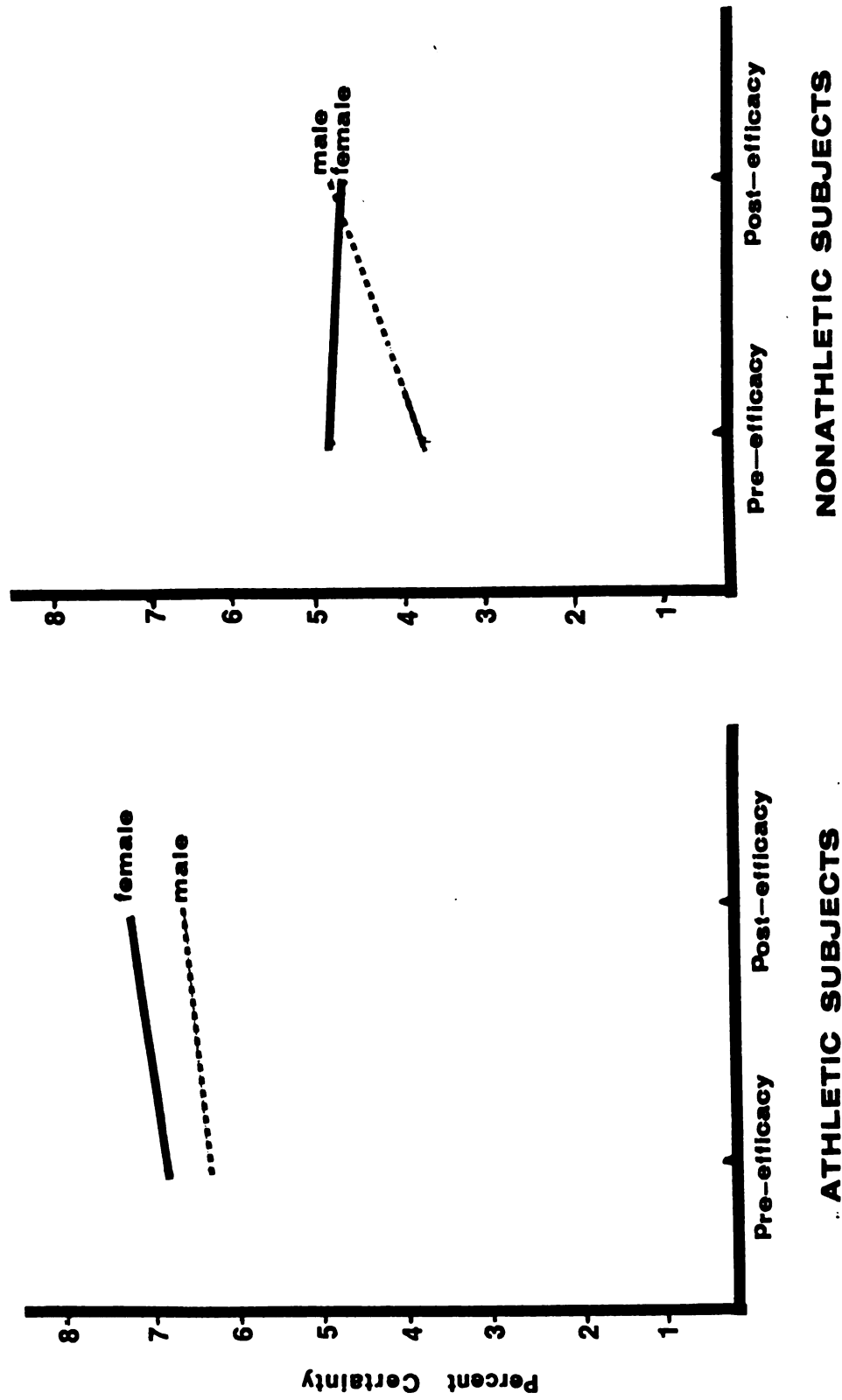


Figure 5. Model Gender by Subject Athletic Ability by Pre/Post Measures Interaction for efficacy strength on Item 5.

subjects ($\underline{M} = 3.81$, $\underline{SD} = .94$). The Subject Athletic Ability main effect is probably better interpreted when examining the two-way (Experimental/Control Groups by Subject Athletic Ability) interaction $\underline{F} (1,146) = 6.76$, $\underline{p} < .010$. Post hoc analyses (using the Behren's Fisher $\underline{t}$ ' test for the comparisons between the groups with unequal $\underline{n}$'s) indicated that athletic experimental and control subjects did not differ in their level of efficacy expectations, however nonathletic experimental subjects had lower levels of efficacy expectations across both pre- and post-efficacy measurements compared to controls. In addition, there were no significant differences between the level of efficacy measurements for athletic and nonathletic control subjects.

Strength of self-efficacy results also indicated a Subject Athletic Ability main effect $\underline{F} (1,146) = 51.40$, $\underline{p} < .0009$. Athletic subjects possessed stronger efficacy feelings ($\underline{M} = 6.67$, $\underline{SD} = 1.67$) across both pre- and post-strength of efficacy measures than the strength of self-efficacy (across both pre- and post-measures) of the nonathletic subjects ($\underline{M} = 4.69$, $\underline{SD} = 1.71$). In addition to the Subject Athletic Ability main effect, a significant Pre/Post main effect ($\underline{p} < .008$) was again evidenced for strength of self-efficacy $\underline{F} (1,146)$ (see Footnote 1) = 7.25. Specifically, strength of self-efficacy increased from pre-experimental measures of self-efficacy ($\underline{M} = 5.50$, $\underline{SD} = 2.12$) to post-experimental measures of self-efficacy ($\underline{M} = 5.86$, $\underline{SD} = 2.11$). The self-efficacy results of Item 5 for the experimental and control groups are summarized in Appendix D, Tables 15 and 16.

In order to more accurately assess self-efficacy on the leg-endurance task, 15 questions were asked concerning subjects' certainty about the length of time they could extend their legs prior to performing the experimental task and also how long they thought they would be able to extend their legs in the future. The time lengths ranged from 30 seconds to 4 minutes, at 15-second intervals. These questions were contained in Items 6 through 20 on both pre- and post-experimental questionnaires. The responses made by the experimental-only group subjects to the 15 questions, were summed to obtain a single score and submitted to a Model Gender x Model Athletic Ability x Subject Athletic Ability x Pre/Post Measures ($2 \times 2 \times 2 \times 2$) ANOVA. Results indicated a significant main effect for Subject Athletic Ability $F(1,112) = 27.52$, $p < .0009$. Athletic subjects possessed stronger self-efficacy feelings toward performing the task ($M = 59.33$, $SD = 23.13$) across both pre- and post-measures of self-efficacy strength than nonathletic subjects ($M = 37.97$, $SD = 21.23$).

In addition to the Subject Athletic Ability main effect, a significant Pre/Post main effect was evidenced $F(1,112)$ (see Footnote 1) = 8.53, $p < .004$ for strength of self-efficacy. Self-efficacy strength decreased from pre- ($M = 51.93$, $SD = 28.64$) to post-experimental measures ($M = 45.38$, $SD = 26.34$) across all experimental subjects; however, this main effect is probably better interpreted by examining the trend ($p > .063$) toward the Subject Athletic Ability by Pre/Post Measures interaction. This interaction was mainly due to the self-efficacy scores of nonathletic subjects. Nonathletic subjects tended to exhibit a decrease in certainty of their ability to perform from

pre- ($\underline{M} = 43.35$, $\underline{SD} = 28.07$) to post-experimental ($\underline{M} = 32.58$, $\underline{SD} = 18.79$) measures of efficacy strength. There was very little difference in strength of efficacy measures between the pre- ($\underline{M} = 60.50$, $\underline{SD} = 26.77$) and post-measures ($\underline{M} = 58.17$, $\underline{SD} = 26.71$) obtained from the athletic subjects. For a summary of the 15-time increment efficacy strength results for the experimental-only group, see Appendix D, Table 17.

