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COGNITIVE SOCIAL PRIMING ON SELF-SCHEMATA,
SELF-EFFICACY, MOOD STATES AND MOTOR PERFORMANCE

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THE EFFECTS OF POSITIVE AND NEGATIVE COGNITIVE SOCIAL PRIMING ON SELF-SCHEMATA, SELF-EFFICACY, MOOD STATES AND MOTOR PERFORMANCE

By

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ABSTRACT

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Several cognitive factors have been shown to influence the quality of motor performance. Despite theory suggesting that positive and negative cognitive social priming may impact motor behavior, there has been no attempt to hypothesize and test its direct or indirect role on motor performance. This study addressed these previously neglected areas in the motor performance literature. Specifically, it was predicted that: (a) a positive or negative self-schema would be differentially primed by an unobtrusive exposure to either a positive or negative social situation, (b) information upon which task-specific self-efficacy predictions are based would be selectively and differentially processed depending on the type of self-schema invoked through the priming process, and (c) due to a positive relationship between self-efficacy and performance, subjects in the negative priming condition would perform less well on a subsequent motor task than subjects assigned to the positive priming condition. In addition, it was predicted that exposure to the priming condition would differentially influence mood states which would, in turn, impact performance. Employing a randomized block design, 81 female volunteers with self-schemata that were positive (n = 27), negative (n = 27) or aschematic (n = 27) toward physical activity were unobtrusively exposed to a videotape depicting either a positive, negative or neutral social

interaction between a basketball coach and her team. Pre- and post-manipulation self-schemata, self-efficacy, mood state and performance measures were collected. Findings supported the contention that even brief and indirect exposures to seemingly irrelevant positive and negative social contexts are capable of exerting considerable influence on the activation of self-referent cognitions. Specifically, multivariate analyses revealed that although mood states were unaffected by the exposure to the prime, there was a significant priming effect on subjects' subsequent self-schemata ratings and self-efficacy expectations. Even more important was the unique finding that positive and negative priming can significantly influence the execution of a subsequent motor task. Path analyses, however, failed to support the predicted causal relationships among priming, self-schemata, self-efficacy, mood and performance. Applied and theoretical implications of these findings are discussed.

To Mom, Dad and Julie

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In the summer of 1976, Lawrence Messe did the impossible. He taught a math-anxious psychology undergraduate that statistics were not something to be dreaded but rather, a tool to better understand the world. As a member of my doctoral committee, Larry continued to broaden my awareness of methodological and statistical issues.

Galen Bodenhausen introduced me to many of the psychological concepts examined in this dissertation. In fact, the rudimentary work upon which this project is based was a proposal I wrote for Galen's cognitive social psychology class. It was only with his constant encouragement that I was able to develop this rather insignificant proposal into a full-fledged doctoral dissertation.

Although my initial contact with William Anderson was as his graduate assistant, he and his wife, Kim, quickly became two of my closest friends. It is not an exaggeration to say this project would

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Although the individuals I've mentioned thus far are "like" family to me, I'll only have one true family. My mother, father and sister (and her husband) have always provided me with unconditional love and support. This past year, more than ever, I've come to realize how lucky I am to have them. Unfortunately, my nature doesn't often allow me to express how important they are to me. I trust they know how much I appreciate them.

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CHAPTER I

INTRODUCTION

Nature of the Problem

A number of cognitive factors have been shown to influence the quality of motor performance. The sport psychology literature is replete with investigations examining the manner in which cognitive variables such as anxiety, attention, causal attributions, goal intentions, motivation, mood states and self-efficacy contribute to the acquisition and performance of motor skills. Despite the strong theoretical assumption that another cognitive factor -- positive and negative cognitive social priming -- may also exert a considerable influence on motor behavior, there has been no attempt to hypothesize and test its direct or indirect (via its impact on other cognitive mechanisms) role on motor performance.

Cognitive social priming. Although the extent to which cognitive social priming can influence the acquisition and performance of motor tasks has yet to be examined, the priming phenomenon has been the focus of extensive research within the broader confines of cognitive and social psychology. According to the definition set forth by Fiske and Taylor (1984), cognitive priming relates to "the effects of prior context on the interpretation and retrieval of information . . . priming is specifically the name for the fact that recently and frequently activated ideas come to mind more easily than ideas that have not been activated" [italics added] (p. 231). In a frequently cited investigation into the effects of cognitive social priming on impression formation, Higgins and his colleagues (Higgins, Rholes & Jones, 1977) found that interpretation and retrieval of information was even susceptible to priming by seemingly irrelevant prior contexts. In their study, subjects were unobtrusively exposed to a series of either "positive" or "negative" personality traits (e.g., adventurous versus reckless; self-confident versus conceited, etc.). Later, in a supposedly unrelated context, the subjects read ambiguous descriptions about an individual named Donald who engages in such behaviors as mountain climbing, skydiving and demolition derby driving. Despite the fact that ostensibly, the two contexts (exposure to the personality traits and reading the story about Donald) had nothing to do with one another, subjects who had earlier been "primed" through exposure to the positive traits evaluated Donald more favorably than subjects "primed" with negative traits.

A similar finding has recently been reported in a sport context. Wann and Branscombe (1990) found that, relative to subjects who had been primed by exposure to nonaggressive sports, subjects exposed to aggressive sports were more likely to rate an ambiguous person as hostile and as being an individual who enjoyed aggressive activities.

Fiske and Taylor (1984) offer the following explanation for these somewhat surprising results: "The priming effect suggests that, in the selection of a person schema to apply to the interpretation of new information, those recently activated are more accessible" (p. 175). Similarly, Wyer & Srull (1980, 1981, 1986; Srull & Wyer, 1979) account for the effects of priming by drawing an analogy to a "storage bin" in which those objects (in this case, a positive or negative schema) which are placed at the top of the heap (invoked most recently) become those most readily accessible. Simply put, as the need to process and interpret new information arises, we search our cognitive storage bin -- starting from the top -- for a framework or schema to serve as a perceptual filter of reality. Upon locating a plausible schema (usually one that has been recently and/or frequently invoked), the cognitive miser within us, in its pursuit for economy of mental functioning, curtails the further search for an alternative, and perhaps more appropriate schema.

Social schemata. The most influential models set forth to explain the mechanisms underlying the priming effect rely on the existence of abstract memory structures or social schemata. Social schemata assist the individual in classifying and categorizing new social information because every second of our waking lives we, as human beings, find ourselves bombarded by literally thousands of pieces of information pertaining to the social and nonsocial world around us. Although we are fortunate in that the vast majority of these stimuli can be safely ignored, there are always certain pieces of information impinging upon us requiring further cognitive processing. With so much information to process and such a limited mental capacity with which to perform this task, we are often forced into the role of "cognitive misers" -- taking mental shortcuts that enable us to make instant judgments regarding the relevance or non-relevance of particular stimuli (Fiske & Taylor, 1984; Wyer & Srull, 1986). Although these cognitive shortcuts or heuristics are essential in dealing effectively and efficiently with vast amounts of information, they carry with them the heavy price tag of being inherently prone to processing errors and biases. One form of mental shortcut receiving considerable attention in the cognitive social psychology literature involves the development and use of "social schemata." In the broadest of possible terms, social schemata may be defined as cognitive structures which serve as abstracted or generalized knowledge structures regarding specific social events or entities. Emphasizing the economic necessity of employing such schemata, Fiske and Taylor (1984) see them as "organized generic prior knowledge [which] enables us to function in a social world that otherwise would be of paralyzing complexity" (p. 149). Because these abstractions are used to keep us informed as to "the way things are" in the social world, they tend to selectively guide (and in some cases -- misguide) our perceptions, memories and inferences regarding incoming social stimuli. In the words of Markus and Smith (1981) "Schemata are the basis of the selectivity that is operative in information processing" (p. 240). Neisser (1976) even more succinctly summarizes the role of schemata in information processing as follows: "Perceivers pick up only what they have schemas for and willy-nilly ignore the rest" (p. 80).