A separate ANOVA was conducted to compare the experimental subject modeling conditions to the athletic and nonathletic subject control groups on self-efficacy with regard to the 15 specified time lengths. The responses indicated by the experimental and control group subjects to these 15 questions, were summed to obtain a single score and submitted to an Experimental/Control Groups x Subject Athletic Ability x Pre/Post Measures ($2 \times 2 \times 2$) ANOVA. Results, again revealed a significant main effect for Subject Athletic Ability $F(1,146) = 24.26$, $p < .0009$. Athletic subjects possessed stronger self-efficacy feelings toward performing the task ($\underline{M} = 58.19$, $\underline{SD} = 22.11$) across both pre- and post-measures of self-efficacy strength than nonathletic subjects ($\underline{M} = 40.20$, $\underline{SD} = 22.90$).

A significant Pre/Post main effect was evidenced $F(1,146)$ (see Footnote 1) $= 6.21$, $p < .014$ for strength of self-efficacy similar to the Pre/Post main effect found for the experimental-only groups. Specifically, self-efficacy strength decreased from pre- ($\underline{M} = 51.74$, $\underline{SD} = 28.29$) to post-experimental measures ($\underline{M} = 46.65$, $\underline{SD} = 26.23$) across all subjects; however (as also noted among the experimental-only groups), this Pre/Post main effect is probably better interpreted by examining

the significant Subject Athletic Ability by Pre/Post Measures interaction $F = (1,146)$ (see Footnote 1) = 4.22, $p < .042$. Post hoc analysis indicated that this analysis was again, mainly due to the self-efficacy scores of the nonathletic subjects. Nonathletic subjects exhibited a decrease in certainty of their ability to perform from pre- ($M = 44.84$, $SD = 29.16$) to post-experimental ($M = 35.56$, $SD = 22.21$) measures of efficacy strength. There was very little difference in strength of efficacy measures between the pre- ($M = 58.64$, $SD = 25.79$) and post-measures ($M = 57.75$, $SD = 25.35$) obtained from the athletic subjects. Again, athletic subjects had higher efficacy scores than nonathletic subjects on both pre- and post-measures. Adding the control subjects to this analysis provided the additional power to make the trend toward a significant interaction found for the experimental-only groups analysis, significant. For a summary of the 15 time-increment-efficacy strength results for experimental and control group subjects, see Appendix D, Table 18.

Model/observer similarity results. Each subject exposed to a model was asked to rate her perceived similarity to that model on a 7-point, likert-type scale with 1 representing "very dissimilar" and 7 representing "very similar". In addition to this rating, subjects were provided with an open-ended item asking them to explain the reason(s) for their ratings.

Responses to the ratings were analyzed by means of a $2 \times 2 \times 2$ (Model Gender x Model Athletic Ability x Subject Athletic Ability) ANOVA for perceived model/observer similarity. Results from this analysis indicated that the main effect for Model Gender was significant

$F(1,112) = 6.36, p < .013$. This main effect indicated that female models were perceived to be more similar to the subjects ($M = 3.60, SD = 1.61$) than were the male models ($M = 3.00, SD = 1.50$).

A Subject Athletic Ability main effect was also significant $F(1,112) = 24.04, p < .0009$. Athletic subjects perceived themselves to be more similar to the models ($M = 3.88, SD = 1.51$) than did the nonathletic subjects ($M = 2.72, SD = 1.43$).

The Subject Athletic Ability main effect is better interpreted by examining the significant interaction between Model Athletic Ability and Subject Athletic Ability with the F -value being 26.86, $df = 1,112, p < .0009$. Post hoc analysis using a Tukey WSD procedure (Winer, 1971) indicated that athletic subjects perceived themselves as being more similar to the athletic model ($M = 4.30, SD = 1.53$) than to the nonathletic model ($M = 3.47, SD = 1.38$). In addition, nonathletic subjects indicated that they were more similar to the nonathletic model ($M = 3.53, SD = 1.38$) than to the athletic model ($M = 1.90, SD = .92$). The results of this analysis are summarized in Appendix D, Table 19.

Descriptive statistics were used to help interpret the reason(s) given by the experimental subjects for their similarity ratings. Frequency distributions indicated that the most frequent response of all subjects exposed to the modeling conditions dealt with "physical items". Specifically, 69.17% of all respondents mentioned athletic experience, athletic background, present level of physical activity and/or physical appearance characteristics, excluding gender responses. None of the subjects indicated gender-only as a response, however, gender responses in combination with other items (physical and/or nonphysical, e.g.,

time factors, student status, attitudes, etc.) accounted for 13.33% of all responses. An additional 10.83% of subject responses dealt with responses unrelated to gender or physical qualities. The remaining 6.67% of responses were not coded (e.g., no answer, etc.).

For subjects viewing a male model, 63.33% mentioned athletic experience, athletic background, present level of physical activity and/or physical appearance characteristics alone or in combination with other "non-physical" items (excluding gender responses); a higher percentage of subjects that observed a female model (81.67%) indicated some component of the "physical" qualities alone or in combination with other "non-physical" items (excluding gender responses).

When considering subject athletic ability, descriptive statistics indicated that athletes (80%) tended to indicate at least one physical/athletic item (excluding gender responses) more often than nonathletic subjects (73.83%). Only 17% of the nonathletic subjects indicated gender responses, while even fewer athletic subjects (11.67%) indicated gender as a reason for their similarity ratings.

Somewhat related to the similarity/dissimilarity dimension was the post-experimental questionnaire item requiring experimental and control subjects to indicate who they thought would perform best on the leg-extension task, males or females. Descriptive statistics were again used to interpret subjects' responses. Frequency distributions indicated that the most frequent response was males which was chosen by 72% of all subjects. Only 15.33% of all subjects indicated that they thought females would perform best on the leg-extension task. Although subjects were only provided with a choice of male or female, 12.67% of all

subjects checked both male and female or wrote both for their responses to this question.

Nonathletic subjects indicated that males would perform best on this task (73.33%) slightly more than did athletic subjects (70.67%). In addition, nonathletic subjects tended to have slightly higher expectations for females (18.67%) than did the athletic subjects (12%). However, substantially more athletic subjects (17.33%) indicated both as a response to this question than nonathletic subjects (8%).

Of the subjects exposed to a male model, 70% indicated that males would perform best on the leg-extension task. Interestingly enough, of the subjects exposed to a female model, 70% also indicated that males would perform best on this task. Subjects exposed to a female model held higher performance expectations for females (21.67%) than did subjects exposed to a male model; only 10% of the subjects exposed to a male model indicated that females would perform best on this task. Lastly, a higher percentage of subjects that viewed a male model indicated both as a response (20%) compared to the lower percentage of subjects indicating both who were exposed to a female model (8.33%).

When examining experimental and control subjects separately, it was found that subjects who did not view a model (controls) thought that males would perform best on this task (80%) more often than did the subjects exposed to a model (70%). Control subjects also held lower expectations for females (13.33%) than did the experimental subjects (15.83%).

Competition, influence and comparison results. All of the items in this section were analyzed by means of frequency distributions.

Only those subjects exposed to the modeling conditions were asked whether or not they competed with the person who demonstrated the leg-extension task. The majority of these subjects (62.5%) indicated that they did not compete with the model. Of the 37.5% of the subjects that did compete with the model, 46.67% of the athletic subjects competed, while only 28.33% of the nonathletic subjects competed.

In examining the gender of the model that subjects were exposed to, athletic and nonathletic subjects did not drastically differ in the extent that they competed with male or female models, however, a slight difference did occur. Specifically, out of the athletic and nonathletic subjects that competed, slightly more competed with the female models (51.11%) than with the male models (48.89%). Both athletic and nonathletic subjects indicated that they competed more with the nonathletic models than with the athletic models. Out of the subjects that did compete, 50% competed with the nonathletic model, while only 25% of the subjects competed with the athletic model.