Self-Schemata. Although it is possible to identify several subcategories of social schemata on the basis of their content, such as those used to process and categorize information pertaining to (a) other individuals (person schemata); (b) appropriate norms and behaviors of broadly defined groups of individuals (role schemata); or (c) particular situations or events (event schemata), the primary concern at present is with the specific subset of social schemata that guide individuals in the way they perceive, remember and make inferences about themselves (self-schemata). A common theoretical assumption is that one tends to view the "self" in much the same way he or she views others (Kihlstrom & Cantor, 1984). This general position is expressed by Kihlstrom and Cantor as follows:

> The question naturally arises as to whether the mental representations [schemata] of oneself differ in some way from one's representations [schemata] of other people. From a structural point of view, we think the answer is clearly no: The self-concept is organized along the same lines as concepts representing others. (p.29)

This view that the formation of mental representations about the self are generally subject to the same principles associated with the formation of mental representations about other people led Higgins and his colleagues to hypothesize the following: "Given that category accessibility [priming] can affect how a person characterizes another person, it may also affect how a person characterizes his or her own behavior and internal processes" (Higgins, et al., 1977, p.152). Self-schemata, as is the case with social schemata as a whole, enable the individual to form an abstracted or generalized version of a social entity, which is then used as a perceptual filter through which incoming information is subsequently processed. One important aspect of self-schemata is that unlike other types of social and nonsocial schemata, self-schemata are used as perceptual filters for information concerned with the most important of social entities -- the "self." Several theorists, in fact, have gone so far as to define self-concept as nothing more than "a system of schemata" (Markus & Smith, 1981, p. 242) or "a complex, person-specific, central, attitudinal schema" (Greenwald & Patkanis, 1984, p. 130). Such views imply that several different self-schemata may be included within an individual's concept of his or her "self." For example, a particular individual may have a number of equally plausible self-schemata: "me as introvert," "me as musician," "me as athlete," "me as honors student," etc. The specific self-schema that becomes activated, and therefore used as a framework for the interpretation of subsequent stimuli, is simply a function of which schema is most salient at a particular time (Markus & Smith, 1981). Several factors such as motivations, relevancy, frequency of activation, or recency of activation may contribute to which, among the several possible self-schemata available, is most salient at a particular time (Fiske & Taylor, 1984; Higgins, Bargh & Lombardi, 1985). Closely related to this principle that self-schemata can be made more salient by frequent or recent activation is the notion that self-schemata may actually be susceptible to social "priming" (Higgins, et al., 1977; Higgins et al., 1985).

The self-schema — self-efficacy relationship. A major premise of schema theory holds that self-schemata, by selectively encoding, storing and retrieving information, serve to guide individuals in the way they perceive, remember and make inferences about themselves. Simply put, "when people are asked to predict their own behavior, they usually make predictions consistent with their self-schema" (Fiske & Taylor, 1984, p. 157). Accordingly, this should also include making predictions based on one's self-efficacy beliefs. Markus (1977), in her initial (and highly influential) investigation of the role self-schema play in information processing, found that "schematic" and "non-schematic" individuals differ significantly in the way they process information. Not only did she find self-schemata facilitate individuals' judgments and decisions about themselves, they further "provide a basis for the confident self-prediction of behavior on schema-related dimensions" [italics added] (p. 63).

In a similar investigation into the way in which behavioral self-predictions can be influenced by one's self-schemata, Kendzierski (1988) classified 66 college undergraduates as having either (a) a self-schema for exercising (exerciser schematics); (b) a self-schema for not exercising (nonexerciser schematics); or (c) a self-schema which favored neither exercising nor non-exercising (aschematics). Each subject rated 12 pairs of behavioral alternatives (one of which reflected a pro-exercise orientation, the other alternative did not) on a 100-point scale indicating the likelihood they would behave in the way described. Results indicated that exerciser schematics thought they would be more likely to choose the exercise-oriented alternative than did either aschematics or nonexerciser schematics. In addition, aschematics were more likely to predict they would choose the exercise-oriented alternative than the nonexerciser schematics. Thus, although the self-schema—self-efficacy relationship has not yet been directly tested, evidence exists that indicates these variables should be positively related.

<u>The self-efficacy — performance relationship</u>. The relationship between self-efficacy, which according to Bandura (1977) "is the conviction that one can successfully execute the behavior required to produce [an] outcome" (p. 193), and motor performance has become axiomatic. Not surprisingly, the intuitively appealing notion that task-specific confidence is positively correlated with performance has received overwhelming support from myriad empirical investigations (e.g., Bandura, 1982; Bandura, Adams & Beyer, 1977; Feltz, 1982; McAuley, 1985). Bandura's (1977) original model of the role self-efficacy plays in performance predicts that the relationship between

self-efficacy and performance is reciprocal in that efficacy is the mediator of performance which in turn influences future perceptions of task efficacy. Recently, a respecified model of self-efficacy has been proposed and supported by Feltz (1982, 1988a; Feltz & Albrecht, 1986; Feltz & Mugno, 1983) in which both prior performance and self-efficacy act as mediators of subsequent performance.

The mood state — self-perception relationship. Observing that individuals clinically diagnosed as depressives tended to selectively focus on past and present negative information about themselves, Beck (1967, 1976) proposed that mood states may be associated with distortions in the processing of information about the self. In addition to providing support for the contention that mood states influence self-relevant information processing, Natale and Hantas (1982) demonstrated that even temporarily elevated or depressed mood states are capable of producing biased memory and information processing. It was found, for example, that having been induced with a "happy" mood state was "associated with decreased recall of negative events and an increased recall of positive events" (p. 927). In contrast, subjects within whom a "sad" mood was induced were found to have a "decreased recall of positive life experiences, weaker memory strength for positive information about oneself, and a bias to recall false negative self-descriptions" (p. 927).

Statement of the Problem

This study was undertaken to address previously neglected areas in the motor performance literature. Specifically, it was predicted that: (a) a positive or negative self-schema would be differentially primed as a result of exposure to either a positive or negative social situation, (b) information upon which task-specific self-efficacy predictions are based would be selectively and differentially processed depending on the type of self-schema that had been invoked through the priming process, and (c) due to a positive relationship between self-efficacy and performance, subjects in the negative priming condition would perform less well on a subsequent motor task than those subjects assigned to the positive priming condition. In addition, it was predicted that exposure to the priming condition would have a direct effect on mood state which would, in turn, impact on performance. Finally, on the basis of Markus' (1977; Markus & Sentis, 1982) findings that schematics and aschematics process information differently and possessing a self-schema for a particular behavioral domain makes an individual more resistant to counter-schematic information, it was hypothesized that there would be an interaction between priming condition (i.e., positive, negative) and physical ability self-schematicity (i.e., positive, negative, aschematic). Priming effects, therefore, should be exacerbated when the prime is schema-consistent.