Subjects exposed to the modeling conditions were asked whether or not they thought the model had an influence on their own performance. In addition, these subjects were provided with an open-ended item asking them to explain the reason(s) for their responses. Descriptive statistics indicated that the majority of the experimental subjects (63.33%) felt that the model did not influence their own performances. Of the 36.67% of the subjects that felt the model influenced their own performances, 40% of the athletic subjects, while 33.33% of the nonathletic subjects responded in this manner. Of these same subjects, more thought that they were influenced by the nonathletic models (56.82%)

than the athletic models (43.18%) and more by female models (54.55%) than male models (45.45%).

Descriptive statistics were also used to help interpret the reason(s) given by the subjects that indicated that the model did influence their own performances. Frequency distributions revealed that the most frequent response of the subjects answering "yes" to the influence question dealt with motivational factors. Fifty percent of these subjects felt that the model influenced their own performance by providing purely motivational cues. The next most frequent response provided by these subjects centered on informational factors. Of these responses, 29.55% included informational answers of two types: "information about how to perform the task", or "information about task difficulty". The third most frequent response offered by subjects (18.18%) was: "motivation and information about the model's condition and ability to perform the leg-extension task". The remaining 2.27% of the responses dealt with responses not coded as informational or motivational in nature (e.g., "basis for comparison").

In order to assess subjects' perceptions of their own performances in relation to that of the models', experimental subjects were asked, "How do you think the model performed in comparison to your performance?" Subjects were provided with a choice of one of three responses; "better", "same", or "worse". Descriptive statistics revealed that the most frequent response offered by subjects was that the model performed better (69.17%) in comparison to their own performances. Only 7.5% of the subjects felt that the model performed worse than themselves, while 23.33% felt that their performance was comparable to that of the model's.

Upon examining the responses in terms of subject athletic ability, it was found that 90% of the nonathletic subjects indicated that the model had performed better than themselves, while 48.33% of the athletic subjects responded in that manner. For the nonathletic subjects, the athletic models were thought to be slightly better than the nonathletic models compared to their own performances (male athletic model = 27.8%; female athletic model = 27.8%; male nonathletic model = 24%; female nonathletic model = 20.4%). However, for the athletic subjects, the male athletic model was more frequently thought to be a better performer (48.3%) than themselves, than were the other models (female athletic model = 27.6%; male nonathletic model = 13.8%; female nonathletic model = 10.3%).

Background information results. All subjects were asked to complete pre-experimental background information questions. The first question required subjects to indicate their past (and present) organized, competitive sports experience. Subjects were provided with seven possible response items: "youth sports team", "junior high school team", "high school athletic team", "college athletic team", "outside league(s)", "college intramurals", or "none". Descriptive statistics revealed that 65.33% of the athletic subjects indicated involvement in youth sports and 16% of the nonathletic subjects indicated youth sports involvement. Junior high school athletic involvement was indicated by 76% of the athletic subjects and 14.67% of the nonathletic subjects. When considering high school athletic experiences, none of the nonathletic subjects (0%) had participated on high school teams, while 94.67% of the athletic subjects had experienced competitive high school athletics.

Outside athletic league involvement was indicated by 72% of the athletic subjects and none (0%) of the nonathletic subjects. Collegiate intramural participation was indicated by 14.66% of the nonathletic subjects and 41.33% of the athletic subjects. Lastly, the majority of nonathletic subjects (62.67%) indicated no form of athletic participation.

The second background question asked subjects to indicate whether or not they were involved in any non-organized sport(s) on a regular basis. Descriptive statistics revealed that 58.67% of the athletic subjects and 24% of the nonathletic subjects regularly engaged in non-organized sports. The two most frequent forms of non-organized athletic participation indicated by athletic subjects were "jogging" (37.33%), followed by "lifting weights" (26.67%). The two most frequent forms of non-organized athletic participation indicated by nonathletic subjects were "jogging" (8%) and "swimming" (6.67%).

Summary of ANOVA Results

Motor performance ANOVAS indicated the following significant findings:

1. Athletic subjects extended their legs significantly longer than nonathletic subjects.
2. Subjects exhibited a significant decrease in performance times from Trials 1 to 2 and from Trials 1 to 3.
3. Athletic experimental and control subjects extended their legs significantly longer than nonathletic experimental and control subjects on the first trial only.

Motor performance ANOVAS indicated the following trends:

1. Subjects observing a female athletic model tended to extend their legs longer than subjects observing a male athletic model.

2. Athletic subjects observing a female athletic model tended to extend their legs longer than athletic subjects observing a male athletic model.

Questionnaire ANOVAS indicated the following significant findings:

1. Athletic subjects possessed higher pre-performance levels and strength of efficacy than nonathletic subjects, concerning a) general athletic ability, b) ability to perform muscular endurance tasks, c) overall ability to perform the leg extension task, and d) for the 15 specified time lengths.
2. Subjects who were exposed to a female model indicated higher levels and strength of pre-performance perceived general athletic ability than the pre-performance level and strength of perceived general athletic ability indicated by subjects exposed to a male model.
3. Subjects who were exposed to a female model indicated stronger pre-performance degrees of perceived ability to perform muscular endurance tasks than the strength of pre-performance perceived muscular endurance ability indicated by subjects exposed to a male model.
4. Strength of self-efficacy to perform the leg-extension task increased from pre- to post-experimental measures of self-efficacy; however, this main effect was superseded by a three-way interaction which indicated that there were no pre-post significant differences for athletic subjects; however, for nonathletic subjects, viewing a female model produced stronger efficacy expectations than viewing a male model. Also, nonathletic subjects who saw a male model, significantly increased their efficacy expectations after performing the task.
5. Self-efficacy strength decreased from pre- to post-experimental measures for the 15 specified time lengths; however, this was mainly due to the self-efficacy scores of nonathletic subjects. Nonathletic subjects exhibited a decrease in certainty of their ability to perform from pre- to post-experimental measures of efficacy strength.
6. Viewing a model did not change level or strength of efficacy for the performance of muscular endurance tasks of the athletic subjects or of the nonathletic subjects.
7. Viewing a model decreased the strength of efficacy to perform muscular endurance tasks compared to controls.

Model/observer similarity ANOVAS indicated the following significant findings:

1. Female models were perceived to be more similar to the subjects than were the male models.
2. Athletic subjects perceived themselves to be more similar to the models than did the nonathletic subjects.
3. Athletic subjects perceived themselves as being more similar to the athletic model than to the nonathletic model.
4. Nonathletic subjects indicated that they were more similar to the nonathletic model than to the athletic model.

CHAPTER V

DISCUSSION AND CONCLUSIONS

The purpose of this study was to investigate the differential effects of model similarity across two dimensions, gender and perceived task ability, on the performance and self-efficacy of subjects on the leg-endurance task. A secondary aim was to investigate the effects of observers' athletic ability on modeling and self-efficacy of the leg-endurance task. It was hypothesized that a) female non-athletic subjects would perform the longest on the leg-endurance task after viewing the female nonathletic model, b) female athletic subjects would perform longest on the leg-endurance task after viewing either the female or male athletic model, and c) subjects who had observed a model of similar athletic ability would extend their legs longer than control subjects. No predictions were made concerning the most salient similarity cue, gender or perceived similarity in task ability, modeled by subjects due to a lack of previous knowledge concerning this issue.

This chapter has been organized into three sections. The first section presents a discussion of this study and its findings. The second section states the conclusions of this investigation, while the third section offers implications and suggestions for future research.

Discussion

This discussion has been organized in an effort to integrate the results of the previous modeling literature with the findings of this study. Questionnaire responses will be discussed in order to add clarity to specific performance findings.

The primary purpose of this study which was to determine the most salient model/observer similarity cue, gender or perceived task ability, could not be determined for subjects' performance. Although subjects' perceptions of similarity were achieved across both dimensions, this perception of model/observer similarity did not influence their motor performance on the leg-extension task; this was especially apparent for nonathletic subjects.