Specifically, the following research hypotheses were set forth and experimentally tested using data collected via a completely randomized block design with replications.

(1) A negative or "failure-oriented" self-schema will be primed (made most salient and accessible) in subjects who are unobtrusively exposed to a coach punishing (verbally criticizing) her players during a halftime talk. Conversely, a positive or "success-oriented" self-schema will be primed (made most salient and accessible) in subjects who are

unobtrusively exposed to a coach encouraging (verbally praising) her players during a halftime talk.

(2) Information upon which task-specific self-efficacy predictions are made will be selectively and differentially processed depending on the type of self-schema (positive or negative) that has been invoked through the priming process. Specifically, subjects within whom a negative self-schema has been invoked will tend to process subsequent ambiguous information related to a task in a manner consistent with a negative or "failure-oriented" self-schema. In contrast, subjects approaching the task with a positive self-schema will tend to process ambiguity associated with the task in a manner consistent with a positive, "success-oriented" self-schema. Because of these unconscious information processing biases, subjects who overhear athletes being criticized will report lower task-specific self-efficacy expectations for an ambiguous motor task than will those subjects who are made to overhear the coach praising her athletes.

(3) Subjects exposed to the positive prime will exhibit significantly lower Total Mood Disturbance (TMD) scores on the Profile of Mood States (POMS; McNair, Lorr & Droppleman, 1971) than subjects exposed to the negative coach videotape. Furthermore, mood disturbance scores will be negatively associated with overall motor performance. As TMD increases, performance will decrease.

(4) Due to a positive relationship between self-efficacy and performance, subjects in the failure-related (criticizing coach) condition will perform less well on a subsequent motor task than will subjects assigned to the success-related (praising coach) condition.

(5) There will be a significant interaction between priming condition and physical ability self-schematicity. Specifically, priming will be exacerbated when it is schema-consistent (i.e., positive schematics will be influenced most by exposure to a positive social prime; negative schematics will be influenced most by exposure to a negative social prime; aschematics will be influenced by both positive and negative social priming).

<u>Delimitations</u>

Subjects in this study were limited to college-age females enrolled in undergraduate psychology courses at Michigan State University. All subjects voluntarily participated in the study in return for course credit. Generalizability of the results obtained in the study are, therefore, limited to the specific tasks and subject population employed.

<u>Basic Assumptions</u>

In addition to having minimal visual and auditory abilities needed to attend to the experimental manipulation, subjects were assumed to possess motivation levels necessary for the accurate completion of all written questionnaires and motor performances. It was also assumed that a 5-minute exposure to the manipulation was of adequate duration and intensity to equally prime negative, positive and neutral self-schemata in each subject. Furthermore, the golf putting task was assumed to be an adequate indication of motor performance.

Limitations

This study was limited by the inability to make the experimenter unaware of the manipulation to which each subject had been exposed. Although extreme care was taken to treat each subject equally, the lack of a "double-blind" makes it impossible to rule out the unlikely event that some subjects were inadvertently provided subtle positive or negative cues during their interaction with the experimenter.

CHAPTER II

REVIEW OF THE LITERATURE

The present chapter reviews relevant literature pertaining to selected cognitive factors that may, either individually or in an integrated fashion, influence motor performance. Specifically examined are the areas of (a) cognitive social priming, (b) self-schemata, (c) self-efficacy, and (d) mood states. In addition, it presents a synthesis of previous research into the interrelationships among these variables and the influences they exert on performance.

Cognitive Priming in Social Perception

Although the extent to which cognitive social priming can influence the acquisition and performance of motor tasks has yet to be examined, the priming phenomenon has been the focus of extensive research within the broader confines of cognitive and social psychology. A review of these studies is provided as a foundation from which a cognitive social priming research paradigm can be extended into the realm of motor behavior.

Historical overview. Gardner (1985) has described cognitive science as having both "a very long past and a relatively short history" (p. 9). This statement is equally descriptive of research involving the priming of social cognitions. Social priming's "very long past" is readily apparent by the voluminous priming literature that has been amassed by cognitive psychologists during several decades of research into the effects an initial stimulus (prime) can exert on the response to a second (target) stimulus (Simon, 1988). Also contributing to the "long past" of priming in social cognition are the myriad investigations into the effects of prior social context on subsequently encountered social information. Despite the tradition of scientific involvement in both cognitive priming and the effects of prior social contexts on social information processing, only recently has the priming metaphor found its way into the social psychological literature. One indication of just how recently the term "priming" achieved legitimacy is the fact that it failed to meet established criteria for inclusion as a psychological index term until the 5th Edition of the Thesaurus of Psychological Index Terms published in 1988 (American Psychological Association, 1988).[1] A second indication that the use of the priming metaphor within a social context is still in its infancy is the fact that virtually all of the "classic" social cognition priming research conducted in the late 1970's and early 1980's (e.g., Bargh & Pietromonaco, 1982; Higgins & King, 1981; Higgins, et al., 1977; Srull & Wyer, 1979, 1980) was published with titles and abstracts that were devoid of any reference to priming. Much of this early research into the social effects of priming, therefore, is found under the more conceptually descriptive and still active (e.g., Smith, 1988; Smith & Branscombe, 1987) rubric of category accessibility.

A number of early investigations demonstrated it was possible to influence the manner in which social information is perceived, remembered and used in inference making simply by altering the context prior to stimulus presentation. Schachter and Singer, (1962) for example, injected subjects with epinephrine (adrenaline), a hormone known to stimulate the sympathetic nervous system thereby producing a general feeling of physiological arousal. In one experimental condition subjects were informed that the drug may produce an emotional state characterized by increased heartbeat, flushing of the face, sweating, etc. In the other condition, subjects were not told of the physiological effects of the drug. All subjects were then exposed to a social context in which a confederate began acting in an agitated and hostile manner. Subjects who were aware of the drug's effects did not follow the lead of the confederate but those who could make no attribution to the injection tended to act in a manner similar to that exhibited by the confederate. In another study designed to examine the effects of prior context on information processing, Kelley (1950) found that students who were told ahead of time that their new instructor was a "warm" person subsequently rated the instructor more favorably than students to whom the instructor had been described as "cold." Although the results of this study are often cited as evidence of the influence a prior context (the experimenter's labeling of the instructor) can have on the storage and retrieval of social information, Higgins, et al. (1977) offer an alternative explanation for Kelley's findings. They suggest that because the students were aware of the experimenter's personal opinion of the instructor (as being either a "warm" or "cold" person) their public ratings may not have been an accurate reflection of their private judgments or recollections, but rather, the students' conscious or unconscious efforts to provide ratings conforming to the experimenter's judgments.

Priming of social judgments. Drawing on the previous writings of Bartlett (1932) and Bruner (1957; 1958) suggesting that the perception process involves a linkage between a stimulus and an existing cognitive category, Higgins, et al. (1977) designed a study to test the two equally plausible alternative interpretations (prior context effects versus experimenter demand effects) of Kelley's (1950) findings. In doing so, Higgins and his colleagues developed a paradigm now considered basic to social priming research. Basically, the paradigm involves presenting subjects with a word or series of words (primes) that are related to the trait of interest. Shortly thereafter, and in an ostensibly separate study, the subjects read an ambiguous description of a target person and are asked to form an impression of this person. Priming is said to occur to the extent that the impressions are differentially influenced by exposure to the prime(s). In the Higgins et al. study the investigators unobtrusively (thereby controlling for experimenter demand effects) exposed subjects to a series of "positive" or "negative" personality traits that could be used to describe the same objective behavior (i.e., adventurous versus reckless; self-confident versus conceited; independent versus aloof; persistent versus stubborn). Later, in a supposedly unrelated "reading comprehension" study, the subjects read ambiguous descriptions about an individual named Donald who engages in such behaviors as mountain climbing, skydiving and demolition derby driving. Despite the fact that ostensibly, the two contexts (exposure to the positive or negative personality traits and reading the story about Donald) had nothing to do with one another, subjects who had earlier been "primed" through exposure to positive traits that were applicable to the ambiguous behaviors (i.e., adventurous, self-confident, independent, persistent) evaluated Donald more favorably than subjects "primed" with applicable negative traits (i.e., reckless, conceited, aloof, stubborn). The effect was not, however, solely a function of the positive and negative valence of the personality traits. Subjects exposed to equally positive or negative personality traits that were not directly applicable to making judgments regarding Donald's behavior (e.g., obedient, neat, disrespectful, clumsy, etc.) failed to demonstrate the priming effects. Not only do these findings suggest that exposure to a seemingly unrelated prior context is capable of exerting a powerful influence on the way new social information is encoded, and subsequently used to make judgments about others, they also support the hypothesis that the selection of a memory category to be used in the processing of ambiguous information can be made more readily accessible by recent activation (priming).

This preliminary finding that social judgments can be manipulated simply by exposure to seemingly irrelevant prior contexts spawned such a flurry of research activity that priming is now "proven one of the most-studied topics in social cognition" (Smith & Branscombe, 1987; p. 490). A host of conceptual replications and extensions of the Higgins et al. (1977) study followed in an attempt to elucidate the nature of the priming effect. Early investigations by Srull and Wyer (1979, 1980) contributed to the priming literature in several ways. First, by assuming that cognitive categories were generalized knowledge structures (schemata) that contained both trait concepts and behaviors, they posited that categories could be made more accessible not only by priming trait terms that presumably represented the category (Higgins et al., 1977) but also by exposing subjects to primes that exemplified those traits. To test this hypothesis Srull and Wyer (1979) had subjects create meaningful sentences from sets of words. Each four-word set was constructed so that only two possible complete sentences could be formed, both describing a behavior either related or unrelated to the trait of interest. In Experiment 1, all word sets formed sentences that were examples of either hostility (e.g., "leg break arm his") or nondescript "filler" items (e.g., "her found know I"). An additional experiment (Srull & Wyer, 1979; Experiment 2) was also conducted in which the hostile primes were replaced by exemplars of "kindness" (e.g., "the hug boy help"). A second extension of the Higgins et al. study was achieved by manipulating the absolute and relative amount of priming subjects received. Subjects were assigned to one of four conditions that exposed them to either 60 sentences (20% or 80% trait related) or 30 sentences (20% or 80% trait related). Finally, Srull and Wyer manipulated the delay between the presentation of the priming task and the target stimulus. Subjects were asked either (a) immediately, (b) after a 1 hour delay; or (c) after a 24 hour delay, to read a vignette about a stimulus person's (Donald's) afternoon activities. As in the Higgins et al. study, the behaviors depicted in the vignette were ambiguous in regard to the trait of interest (hostility or kindness). When taken as a whole, the results of this study revealed that (a) behavioral exemplars, as well as trait adjectives that are represented within a schema, have the ability to increase category accessibility; (b) category accessibility becomes more pronounced as the absolute and relative number of behavioral primes increase; and (c) although category accessibility decreases with the passage of time, the effects are still detectable as much as 24 hours after priming.

Theoretical models of the priming effect. In addition to the previously mentioned empirical investigations of cognitive priming on social categorization, several theories have been proposed in an attempt to explain the cognitive mechanisms involved in the priming effect. Wyer and Srull (1980, 1981, 1986; Srull & Wyer, 1979), for example, have developed an elaborate theory of human cognition in social contexts that, among other things, accounts for the effects of priming. Although the entire theory, in its most recent conceptualization (Wyer & Srull, 1986), sets forth 23 underlying postulates, Table 1 presents four postulates regarding information storage and retrieval that are particularly relevant to understanding the cognitive mechanisms underlying the priming effect.

The referent bins to which Wyer and Srull (1986) refer in Postulate B-7 can be thought of as an encyclopedia containing representations of "stored knowledge about one's physical and social world" (p. 329). Of particular relevance to the processing of social information are those bins that contain stored knowledge related to persons, groups and events. These referent bins of abstracted social representations of stored knowledge are analogous in many ways to what other theorists have called "social schemata" (Fiske & Taylor 1984). Postulate B-7 simply states that each of these bins has an identifiable "header" that consists of the bin name and a set of salient features associated with the contents of the bin. Searches of social information are conducted by identifying (by means of the header) and searching relevant bins. Upon locating an appropriate referent bin, its contents are searched "from the top down" (Postulate C-9). Once information from a particular bin is selected for use in processing, the original information maintains its position in the bin while an exact copy of the information is sent to the "work space" for use. When the

Table 1.

Postulates Related to the Storage, Search and Retrieval Processes Underlying the Priming Effect (Wyer & Srull, 1986; p. 336).

<u>Postulate B-7</u>: The header of a referent bin consists of (a) a name that specifies the referent and (b) a set of features that are strongly associated with it.

<u>Postulate C-1 (Heuristic Postulate)</u>: No more information is retrieved for use in attaining a processing objective than is sufficient to allow the object to be attained. When this minimal amount has been retrieved, the search terminates.

<u>Postulate C-9 (Recency Postulate)</u>: When the contents of a bin are searched for the purpose of attaining a processing objective, the search proceeds from the top down. A particular unit of information is identified as potentially relevant if its features include the probe cues governing the search. The probability of retrieving a unit of information from a bin, given that units stored on top of it have not been used, is a constant.

<u>Postulate C-10 (Copy Postulate)</u>: When a unit of information in a bin is identified as relevant for attaining a processing objective, a copy of this information is transmitted to the Work Space. Thus, the original position of the information in the bin is preserved. However, when processing objectives are complete, a copy of the retrieved unit of information is returned to the top of the bin from which it was drawn.

job for which it was copied is complete, the copy is returned to the top of the referent bin from which it was drawn (Postulate C-10). Because a copy of all accessed information is returned to the top of the bin, information that has been most recently activated is stored near the top of the bin and is most likely to be encountered early during the next "top down" search of the bin (Postulate C-9). In addition, because the original information retains its initial position in the bin and identical copies of the information are returned to the bin after each use, a more frequently activated category will have more copies available for retrieval when a particular referent bin is searched. Finally, all search and retrieval processes are guided by heuristics (Postulate C-1). This simply means that an exhaustive search of the bin will not be undertaken and the search will be terminated as soon as enough information is gathered to perform the required task.