Perhaps one of the reasons for this inability to determine the most salient dimension of model/observer similarity was due to the lack of sufficient power necessary for detecting significant effects. The power of a test is defined as the probability of rejecting the null hypothesis. In order to test this plausible explanation, power for the Gould and Weiss (1981) investigation was calculated for the no-talk similar and dissimilar experimental groups. The resulting power, using Cohen's (1969) formula was .99. Power, in the present study, was calculated separately for the athletic and nonathletic experimental groups. Power for the nonathletic treatment group, the group most comparable to the Gould and Weiss subject sample, was found to be .08. The power for the athletic treatment group was somewhat higher (.16). Possible explanations for the difference in power between the two studies could

be the combination of the small sample size and large variability found in the present study.

In terms of power, the larger the sample size, the smaller the sampling fluctuation of a statistic (e.g., standard error). By increasing the sample size, the standard error of the sampling distribution is reduced; in addition, the power to detect significant effects is increased. Gould and Weiss (1981) found significant motor performance differences between the nonathletic subjects exposed to the different modeling conditions. The lack of significant differences found among the nonathletic subjects in the present study may have been due to the relatively small number of nonathletic subjects assigned to each cell. In the experimental conditions, 15 nonathletic subjects were assigned to each one of the four modeling conditions or to the control condition. In the Gould and Weiss investigation, 60 nonathletic subjects were exposed to each one of the two modeling conditions with 30 nonathletic subjects assigned to the control condition. By extending the present investigation to include athletic as well as nonathletic subjects, and by extending the number of models from two to four, a condition was created in which the total sample size of the entire study may have needed to be substantially increased to realize experimental effects. However, the decision was made to test only 15 subjects per cell because that was the sample size per cell in the Gould and Weiss study.

Regarding the variability factor, this investigation noted a great deal of variability for the experimental and control groups. This was clearly evident when examining the elevated *Ms* error terms for each of the analyses. Other investigations have also found high variability

when using the same leg-extension task (Corbin, Landers, Feltz & Senior, in press; Gould & Weiss, 1981; Martens & Landers, 1969; Weinberg, Gould & Jackson, 1979).

A small sample size and large performance variability were probably also the reasons why the first and third hypotheses were not supported. The second hypothesis may not have been supported as specifically stated because the female athletic model group, which elicited the highest performance and the male athletic model group, which elicited the lowest performance were averaged together when performing the a priori contrasts, and this averaged score indicated that there were no significant differences between the two averaged groups. However, when the most similar group (female athletic model) was compared to all other groups in an a posteriori contrast there was still no significant difference, $t_{(70)} = 1.42$, $p > .17$.

Although results of this study did not support any of the hypotheses as stated, a number of interesting performance trends did occur. For instance, the present investigation revealed a trend for athletic subjects which indicated that athletic subjects assigned to the female athletic model group tended to have longer performance times than subjects assigned to the male athletic group. A tentative explanation for this finding may be that female athletic subjects were less threatened by societal evaluations received when competing with a female model as compared to the possible negative social sanctions received if they had competed with a male model. In support of this notion is the questionnaire data which revealed that more subjects felt influenced by the female models than the male models, and more subjects indicated that

they competed with the female models than with the male models.

Another plausible explanation for this trend may have been the different motivation and encouragement provided by the models. Specifically, for female subjects, the female athletic model may have provided more motivation than the male athletic model, eliciting the attitude that "if she can do it, so can I". Indeed, subjects in the present study that reported being influenced by the models, seemed to provide support for the importance of motivation. The majority of responses as to why the model influenced subjects' performances indicated that the model provided motivational cues.

Perhaps the conclusion by Landers and Landers (1973) that modeling may, in fact, play a significant role in observer attention/motivation can be related to subjects' perceptions and the motor performance scores found in the present study. Landers and Landers (1973) found that elementary school children who had observed an unskilled peer performed better than children who had observed an unskilled teacher. Possibly, subjects felt less threatened by the unskilled peer and hence, in more of a position to compete with the peer. It is possible that the children in the Landers and Landers study felt less threatened in terms of societal evaluation when a) competing against a fellow student rather than when competing against a teacher (authority figure) and b) when perceiving themselves to be in more of a position to emerge victorious when competing against an unskilled rather than skilled model. In addition, a peer perceived as equal or less in ability to oneself, may introduce the "if he/she can do it, so can I" philosophy. It must be

remembered that caution be observed when interpreting this finding because the differences were short of significance.

Although no hypothesized differences for the effects of modeling on self-efficacy were made, some differential effects of model similarity were found. Even though the perception of model similarity existed along both model gender and model ability dimensions, similarity in terms of gender seemed to be more influential of self-efficacy. Female models elicited higher levels of efficacy and stronger efficacy perceptions of general athletic ability and the ability to perform muscular endurance tasks for athletic and nonathletic subjects than male models. Furthermore, for nonathletic subjects, female models also influenced overall present and future predictions for performance on the leg-extension task more than male models. However, there were no differences concerning model gender on the 15-item time lengths. No significant differences for model athletic ability were found when analyzing subject self-efficacy.

The self-efficacy results of this investigation partially support the results of Gould and Weiss (1981) who found that similar model subjects (a female nonathletic model) had higher levels of self-efficacy and were more confident than dissimilar model subjects (a male athletic model), though they could not determine which similarity characteristic, gender or athletic ability, most greatly influenced subjects' efficacy appraisals. Again, the reason for Gould and Weiss' finding may be due to the subject's expectation that if another woman can do it, so can she.

However, the present results must be taken in light of the fact that a comparison between the self-efficacy of subjects before they

viewed any one of the models and again after they had viewed the models was not made. Subjects' pre-performance efficacy was only measured after viewing the models and again after performing the task (post-efficacy). No efficacy measurement was taken prior to exposure to the models. This is limiting in the sense that it is not known to what degree observing a particular gender or particular athletic ability model changed subjects' initial degree of self-efficacy.

A secondary aim of this investigation was designed to examine the effects of observers' athletic ability on modeling and self-efficacy of performing the leg-endurance task. For both motor performance and all self-efficacy measures, athletes had higher scores than nonathletes. Somewhat related to this finding is the fact that 90% of the nonathletic subjects indicated that the model performed better than themselves (perhaps reflecting a low degree of self-efficacy) while only 48.33% of the athletic subjects responded in that manner (perhaps reflecting higher perceptions of self-efficacy). One of the more interesting findings was the fact that in comparison to controls, viewing a model actually decreased nonathletic subjects' efficacy expectations for performance. In examining the individual group means of all subjects, the only nonathletic group that had higher efficacy scores than controls was the group exposed to a female nonathletic model. In addition, non-athletes also decreased their efficacy expectations after performing the task whereas athletes stayed about the same.

Perhaps these findings can be related to the Weinberg et al., 1981 investigation. Weinberg et al. (1981), postulated an interesting efficacy modeling effect. Specifically, Weinberg proposed that subjects

who were experimentally manipulated to achieve a high degree of self-efficacy responded to a specific failure situation by increasing their persistence efforts on the leg endurance task due to a state of internal cognitive dissonance created by their situational failure experience and their conflicting manipulated perceptions of high self-efficacy.

Weinberg et al. (1981), also suggested that subjects who were experimentally manipulated to achieve a low degree of self-efficacy responded to the specific failure situation by reinforcing their feelings of inadequacy and convincing themselves that they would never perform adequately and hence, would fail in their future attempts when performing this task. Although the present study did not involve model or subject success or failure experimental evaluations, athletic subjects possessing a higher degree of self-efficacy than the nonathletic subjects, perhaps were not devastated by observing a model and did not change their efficacy expectations. However, possible self-defeating thoughts of the nonathletic subjects already possessing lower degrees of self-efficacy, may have dominated their cognitions to the extent that the observation of any successful model performing the experimental task reinforced their feelings of inadequacy. These subjects may also have convinced themselves that they would perform poorly in future attempts at this task, which may explain why they lowered their already depressed feelings of self-efficacy after performing the task. This postulation may explain the self-efficacy findings of the present study.