Simply put, Wyer and Srull (1986) account for the effects of priming (i.e., recently and frequently activated categories are more likely to be used to process subsequently presented information) by drawing an analogy to a "storage bin" in which those objects (e.g., a positive or negative trait category) placed at the top of the heap (invoked most recently) become those most readily accessible. As the need to process and interpret new information arises, we search a relevant cognitive storage bin -- starting from the top -- for a framework to serve as a perceptual filter of reality. Upon locating a plausible framework (usually one that has been recently and/or frequently invoked), the cognitive miser within us, in its pursuit for economy of mental functioning, curtails the further search for alternative, and perhaps more appropriate information.

Although Wyer and Srull's (1981, 1986) mechanistic metaphor is widely cited in the literature (Fiske & Taylor, 1984; Ratcliff & McKoon, 1988; Wyer & Gordon, 1984), it is not the only explanation that has been offered for the cognitive mechanisms underlying the priming effect (Ratcliff & McKoon, 1988). Energy transmission models such as those proposed by Higgins, et al. (1985) suggest that: (a) priming serves to increase a construct's excitation level, (b) this excitation level must attain a certain minimum threshold in order to process information, (c) the more frequently a construct is primed, the more likely it is to reach and maintain a useable threshold level of excitation, and (d) the excitation level of a construct will dissipate over time. Just as Wyer and Srull use the storage bin analogy to illustrate their model, Higgins, et al. use "battery" and "synapse" models to depict two energy transmission interpretations of priming effects. In the battery model, the cognitive mechanisms responsible for priming effects are thought to be analogous to an automobile battery. The more a battery is charged (i.e., the more a category is primed) the higher its level of energy (activation) and the more likely its subsequent use. When the battery (category) is not recharged (primed) for an extended period of time, its level of energy (level of activation) dissipates until it is no longer viable when called upon to start the engine (process incoming information). In contrast, the synapse model of energy transmission uses the propagation of neural energy in vertebrates (see Guyton, 1981) to illustrate the priming effect. The first principle of neural transmission is that activation of a particular cell is an "all or none" (binary) proposition. Receptor sites on the cell (category) are stimulated by neural transmitters (primes) to a certain minimum threshold point. Stimulation (priming) beyond the threshold level has no effect on the activation of the cell. The cell (category) either "fires" (becomes activated) or it does not. Once an action potential (activation of a category) is achieved, it slowly dissipates over time. The only advantage of hyperstimulation is to slow the rate at which this dissipation occurs.

Based on assumptions inherent in the three theoretical models (i.e., storage bin, battery and synapse), Higgins, et al. (1985) formulated predictions regarding the relative importance of recency and frequency of priming and the decay of the priming effect over time. They posited, for example, that the storage bin theory predicts a recently primed construct would predominate over constructs that were more frequently activated regardless of the length of delay between the prime and the stimulus presentation. Conversely, the battery model, which is based solely on level of activation, would generally favor the more frequently primed construct unless it had last been primed so long ago that its activation level decayed to a point below that of a more recently, but less frequently, primed construct. In any event, the battery model suggests that whichever construct possessed a higher level of activation (and was predominant) after a short delay period should also have a higher level of activation (and therefore be predominant) after a long delay between the prime and stimulus presentation. Finally, according to the authors, only the synapse model predicts a reversal between a more recently and a more frequently primed construct as a function of delay between final priming and stimulus presentation. Because recently and frequently primed constructs have a maximum action potential, they both begin to dissipate immediately after their final prime, thereby giving the more recently primed construct the advantage after a short prime-to-stimulus delay. The more frequently activated construct, however, is hypothesized to dissipate at a slower rate, thereby giving it the advantage after a longer delay period. Despite the Higgins, et al. (1985) conclusion that their data were most consistent with predictions based on assumptions set forth in the synapse model of priming effect, Wyer and Srull (1986) contend their storage bin model could also "account for this finding if the probability of retrieving a particular concept from the attribute bin is fairly low" (p. 335).

Despite their obvious differences, all three models (i.e., storage bin, battery cell, and synapse) resemble one another to the extent they each assume memory structures containing abstract representations of constructs (e.g., schemata) are in some way altered by exposure to a prior context. The need to assume the existence of such abstract constructs was brought into question, however, when Smith (1988) demonstrated that a computer simulation and an "exemplar-only memory model" was capable of reproducing several of the major features of social priming effects. Specifically, without imposing the existence of abstract cognitive constructs, Smith was able to reproduce previous findings that (a) category accessibility effects are influenced by the number of primes presented (Srull & Wyer, 1979); (b) behavioral primes have longer lasting effects when compared to trait-related word primes (Smith & Branscombe, 1987; Srull & Wyer, 1979); and (c) more recently presented primes exert a greater influence when there is a short delay between the prime and the stimulus, whereas more frequently presented primes have a greater effect when there is an extended prime-to-stimulus interval (Higgins et al., 1985). Although Smith's data imply that "category accessibility effects can no longer be taken as evidence for the use of abstract schemas or constructs in social perception" (p. 460), it is equally important to note that these data do not preclude the existence and use of such structures in the processing of social information.

Further delineations of the priming effect. A number of investigations have identified conditions under which the previously described effects of social priming are mediated. Herr (1986; Herr, Sherman & Fazio, 1983) and Martin (1986), for example, have conducted a series of investigations indicating the priming effect on social categorization may not be as straightforward as originally thought. Their research has demonstrated that under certain conditions, it is possible to predict that priming a trait category will result in judgments that are completely the reverse of those hypothesized by the priming effect. That is, rather than obtaining judgments skewed in the direction of the primed category (assimilation effects) certain characteristics of the prime, relative to the primed concept, result in judgments away from the prime (contrast effects).

Like many findings in the area of cognitive priming, contrast effects were first reported in a non-social context. Kubovy (1977), for example, had subjects generate random digits after he varied the explicitness with which a particular digit was mentioned in the instructions. In the control condition, subjects were simply asked to "report the first digit that comes to mind." In two experimental variations of this condition, Kubovy altered the instructions by either subtly or blatantly priming the subjects with the digit 1 (one). In the subtle priming condition, subjects were instructed to "report the first one digit that comes to mind" (italics added). In the second, and more blatant, priming condition subjects were told to "report the first digit that comes to mind, like one" (italics added). Results indicated subjects in the control condition, who had received no priming at all, randomly chose the digit 1 about 2.2% of the time. As expected, responses from subjects exposed to the subtle prime were consistent with the traditional (assimilation) effects of priming. Approximately 18% of the subtly primed subjects "freely" chose the digit 1. In contrast, only 5.5% of the subjects exposed to the more blatant prime selected the digit 1. This curvilinear nature of the priming effect seemed to indicate that extreme priming of a construct could result in at least a reduced, if not totally reversed, priming effect.

Herr, et al. (1983) likewise examined the effects of moderate and extreme priming on non-social categorization. In their study, subjects were primed with exemplars of (a) extremely small, (b) moderately small, (c) moderately large or (d) extremely large animals. The effects exposures to these exemplars had on the size estimate of an unreal, and therefore ambiguous animal, demonstrated that priming is capable of producing both assimilation (judgments in the direction of the prime) and contrast (judgments away from the prime) effects. Specifically, subjects exposed to extreme exemplars (either very small or very large animals) exhibited contrast effects. For example, when primed with extremely small animals, subjects' estimates regarding the size of an unreal animal were larger than those given by subjects exposed to primes of either moderately small or moderately large animals (contrast effects). On the other hand, subjects primed with moderate exemplars (moderately small or moderately large animals) tended to judge the size of an unreal animal to be closer to that of the primed category of animals (assimilation effects).

In a study designed to extend these assimilation and contrast findings to social categorization, Herr (1986) unobtrusively exposed subjects to exemplars of famous personalities who were categorized as being either (a) extremely nonhostile, (b) moderately nonhostile, (c) moderately hostile, or (d) extremely hostile. Subjects' subsequent judgments of an ambiguously described individual supported the assimilation hypothesis that exposure to moderately hostile (e.g., Bobby Knight, Menachem Begin, etc.) or moderately nonhostile (e.g., Daniel Boone, Billie Jean King, etc.) primes would produce categorization judgments in the direction of that category. Conversely, priming with extreme hostile categories (e.g., Adolph Hitler, Charles Manson, etc.) resulted in lower hostility ratings of the ambiguous person than exposures to exemplars of either moderate category. Similar contrast effects were also observed in those subjects exposed to extremely nonhostile primes (e.g., Santa Claus, Shirley Temple, etc.).

Martin (1986) has proposed and tested a theoretical model accounting for the seemingly contradictory assimilation and contrast effects of priming. According to Martin, factors other than the similarity or difference between the target and the priming context may be brought to bear when individuals use or disuse a prime. Simply put, assimilation or contrast will occur depending on whether or not the individual is prompted to use contextually activated (primed) concepts when making impression formations. If an applicable concept, once it is primed, remains active beyond the original priming episode, it results in assimilation judgments toward the prime. Conversely, concepts that remain isolated to the priming episode are thought to activate distinct, alternative concepts which are, in turn, used to process and interpret information. In either case, exposure to the prime has caused the effect since it has elicited true changes in the way the subsequent information is interpreted. As Martin explains, "impressions may be a function not only of the concepts that are accessible to individuals but also of what individuals do with those concepts" (p. 503).

In keeping with Martin's (1986) context x person interactionist perspective (cf. Endler, 1973; 1975; Silva & Weinberg, 1984) of priming effects, several other investigations have examined individual-specific factors that may influence category accessibility. Higgins, King and Mavin (1982), for example, hypothesized that subjects would be more inclined to use personally accessible constructs (as opposed to personally inaccessible constructs) when forming a social impression. To test their hypothesis, Higgins and his colleagues (Study 1) had subjects write down a maximum of 10 characteristics or traits found in (a) themselves, (b) two male friends and (c) two female friends. A trait was considered accessible to a particular subject if it was used to describe either himself/herself and one of the friends, or at least three of the friends. Traits not meeting the criteria were considered inaccessible to the subject. Two weeks later, when subjects returned to participate in what was ostensibly an unrelated "person perception" study, they read an ambiguous behavioral description of a person containing references to both accessible and inaccessible traits. After a 10-minute delay, subjects were asked to reproduce the behavioral description word-for-word and write, as completely as possible, their general impression of the person described in the essay. Results indicated that when forming an impression or reproducing the description, subjects were far less likely to omit references to traits that were personally accessible to them than traits to which they were inaccessible.

In a related study, Higgins, et al. (1982; Study 2) exposed subjects to individually tailored descriptions containing six accessible and six inaccessible behavioral descriptions. Subjects were then "yoked" to one another in order to assure that a trait that was accessible to one subject was inaccessible to another. In addition to replicating their previous findings (Study 1), results of this second study revealed that accessibility to various trait constructs is quite idiosyncratic as demonstrated by only a 10% overlap between subjects in terms of their accessible constructs. The authors interpreted these findings in the following manner: "If two perceivers have nonoverlapping accessible traits, their impressions and recollections of the same target person may have little in common . . . and there appears to be, in fact, relatively little overlap in people's accessible traits" (p. 44).

Still another counter-intuitive, yet consistent, finding concerns the degree to which subjects are aware of the prime. Not only are reliable priming effects evident even when subjects are unable to recall the prime (Bargh & Pietromonaco, 1982), there is considerable evidence that suggests the effects are actually enhanced by the subliminal presentation of the primes (Bargh, 1982; Lombardi, Higgins

& Bargh, 1987). Specifically, Lombardi and her colleagues found that individuals who had the poorest recall of the prime tended to exhibit the largest priming effects.

Cognitive Schemata

Notwithstanding Smith's (1988) findings that priming effects need not assume the presence of abstract knowledge structures, the most influential models set forth in an effort to explain the mechanisms underlying the priming effect (i.e., Wyer & Srull's (1981; 1986) storage bin model and Higgins, et al.'s (1985) energy transmission models) rely on the existence of these abstract memory structures. In each model, cognitive schemata (or closely related concepts) are activated by the priming event, thereby making them more accessible -- and more likely to be employed -- when encountering and processing information in the future. Because schemata are generally viewed as the cognitive mechanisms activated by the prime, it is necessary to understand the historical development and ongoing research into these underlying hypothetical constructs.

Historical overview of schema theory. Although it is generally acknowledged that the neurologist H. Head (1918; 1926) is responsible for formulating the initial schema hypothesis, it is Bartlett's (1932) elaboration and extension that has inspired most modern schema theories (Brewer & Nakamura, 1984). According to Bartlett, schemata are unconscious, organized, abstracted knowledge structures involved in actively encoding, storing and retrieving information. Despite schema theory's eventual impact on cognitive psychology and its early acceptance in England, Bartlett's contributions went virtually unnoticed for nearly half a century. In large part, this lack of recognition was due to the fact that Bartlett's theory had its origins in the Continental philosophical tradition (e.g., Immanuel Kant, etc.) which assumes the existence of unconscious, complex mental structures of knowledge.[2] Unlike Bartlett's homeland of England, where the Continental philosophy exerted considerable influence on the development of psychological theory, mainstream American psychology was, at the time, totally committed to the theoretical descendants of the British Empiricists (e.g., George Berkeley, Thomas Hobbs, David Hume, John Locke, James Mill, John Stuart Mill, etc.). The atomistic, mechanistic, associationistic and passive views of learning and memory such as those espoused by popular stimulus-response theorists (e.g., Ivan Pavlov, John B. Watson, E. L. Thorndike and B. F. Skinner, etc.) left little room for the serious consideration of vague and "soft-headed" theories dealing with the complex, unconscious, organized, abstracted knowledge structures Bartlett proposed. In fact, the neo-Empiricist tradition so dominated American psychological thought for the first 70 years of the twentieth century that by the time of his death in 1969, even Bartlett's disciples (e.g., Broadbent, 1970; Oldfied, 1972; Zangwill, 1972, etc.) had resolved that schema theory had died with him (Brewer & Nakamura, 1984).