Another plausible explanation for these results may have to do with the higher efficacy and perhaps higher competency perceptions noted among athletic subjects as proposed by Harter (1978). Harter (1978) proposes

that people who perceive themselves as competent (athletes in the present investigation) will persist at a task and possess a desire to master the task, while people who perceive themselves as incompetent (nonathletes in the present investigation) will exhibit lower persistence and a lower desire to master a task. Harter (1978) also noted that competency perceptions arise as a result of past, reinforcing successful experiences (i.e., athletes in the present study), which increases competency feelings, which in turn heightens the individuals' desire to persist at that task until it is mastered. A history of unsuccessful experiences or a history of little experience within a particular realm decreases competency feelings or does not provide the opportunity for the development of competency feelings, which in turn lowers the desire to master a task, lowering task persistence. The nonathletic subjects in this study had little experience with any form of athletics or physical activity. Perhaps, as Harter suggests, this is why their efficacy and performances were low.

As a final note, athletes indicated that they competed more with the model than nonathletes. This finding supports Bandura's note (c.f., Gould & Weiss, 1981) that individuals who feel efficacious are likely to compete with others, whereas those who feel inefficacious avoid competition. However, it was interesting, that of all the subjects who competed with a model, more competed with the nonathletic models than with the athletic models. This conflicts somewhat with Gould and Weiss' (1981) finding that similar model subjects competed more with the similar model than with the dissimilar model. They concluded that perceived similarity between model and observer may have heightened the social comparison

process, increasing observer motivation. From the present findings, however, this conclusion may not be tenable. It may be perceived superiority rather than perceived similarity on the part of the observer that increases observer motivation since athletic subjects in this study did compete more with the nonathletic than with the athletic models.

Conclusions

Based upon the findings and within the limitations of this study, the following conclusions were reached:

1. This investigation was unable to determine the more salient dimension of model similarity, gender or perceived task ability, influencing subjects' motor performance.
2. Gender is a more powerful similarity cue than perceived task ability for college-aged females' efficacy expectations on motor performance tasks.
3. Both gender and perceived task ability are influential similarity cues when considering subjects' perceptions of similarity.
4. Athletic subjects exhibited longer performances on the leg endurance task and higher degrees of self-efficacy than nonathletic subjects.

Suggestions for Future Research

Several suggestions concerning future research on model similarity can be stated. First, all of the noted limitations of this study should be taken into account and hopefully rectified or controlled for in future studies. Especially important is the future obtainment of two

pre-efficacy measurements, one before subjects view a model and a pre-measurement taken again after viewing the model but before task performance. Only the latter pre-efficacy measurement was obtained in this study and the Gould and Weiss (1981) study.

Due to the high variability that has been found with this task, future investigations employing this task may want to consider the use of pre-experimental performance as a covariate. Regarding sample size, the relatively small number of subjects per treatment cell probably masked any significant effects for the nonathletic as well as athletic subjects. If time and experimenter availability constraints did not exist, the total sample size of the entire study could have been substantially increased. Since lack of testing time and experimenter availability was a problem, perhaps the use of athletic subjects should have been eliminated.

The next logical step after the Gould and Weiss (1981) investigation should have been the addition of two more models (athletic female, nonathletic male) without the addition of athletic subjects. After the study was extended to include four models, the next step could have involved the testing of athletic subjects to see if the findings generalized to that population.

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FOOTNOTES

¹The lambda hat adjustment for degrees of freedom was used to correct for non-symmetry in the variance-covariance matrix.

APPENDICES

APPENDIX A

PRE-EXPERIMENTAL QUESTIONNAIRE

APPENDIX A

PRE-EXPERIMENTAL QUESTIONNAIRE

Subject No. _____

Group _____

1a. What is your past competitive sports experience? (check all that apply)

- _____ Youth Sports Team
- _____ Junior High School Team
- _____ High School Athletic Team
- _____ College Athletic Team
- _____ Outside League(s)
- _____ College Intramurals
- _____ None

b. Do you engage in any non-organized sports on a regular basis? (i.e., jogging, swimming, weightlifting, etc.)

- _____ yes; if yes please explain _____
- _____ no

2. Do you have any leg injury that could affect your performance on this task?

- _____ yes
- _____ no

0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100

Place a (✓) on the appropriate line if you will be able to extend your leg above the cord for:

very uncertain somewhat certain very certain
0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100

[illegible]

APPENDIX B

POST-EXPERIMENTAL QUESTIONNAIRE

APPENDIX B

POST-EXPERIMENTAL QUESTIONNAIRE

Subject No. _____

Group _____

% Of Certainty Of Your Future Ability To
Perform

Rate On The Scale Below: very uncertain somewhat certain very certain
0 10 20 30 40 50 60 70 80 90 100

how well you think your
overall performance would
be on this task in the
future

1 2 3 4 5 6 7
poor average good

Place a (✓) on the appro-
priate line if you think
that in the future you
would be able to extend
your leg above the cord
for:

% Of Certainty Of Your Ability To
Perform

very uncertain somewhat certain very certain
0 10 20 30 40 50 60 70 80 90 100

30 sec.?												
45 sec.?												
60 sec.?												
1 min. 15 sec.?												
1 min. 30 sec.?												
1 min. 45 sec.?												
2 min.?												
2 min. 15 sec.?												
2 min. 30 sec.?												
2 min. 45 sec.?												
3 min.?												
3 min. 15 sec.?												
3 min. 30 sec.?												
3 min. 45 sec.?												
4 min.?												

Do you think males or females would perform best on this task?

_____ males

_____ females

How similar do you perceive yourself to be to the person who demonstrated this task?

/	/	/	/	/	/	/
1	2	3	4	5	6	7
very dissimilar			somewhat similar		very similar	

WHY? _____

How do you think the model performed in comparison to your performance?

_____ better _____ same _____ worse

Do you think the model had an influence on your performance?

_____ yes _____ no

If yes, why? _____

Did you compete with the person who demonstrated this task? That is, did you try to do better than they did?

_____ yes _____ no

APPENDIX C

MOTOR PERFORMANCE DATA

Table 3
Analysis of Variance for Motor Performance of
Experimental-Only Subjects

Source	<u>df</u>	<u>MS</u>	<u>F</u>
Model Gender (A)	1	1195.378	.30
Model Athletic Ability (B)	1	243.378	.06
A x B	1	14668.900	3.65 [†]
Subject Athletic Ability (C)	1	160444.400	39.87*
A x C	1	816.011	.20
B x C	1	2064.011	.51
A x B x C	1	11971.600	2.98 ^{††}
Error between	112	4024.179	
Trials (J)	1	31332.790	49.78*
A x J	1	1350.903	2.15
B x J	1	546.103	.87
A x B x J	1	221.908	.35
C x J	1	4602.869	7.31*
A x C x J	1	50.119	.08
B x C x J	1	42.086	.07
A x B x C x J	1	50.358	.08
Error within	158	629.424	
Satterthwaite Ms error	184	1761.009	

* $p < .05$
^{††} $p > .059$
[†] $p > .087$

Table 4
Analysis of Variance for Motor Performance of
Experimental versus Control Subjects

Source	<u>df</u>	<u>MS</u>	<u>F</u>
Experimental/Control Groups (A)	1	2762.722	.66
Subject Athletic Ability (B)	1	163210.900	38.94*
A x B	1	7688.000	1.83
Error between	146	4190.928	
Trials (J)	2	38015.240	60.83*
A x J	2	349.677	.56
B x J	2	4644.229	7.43*
A x B x J	2	400.552	.64
Error within	222	624.929	
Satterthwaite Ms error	235	1813.595	

* $p < .05$

APPENDIX D

QUESTIONNAIRE DATA

Table 5
 Analysis of Variance for Questionnaire Item 3^a--
 Level of Efficacy for Experimental-Only Subjects

Source	<u>df</u>	<u>MS</u>	<u>F</u>
Model Gender (A)	1	5.208	5.06*
Model Athletic Ability (B)	1	1.008	.98
A x B	1	.208	.20
Subject Athletic Ability (C)	1	175.208	170.15*
A x C	1	2.408	2.34
B x C	1	.408	.40
A x B x C	1	.008	.01
Error between	112	1.030	

^a3--"Rate your general athletic ability."

* $p < .05$

Table 6

Analysis of Variance for Questionnaire Item 3^a-
Strength of Efficacy for Experimental-Only Subjects

Source	<u>df</u>	<u>MS</u>	<u>F</u>
Model Gender (A)	1	16.875	5.50*
Model Athletic Ability (B)	1	1.875	.61
A x B	1	1.875	.61
Subject Athletic Ability (C)	1	429.408	139.86*
A x C	1	7.008	2.28
B x C	1	.675	.22
A x B x C	1	.408	.133
Error between	112	3.070	

^a3--"Indicate your percent certainty of your general athletic ability."

* $p < .05$

Table 7

Analysis of Variance for Questionnaire Item 4^a-
Level of Efficacy for Experimental-Only Subjects

Source	<u>df</u>	<u>MS</u>	<u>F</u>
Model Gender (A)	1	.533	.50
Model Athletic Ability (B)	1	.033	.03
A x B	1	.833	.78
Subject Athletic Ability (C)	1	90.133	84.78*
A x C	1	2.133	2.01
B x C	1	.033	.03
A x B x C	1	.033	.03
Error between	112	1.063	

^a4--"Rate your ability to perform muscular endurance tasks."

* $p < .05$

Table 8

Analysis of Variance for Questionnaire Item 4^a-
Strength of Efficacy for Experimental-Only Subjects

Source	<u>df</u>	<u>MS</u>	<u>F</u>
Model Gender (A)	1	7.008	2.03
Model Athletic Ability (B)	1	.075	.02
A x B	1	3.675	1.06
Subject Athletic Ability (C)	1	255.208	73.80*
A x C	1	5.208	1.51
B x C	1	1.875	.54
A x B x C	1	.208	.06
Error between	112	3.458	

^a4--"Indicate your percent certainty of your ability to perform muscular endurance tasks."

* $p < .05$

Table 9

Analysis of Variance for Questionnaire Item 3^a-
Level of Efficacy for Experimental versus Control Subjects

Source	<u>df</u>	<u>MS</u>	<u>F</u>
Experimental/Control Groups (A)	1	1.042	.96
Subject Athletic Ability (B)	1	204.167	187.97*
A x B	1	1.042	.96
Error between	146	1.086	

^a3--"Rate your general athletic ability."

*p < .05

Table 10

Analysis of Variance for Questionnaire Item 3^a-
Strength of Efficacy for Experimental versus Control Subjects

Source	<u>df</u>	<u>MS</u>	<u>F</u>
Experimental/Control Groups (A)	1	4.335	1.39
Subject Athletic Ability (B)	1	468.167	150.19*
A x B	1	9.375	3.01†
Error between	146	3.117	

^a3--"Indicate your percent certainty of your general athletic ability."

* $p < .05$

† $p > .085$

Table 11

Analysis of Variance for Questionnaire Item 4^a-
Level of Efficacy for Experimental versus Control Subjects

Source	<u>df</u>	<u>MS</u>	<u>F</u>
Experimental/Control Groups (A)	1	.240	.23
Subject Athletic Ability (B)	1	91.260	86.22*
A x B	1	4.507	4.26*
Error between	146	1.058	

^a4--"Rate your ability to perform muscular endurance tasks."

*p < .05

Table 12

Analysis of Variance for Questionnaire Item 4^a-
Strength of Efficacy for Experimental versus Control Subjects

Source	<u>df</u>	<u>MS</u>	<u>F</u>
Experimental/Control Groups (A)	1	.375	.11
Subject Athletic Ability (B)	1	248.327	75.15*
A x B	1	17.682	5.35*
Error between	146	3.304	

^a4--"Indicate your percent certainty of your ability to perform
muscular endurance tasks."

* $p < .05$

Table 13

Analysis of Variance for Questionnaire Item 5^a-
Level of Efficacy for Experimental-Only Subjects

Source	<u>df</u>	<u>MS</u>	<u>F</u>
Model Gender (A)	1	4.267	2.74
Model Athletic Ability (B)	1	1.067	.69
A x B	1	.267	.17
Subject Athletic Ability (C)	1	135.000	86.80*
A x C	1	.267	.17
B x C	1	1.067	.69
A x B x C	1	.267	.17
Error between	112	1.555	
Pre/Post Efficacy (J)	1	.017	.04
A x J	1	.150	.32
B x J	1	.017	.04
A x B x J	1	.417	.89
C x J	1	.417	.89
A x C x J	1	.150	.32
B x C x J	1	.417	.89
A x B x C x J	1	.817	1.74
Error within	112	.470	

^a5--Pre-efficacy: "Rate how well you think your overall performance will be on this task."

Post-efficacy: "Rate how well you think your overall performance would be on this task in the future."

* $p < .05$

Table 14

Analysis of Variance for Questionnaire Item 5^a-
Strength of Efficacy for Experimental-Only Subjects

Source	<u>df</u>	<u>MS</u>	<u>F</u>
Model Gender (A)	1	13.067	2.16
Model Athletic Ability (B)	1	1.067	.18
A x B	1	1.667	.28
Subject Athletic Ability (C)	1	290.400	48.02*
A x C	1	.067	.01
B x C	1	1.667	.28
A x B x C	1	.067	.01
Error between	112	6.048	
Pre/Post Efficacy (J)	1	8.817	7.08*
A x J	1	3.750	3.01
B x J	1	2.817	2.26
A x B x J	1	2.017	1.62
C x J	1	.150	.12
A x C x J	1	7.350	5.90*
B x C x J	1	.817	.66
A x B x C x J	1	.817	.66
Error within	112	1.245	
Satterthwaite	156	3.646	

^a5--Pre-efficacy: "Indicate your present certainty of how well you think your overall performance will be on this task."

Post-efficacy: "Indicate your percent certainty of how well you think your overall performance would be on this task in the future."

*p < .05

Table 15

Analysis of Variance for Questionnaire Item 5^a-
Level of Efficacy for Experimental versus Control Subjects

Source	<u>df</u>	<u>MS</u>	<u>F</u>
Experimental/Control Groups (A)	1	.333	.20
Subject Athletic Ability (B)	1	128.053	77.23*
A x B	1	11.213	6.76*
Error between	146	1.658	
Pre/Post Efficacy (J)	1	.000	.00
A x J	1	.083	.16
B x J	1	.480	.94
A x B x J	1	.003	.01
Error within	146	.510	

^a5--Pre-efficacy: "Rate how well you think your overall performance will be on this task."

Post-efficacy: "Rate how well you think your overall performance would be on this task in the future."

* $p < .05$

Table 16

Analysis of Variance for Questionnaire Item 5^a-
Strength of Efficacy for Experimental versus Control Subjects

Source	<u>df</u>	<u>MS</u>	<u>F</u>
Experimental/Control Groups (A)	1	.213	.04
Subject Athletic Ability (B)	1	292.053	51.40*
A x B	1	15.413	2.71
Error between	146	5.682	
Pre/Post Efficacy (J)	1	9.720	7.25*
A x J	1	.163	.12
B x J	1	.013	.01
A x B x J	1	.403	.30
Error within	146	1.340	

^a5--Pre-efficacy: "Indicate your percent certainty of how well you think your overall performance will be on this task."

Post-efficacy: "Indicate your percent certainty of how well you think your overall performance would be on this task in the future."

* $p < .05$

Table 17

Analysis of Variance for Questionnaire Item Assessing
Strength of Efficacy for 15 Time Lengths^a of
Experimental-Only Subjects

Source	<u>df</u>	<u>MS</u>	<u>F</u>
Model Gender (A)	1	2065.067	2.07
Model Athletic Ability (B)	1	522.150	.53
A x B	1	8.817	.01
Subject Athletic Ability (C)	1	27392.070	27.52*
A x C	1	123.267	.12
B x C	1	40.017	.04
A x B x C	1	2076.817	2.09
Error between	112	995.459	
Pre/Post Efficacy (J)	1	2574.150	8.53*
A x J	1	390.150	1.29
B x J	1	693.600	2.30
A x B x J	1	141.067	.47
C x J	1	1066.817	3.54 [†]
A x C x J	1	104.017	.35
B x C x J	1	60.000	.20
A x B x C x J	1	201.667	.67
Error within	112	301.674	
Satterthwaite	174	648.567	

^aStrength of Efficacy for 15 Time Lengths--

Pre-efficacy: "Indicate your percent certainty of your ability to extend your leg, prior to performing the task for the 15 time lengths."