Two necessary antecedents for the resurrection of schema theory occurred during the 1960s and 70s. First, and foremost, there was a major paradigm shift "away from stimulus-response units to describe perception and action toward a recognition that human beings bring meaning and organization into almost every new encounter" (Singer & Salovey, 1991; pp. 33-34). Specifically, psychologists who were originally attracted to the tough-mindedness of the British Empiricist position, were finally, as Brewer and Nakamura (1984) put it, "dragged 'kicking and screaming' by the brute facts of nature to the Continental position" (p. 129). Second, it became easier to understand (and explain via analogies) the basic properties of schemata when technological advances allowed for the building of computer systems that "employed schema-like entities [computer programs] as a fundamental part of their operations" (Rumelhart, 1984; p. 162). Finally, by 1975, the philosophical and technological conditions existed which were compatible with the rebirth of the schema construct. In that year, papers employing variations of the schema theory were published in such diverse content areas as artificial intelligence (Minsky, 1975), cognitive psychology (Rumelhart, 1975) and motor performance (Schmidt, 1975). In addition, a number of schema-related concepts gained popularity at this time. Examples of these "schema-compatible concepts" (Taylor & Crocker, 1981) include "frames" (Minsky, 1975), "prototypes" (Cantor & Mischel, 1977), and "scripts" (Abelson, 1975).

Schema theory. Despite lacking a fixed definition for the term "schema," theories employing the schema concept have been "used to guide or explain a considerable portion of current research in human memory" (Alba & Hasher, 1983; p. 203). These theories generally assume that knowledge, whether it pertains to an inanimate object (e.g., chair, desk, lamp, etc.), an event (e.g., washing clothes, driving a car, etc.), a social situation (e.g., a cocktail party; a college classroom, etc.) or a social entity (e.g, Richard Nixon, my friend David, me, etc.), is abstracted and organized into modular structures of related information called schemata. Once they are constructed on the basis of prior experience, these organized knowledge structures serve as idiosyncratic cognitive frameworks by which sensory input is actively interpreted to form a meaningful reality.

The way in which these knowledge structures are capable of abstracting previous experiences, interpreting incoming information and initiating novel responses can be illustrated by examining Schmidt's (1975) motor schema theory. Schmidt's theory attempts to explain -- using the schema concept -- how individuals learn and control new motor skills. According to the theory, any time a motor skill of any type is performed, four specific types of information are abstracted from the movement experience: (a) initial conditions -- environmental and body conditions at the time the movement was initiated, (b) response specifications -- the task demands in terms of speed, force, etc., (c) sensory consequences -- sensory input from a variety of sources, both during and after the movement, and (d) response outcome -- basically, knowledge of results. This abstracted information is called upon whenever the individual is faced with performing a novel motor skill. For example, when throwing a javelin for the first time, a performer may demonstrate surprising ability by drawing on previously abstracted movement experiences stored in memory. Despite having no direct experience throwing a javelin, he or she has a general motor schema for the required "overhand throw." Key elements involving the initial conditions, task specifications, sensations and response outcomes of previous (similar) motor experiences such as hitting an overhead tennis serve or throwing a baseball, softball or football have all been stored in memory and serve as a guide when performing the novel motor task.

Schemata, according to Singer and Salovey (1991) "allow the perceiver to identify stimuli quickly, cluster them into manageable units, fill in missing information, and select a strategy for obtaining further information in order to solve a problem or reach a goal" (p. 35). The essential role schema play in the processing of new information is evidenced by the fact they have been described as no less than "the basis of the selectivity that is operative in information processing" (Markus & Smith, 1981; p. 240) and "the fundamental elements upon which all information processing depends" (Rumelhart, 1984; p. 162).

Rumelhart (1984) offers several analogies in an attempt to describe the nature and operation of schemata. His first analogy is that of a theatrical play where schemata function as "scripts" containing prototypes of characters, roles, motives, actions, and interactions. These event or situation schemata serve as a general framework that enables us to quickly assemble otherwise fragmentary and uninterpretable stimuli into a coherent and meaningful perception of reality. Although the details of this script can change considerably, the general nature of the "performance" is identified as being the same. An example of an event schema (script) we all have is "buying a car." A great deal of variation can take place regarding the specifics of this schema. The variables in our script can take on many (but not all) values. The schema provides information about the event by setting legitimate value ranges within which this event must take place. For example, the buyer or seller of the car may be a man or woman, young or old, large or small, fat or thin, intelligent or stupid but not a grizzly bear. The car may be old or new, large or small, expensive or inexpensive but not made of soap. The transaction may take place publicly at an automobile showroom, in a restaurant, or in a private home but probably not in the midst of a funeral procession. This framework is effective in giving us a quick, usable notion of what the event "buying a car" usually entails.

A second analogy proposes that an individual's schemata, when taken as a whole, function much like a personal theory of reality. Schemata, like all useful scientific theories, are constantly being evaluated on the basis of their ability to adequately represent, and thereby explain, the real world. When a particular schema (theory) is activated in an attempt to explain incoming information (data), something analogous to a "goodness-of-fit test" is calculated to determine the degree to which the schemata (theory) assists in the comprehension (explanation) of the information (data). If the information (data) generally "fits," the schema (hypothesis) is accepted. To the extent that the activated schemata (theory) fails to account for all the information (data), it can either be modified or totally rejected in favor of a better, more explanatory model of reality.

Another analogy is drawn to computer program procedures. First, just as computers are capable of discerning the degree of fit between a given observation and a previously assigned value, schemata allow us to classify information based on the degree to which it matches a previously specified prototype. Second, computers often employ a number of "sub-routines" to perform a complex task. Similarly, complex schematic representations -- such as those that define the recognition of a human face -- often exist at the top of a procedural hierarchy of sub-schemata (e.g., human eye, human mouth, etc.) that examine and determine whether there is an acceptable degree of fit between the observation and previously formed schemata. The sub-schema for a human eye, may in turn, have several sub-schemata of its own which look for acceptable variations in number (two, not seven), color (blue, brown, etc., but not orange), shape (oval, not square), size (not six inches in diameter) and spatial relationships (on the front upper third of the face, not on the sides of the head). Similar to the operation of a computer program's sub-routines, these individual judgments are sent back to higher level schemata which determines whether the total observation is within the "acceptable limits" imposed by the schema.

These analogies tend to emphasize the common belief that schemata generally process information in a theory-driven or "top-down" fashion (e.g., Bransford & Johnson, 1972; Singer & Salovey, 1991). Top-down processing basically assumes that incoming sensory data are assimilated into an existing knowledge structure. Singer and Salovey offer the following clever illustration of how an activated (instantiated) schema can drive the interpretation of ambiguous data:

> Suppose one of us shows you a photograph of a man, standing in his shorts, holding a glass filled with a yellowish liquid. If we then tell you that this is a photograph of someone standing by the pool on a hot day, instantiating your schema about poolside behavior, you will conclude that the yellow liquid is lemonade and the shorts are really a bathing suit. On the other hand, suppose we tell you this is a photo of a man with a bladder infection at a

> recent visit to the urologist. You now conclude that he is really wearing boxer shorts. And what do you now think the glass of yellow liquid is? (p. 37).

Rumelhart (1984), however, also stresses the less conventional view that schemata are equally capable of processing information in a "bottom-up" data- or event-driven manner. By analyzing the interpretations people make after being presented with fragmentary information, Rumelhart (1981) uses the following example to illustrate how comprehension is the result of both data-driven theory construction and conceptually-driven theory testing:

> Business had been slow since the oil crisis. Nobody seemed to want anything really elegant anymore. Suddenly the door opened and a well dressed man entered the showroom floor. John put on his friendliest and most sincere expression and walked toward the man (p. 171).