Post-efficacy: "Indicate your percent certainty of your ability to extend your leg again, in the future, on this task for the 15 time lengths."

* $p < .05$; [†] $p > .063$

Table 18

Analysis of Variance for Questionnaire Item Assessing
Strength of Efficacy for 15 Time Lengths^a of
Experimental versus Control Subjects

Source	<u>df</u>	<u>MS</u>	<u>F</u>
Experimental/Control Groups (A)	1	358.613	.36
Subject Athletic Ability (B)	1	24282.000	24.26*
A x B	1	3413.813	3.41 [†]
Error between	146	1001.044	
Pre/Post Efficacy (J)	1	1940.563	6.21*
A x J	1	642.403	2.06
B x J	1	1318.803	4.22*
A x B x J	1	.163	.00
Error within	146	312.387	
Satterthwaite	229	656.716	

^aStrength of Efficacy for 15 Time Lengths--

Pre-efficacy: "Indicate your percent certainty of your ability to extend your leg, prior to performing the task for the 15 time lengths."

Post-efficacy: "Indicate your percent certainty of your ability to extend your leg again, in the future, on this task."

* $p < .05$; [†] $p > .067$

Table 19

Analysis of Variance for Questionnaire Item Assessing
Model/Observer Perceived Similarity Rating^a
for Experimental-Only Subjects

Source	<u>df</u>	<u>MS</u>	<u>F</u>
Model Gender (A)	1	10.800	6.36*
Model Athletic Ability (B)	1	4.800	2.83
A x B	1	.133	.08
Subject Athletic Ability (C)	1	40.833	24.04*
A x C	1	.033	.02
B x C	1	45.633	26.86*
A x B x C	1	2.700	1.59
Error between	112	1.699	

^aModel/Observer Perceived Similarity Rating--
"Rate how similar you perceive yourself to be to the person who
demonstrated this task on the 7-point scale provided."

* $p < .05$

APPENDIX E

RAW DATA

APPENDIX E

RAW DATA

<u>Card 1</u>		
<u>Columns</u>	<u>Item</u>	<u>Value Labels</u>
1-3	Subject number	
4	Blank	
5	Model gender	1 = male, 2 = female, 3 = no model
6	Model athletic experience	1 = athletic, 2 = nonathletic 3 = no model
7	Subject athletic experience	1 = athletic, 2 = nonathletic
8	Blank	
9-10	Subject age	
11	Blank	
12-13	Subject major	01 = English 02 = Psychology 03 = Communications 04 = Physical Education/Recreation/Coaching 05 = Health 06 = Math 07 = Zoology 08 = Engineering 09 = Business/Marketing/Accounting 10 = Criminal Justice 11 = No preference 12 = Computer Science 13 = Pre-Med./Vet., Medical Technology 14 = Hotel and Restaurant Management 15 = Nursing 16 = Social Work 17 = Nutrition/Dietetics

<u>Columns</u>	<u>Item</u>	<u>Value Labels</u>
12-13 cont'd		18 = Counseling 19 = Speech and Audiology 20 = Advertising/Graphics 21 = Political Science 22 = Geology 23 = Social Science 24 = Special Education/Elementary Education 25 = Biology/Biochemistry/Microbiology 26 = Packaging/Materials and Logistics 27 = Travel Agent/Tourism 28 = Theatre 29 = Animal Science 30 = Pre-Law/Business Law 31 = Labor Relations/Public Affairs Management 32 = Geography 33 = Physiology
14	Blank	
15	Subject year in school	1 = freshman, 2 = sophomore, 3 = junior, 4 = senior, 5 = graduate student, 6 = other
16	Blank	
17	Subject verbalization	1 = yes, 2 = no
18	Subject nonverbal behavior	1 = yes, 2 = no
19-20	Blank	
21-23	Trial 1; time in seconds	
24	Blank	
25-27	Trial 2; time in seconds	
28	Blank	
29-31	Trial 3; time in seconds	

<u>Columns</u>	<u>Item</u>	<u>Value Labels</u>
32	Blank	
33-38	Average time for three trials; time in seconds	
39-40	Blank	
41	Rate your general athletic ability	1 to 7; with 1 representing poor and 7 representing good
42-43	Indicate your percent certainty of your ability to perform general athletic tasks	00 to 10; with 00 representing very uncertain and 10 representing very certain
44	Blank	
45	Rate your ability to perform muscular endurance tasks	1 to 7; with 1 representing poor and 7 representing good
46-47	Indicate your percent certainty of your ability to perform muscular endurance tasks	00 to 10; with 00 representing very uncertain and 10 representing very certain
48	Blank	
49	Rate how well you think your overall performance will be on this task	1 to 7; with 1 representing poor and 7 representing good
50-51	Indicate your percent certainty of your overall ability to perform this task	00 to 10; with 00 representing very uncertain and 10 representing very certain
52	Blank	
53-54	Level of efficacy	01 to 15; total number of pre-experimental, time increment check marks
55	Blank	

<u>Columns</u>	<u>Item</u>	<u>Value Labels</u>
56-58	Strength of efficacy	000 to 150; sum of the first digits (first two digits for 100% column) of pre-experimental percent certainty check marks
59	Blank	
60	Rate how well you think your overall performance would be on this task in the future	1 to 7; with 1 representing poor and 7 representing good
61-62	Indicate your percent certainty of your overall ability to perform this task in the future	00 to 10; with 00 representing very uncertain and 10 representing very certain
63	Blank	
64-65	Level of efficacy	01 to 15; total number of post-experimental, time increment check marks
66	Blank	
67-69	Strength of efficacy	000 to 150; sum of the first digits (first two digits for 100% column) of post-experimental percent certainty check marks
70	Blank	
71-72	Percent certainty of your <u>ability</u> influencing your performance	00 to 10; with 00 representing very uncertain and 10 representing very certain
73-74	Percent certainty of <u>luck</u> influencing your performance	00 to 10; with 00 representing very uncertain and 10 representing very certain
75-76	Percent certainty of <u>task difficulty</u> influencing your performance	00 to 10; with 00 representing very uncertain and 10 representing very certain

<u>Columns</u>	<u>Item</u>	<u>Value Labels</u>
77-78	Percent certainty of your <u>effort</u> influencing your performance	00 to 10; with 00 representing very uncertain and 10 representing very certain
79	Blank	
80	Do you think males or females would perform best on this task	1 = males; 2 = females; (3 = both)

Card 2

1-3	Subject number	
4	Blank	
5	Model gender	1 = male, 2 = female, 3 = no model
6	Model athletic experience	1 = athletic, 2 = nonathletic 3 = no model
7	Subject athletic experience	1 = athletic, 2 = nonathletic
8	Blank	
	What is your past competitive sports experience:	
9	Youth sports team	1 = yes, 2 = no
10	Junior high school team	1 = yes, 2 = no
11	High school athletic team	1 = yes, 2 = no
12	College athletic team	1 = yes, 2 = no
13	Outside league(s)	1 = yes, 2 = no
14	College intramurals	1 = yes, 2 = no
15	None	1 = yes, 2 = no
16	Blank	

<u>Columns</u>	<u>Item</u>	<u>Value Labels</u>
17	Do you engage in any non-organized sports on a <u>regular</u> basis	1 = yes, 2 = no
18	Blank	
19	Do you have any leg injury that could affect your performance on this task	1 = yes, 2 = no
20	Blank	
21	Rate how similar you perceive yourself to be to the person who demonstrated this task	1 to 7; with 1 representing very dissimilar and 7 representing very similar
22	Blank	
23-24	<u>Why</u> did you select the <u>similarity</u> rating you indicated	01 = gender 02 = athletic background, experience and physical activity level 03 = physical appearance 04 = leg shake 05 = student 06 = seriousness of performance 07 = age 08 = athletics/physical appearance/student/age/seriousness of performance 09 = gender/athletic experience 10 = gender/physical appearance 11 = physical appearance/athletic experience 12 = task 13 = task/athletic experience 14 = gender/athletic experience/physical appearance 15 = confidence, comfortable, relaxed attitudes 16 = lactic acid/athletic experience 17 = time 18 = leg shake/athletic experience 19 = task/leg shake 20 = time/leg shake

<u>Columns</u>	<u>Item</u>	<u>Value Labels</u>
23-24 cont'd		21 = gender/task/physical activity level 22 = everyone is different in abilities 23 = I don't know 24 = blank
25	Blank	
26	How do you think the model performed in comparison to your performance	1 = better, 2 = same, 3 = worse
27	Blank	
28	Do you think the model had an influence on your performance	1 = yes, 2 = no
29	Blank	
30	<u>Why</u> did the model influence your performance (if you selected "yes" for <u>influence</u> question)	(Blank if selected "no" for <u>influence</u> question) 1 = information about how to perform task 2 = motivation 3 = information about models condition and ability 4 = information about task difficulty 5 = motivation and information about task difficulty 6 = motivation and information about models condition and ability 7 = motivation and information about how to perform task 8 = basis for comparison
31	Blank	
32	Did you compete with the person who demonstrated this task? That is, did you try to do better than they did	1 = yes, 2 = no

<u>Columns</u>	<u>Item</u>	<u>Value Labels</u>
33	Blank	
34	team	(blank if no team) 1 = volleyball 2 = swimming/diving 3 = gymnastics 4 = basketball 5 = softball 6 = tennis 7 = rugby

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008 111 21 01 4 21 132 047 074 084333
008 111 1111122 2 1 02 2 2 1
016 111 21 07 4 21 127 109 102 112666
016 111 1111212 1 2 5 08 1 1 2 1 2
029 111 20 03 3 11 188 073 077 112666
038 111 1111 1 2 09 1 1 1 1 1
055 111 19 04 2 22 085 080 082 082333
055 111 1221222 1 2 3 10 1 2 2
055 111 1221222 1 2 3 04 1 2 1 4
069 111 2221222 1 2 094 068 053 071666
075 111 21 06 4 22 089 081 081 083666
075 111 111112 2 2 6 1 1 2 2 2
081 111 18 07 1 22 078 056 063 065666
081 111 111112 1 2 5 04 1 2 2 5
094 111 18 02 1 22 100 108 068 092000
094 111 111112 1 2 3 10 1 2 2 2
098 111 20 08 4 21 112 055 073 080000
098 111 111112 1 2 5 02 1 1 3 1 4
103 111 18 04 22 088 040 059 062333
103 111 111122 1 2 2 09 1 2 2 2
119 111 17 03 1 22 140 153 128 140333
119 111 211122 1 2 5 13 1 2 2 6
129 111 18 09 1 22 065 046 052 054666
129 111 111122 1 2 4 02 1 2 2 1
140 111 18 08 1 11 083 050 045 059333
140 111 121112 1 2 2 04 1 1 4 1 6
144 111 21 10 4 22 089 067 057 071000
144 111 111112 1 2 2 03 1 2 2 2 7
146 111 22 11 2 22 1 086 072 090333
146 111 221112 1 2 3 03 1 1 1 1 1
002 118 11 1 12 115 085 079 093000
002 112 2222221 2 2 144 087 061 098333
009 112 2222221 2 2 2 09 2 1 2 2
009 112 2222221 1 2 2 14 1 2 2 2
011 112 18 13 1 12 027 080 076 061000
011 112 2222221 2 2 2 09 2 1 2 2
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030 112 2222221 2 2 2 03 1 2 2 2
037 112 19 02 3 22 076 056 043 058333
037 112 2222221 2 2 1 02 1 2 2 1
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044 112 2222221 2 2 1 02 1 2 2 1
050 112 20 08 3 12 116 053 062 077000
050 112 1222221 1 2 4 03 1 1 2 1 1
063 112 22 03 4 22 098 063 059 073000
063 112 2122222 2 2 100 029 080 069666
066 112 2222221 2 2 1 09 1 2 2 2
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301 404 404 07 044 404 04 032 08000808 1
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304 304 304 04 010 304 04 007 04010506 2
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406 406 406 06 030 405 04 020 05000005 1
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608 608 506 07 051 606 07 058 08050908 3
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608 506 506 14 073 506 14 089 06000707 1
709 709 709 15 127 710 15 150 10000108 2
609 509 606 07 057 605 07 060 09000909 1
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048	212	222222	1	2	2	2	1	1	1	2	1								
061	212	22	01	4	12	049	031	033	037666	506	405	506	11	070	304	04	034	10000510	1
061	212	222222	1	2	2	2	02	1	2	2									
072	212	20	09	3	22	097	053	041	063666	609	608	508	15	106	408	07	050	10050409	1
072	212	212222	1	2	2	4	02	1	2	2									
085	212	21	09	4	22	083	114	069	088666	303	404	404	06	029	405	07	030	08000609	1
085	212	222222	1	2	2	2	02	1	1	2	2								
101	212	23	26	4	22	021	030	025	025333	303	305	405	03	024	404	03	024	05030606	2
101	212	222222	1	2	2	2	1	1	1	2	1								
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114	212	212222	1	2	2	3	17	1	1	2	2								
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116	212	222222	1	2	2	1	02	1	2	2									
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134	212	222222	1	2	2	2	1	1	1	2	2								
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062	221	221122	1	2	2	5	03	2	1	4	1	4							
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074	221	211112	1	2	2	5	04	3	2	2	5								
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091	221	221122	1	2	2	4	03	2	1	2	1	4							
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100	221	111112	1	2	2	4	03	2	1	6	1	5							
105	221	20	30	3	21	103	096	065	088000	709	507	506	06	046	408	05	042	08000810	3
105	221	111112	1	2	2	2	02	2	2	2	5								
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143	221	221212	1	2	2	1	02	3	2	1	2								
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145	221	111112	1	2	2	2	02	3	2	1	7								
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015	222	222222	1	2	2	6	04	1	1	2	1								
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021	222	222222	1	2	2	5	02	2	2	2	2								
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033	222	19	09	2	22	014	069	035	039333	507	404	405	15	105	404	09	059	06040706	1
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039	222	22	31	5	12	110	049	067	075333	304	303	405	12	057	405	07	042	07020809	1
039	222	222222	1	2	2	3	03	1	1	1	1								
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046	222	222222	1	2	2	4	1	2	2	2	2								
057	222	25	26	4	22	047	054	041	047333	303	202	303	09	057	303	07	034	03000304	1
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073	222	19	11	2	11	103	052	040	065000	404	609	608	15	138	404	07	053	10001010	1
073	222	222222	1	2	2	4	20	1	2	1	1								
082	222	21	31	4	22	097	045	028	056666	609	609	710	11	084	508	06	055	06000103	1
082	222	222222	1	2	2	4	02	2	2	2	2								
093	222	22	08	4	21	042	053	047	047333	404	303	303	06	035	405	04	030	08000907	1
093	222	122222	1	2	2	5	02	1	2	2	2								
107	222	22	02	4	22	118	064	048	076666	407	507	507	12	058	507	09	039	07020408	1
107	222	122222	1	2	2	4	2	1	6	1	1								
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113	222	212222	1	2	2	3	03	1	1	2	1								
125	222	24	25	4	22	077	052	054	061000	606	404	404	07	033	304	07	034	04000000	2
125	222	222222	1	2	2	3	1	2	2	2	2								
024	331	18	09	1	22	094	071	063	076000	709	607	709	09	076	405	04	034	07010709	1
024	331	211112	1	2	2	2													
031	331	18	13	1	22	042	042	062	048666	608	506	506	07	047	506	07	045	07040505	1

[illegible]

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