Although very little factual information is provided in the preceding paragraph, most people conclude that John is a automobile salesman specializing in the sale of large, American-made, luxury automobiles. The well dressed man is a potential customer, the entire scene is taking place in an automobile showroom and John is approaching the man with the hope of selling him a new car. Rumelhart (1981) summarizes the way this fragmentary information is generally interpreted as follows: A plausible schema doesn't simply "suggest itself," but instead, is a direct function of an initial observation. A "business" schema is therefore activated by reading the first sentence. The exact nature of the business is, at this point, still unknown but it must be related, in some way, to the oil industry. Once this bottom-up activation of the business schema has taken place, the schema would, in the traditional top-down fashion, generate a list of plausible businesses by conducting a goodness-of-fit test on this oil-related criterion. Automobile-related businesses are prime candidates. This business schema also tends to activate a "buy" and/or "sell" schema that places automobile and gasoline sales at the top of the list. The introduction of the second sentence effectively eliminates the gasoline hypothesis leaving only the automobile sales schema in tact. The remaining sentences are examined for the degree to which they support or fail to support the automobile sales hypothesis. Because each subsequent sentence supports and reinforces the validity of this hypothesis, it is eventually accepted.

In summary, Rumelhart (1984; Rumelhart & Ortony, 1977) suggests that in addition to their ability to engage in both top-down and bottom-up information processing, schemata have six general characteristics. Specifically, schemata: (a) have variables; (b) can embed, one within another; (c) represent knowledge at all levels of abstraction; (d) represent knowledge rather than definitions; (e) are active processes; and (f) are recognition devices whose processing is aimed at the evaluation of the goodness-of-fit to the data being processed (Rumelhart, 1984; p. 169).

Self-Schemata. Many different types of cognitive schemata are required to process the vast amount of social and non-social information human beings encounter. Taylor and Crocker (1981) have identified several subcategories of social schemata on the basis of their content, such as those used to process and categorize information pertaining to (a) people (person schemata); (b) appropriate norms and behaviors of broadly defined groups of individuals (role schemata); or (c) social situations or events (event schemata). In addition, much of the information humans need to process is information used to perceive, remember and make inferences about themselves (self-schemata). Although theorists have conceptually and operationally defined these unique instances of person schemata in a variety of ways, an examination of Table 2 reveals that self-schemata are typically viewed as organized general knowledge structures containing information about the self. As is the case with social schemata as a whole, self-schemata enable the individual to form an abstracted or generalized version of a social entity, which is then used as a perceptual filter through which incoming information is subsequently processed. One important aspect of self-schemata that makes them unlike other types of social and nonsocial schemata, however, is the fact that self-schemata are the perceptual filters for information concerning the most important of social entities -- the "self." Some theorists, in fact, have gone so far as to define self-concept as nothing more than "a system of self-schemata" (Markus & Smith, 1981, p. 242; Markus & Sentis, 1982, p.45) or "a complex, person-specific, central, attitudinal schema" (Greenwald & Patkanis, 1984, p. 130). Such views imply that several different self-schemata may be included within an individual's concept of his or her "self." For example, a number of equally plausible self-schemata: "introvert," "musician," "athlete," "honors student," etc. may all coexist as part of a particular individual's view of himself or herself. The specific self-schema that becomes activated, and therefore used as a framework for the interpretation of subsequent stimuli, is simply a function of whichever schema is most

Table 2.

Conceptual Definitions of Self-Schema.

Author	Conceptual Definition
Markus (1977)	Cognitive generalizations about the self, derived from past expectancies, that organize and guide the processing of self-related information contained in an individual's social experience.
Markus & Smith (1981)	Same as Markus (1977), noting also that self-schemas provide an anchor or frame of reference for judgments and evaluations of others.
Derry & Kuiper (1981)	A hierarchically organized body of knowledge stored in long-term memory, a list of general and specific terms characteristic of the individual that have been derived from a lifetime of experience with personal data.
Cantor, Mischel & Schwartz (1982)	A set of beliefs about the self through which interpretations of other people's behaviors and social interactions are filtered.
Fiske & Taylor (1984)	General information about one's own psychology makes up a complex, easily accessible verbal self-concept that guides information processing about the self.
Klein & Kihlstrom (1986)	Superior recall for adjectives when a self-relevant information-processing set is adopted.

Adapted from Singer & Salovey (1991).

salient at that particular time (Markus & Smith, 1981). Several factors such as motivations, relevancy, frequency of activation, or recency of activation may contribute to which, among the several possible self-schemata available, is most salient at a particular time (Fiske & Taylor, 1984; Higgins, et al., 1985).

Self-schemata were initially viewed as theoretical constructs or epiphenomena which were used primarily as post hoc explanations of observed behavior. Markus (1977), however, expanded this rather limited application by specifying and empirically testing hypothesized functions of self-schema. Markus posited that it is possible to identify, via self-report measures, individuals who either possess (schematics) or do not possess (aschematics), a self-schema for a particular behavioral domain. Once identified, these individuals can be subjected to a variety of cognitive tasks related to the domain. Markus' underlying assumption is that observed differences in the way schematics and aschematics process domain-related information is attributable, in part, to the presence or absence of a self-schema (Markus & Sentis, 1982).

In what has since become a classic paradigm for examining the effects of self-schemata on information processing, Markus (1977; Study 1) had 101 female undergraduates rate themselves on semantic differential scales describing a variety of behavioral domains. In addition, subjects were asked to "rate the importance of each semantic dimension to their self-description" (p. 66). On the basis of these preliminary data, Markus was able to assign 16 subjects to each of three experimental groups: (a) <u>independent schematics</u> - subjects rating themselves as highly independent and perceiving the dependence/independence dimension as being important to their self-description; (b) <u>dependent schematics</u> - subjects rating themselves as highly dependent and perceiving the dependence/independence dimension as being important to their self-description; and (c) <u>aschematics</u> - subjects with self-ratings in the middle range of the dependence/independence dimension and importance ratings suggesting this dimension was not central to their self-description. Three to four weeks after the initial assessment, subjects were briefly exposed to words that were either independence-related, dependence-related or creativity-related (control). Subjects were instructed to indicate whether or not the word was descriptive of them by pushing either a "me" or a "not me" button. Not only was there the expected difference between the groups in the absolute number of "me" and "not me" self-classifications (i.e., independent schematics indicating "me" to more independence-related words and dependent schematics indicating "me" to more dependence-related words) but response latencies indicated that subjects responded faster to words that were consistent with their self-schema. Specifically, independent schematics responded faster to independence-related words; dependent schematics responded faster to dependence-related words and aschematics responded with approximately equal speed to both independence- and dependence-related words. These findings suggest that having an existing schema on a particular behavioral domain enables the schematic to process schema-related information in a somewhat different (and faster) manner that non-schematics.

To test the hypothesis that possessing a self-schema on a behavioral dimension makes an individual resistant to counter-schematic information, Markus (1977; Study 2) arranged for the same subjects to return to the lab after a three week interval. In an ostensibly unrelated task, subjects completed a fictitious suggestibility measure and were given bogus feedback that was inconsistent with their previously identified self-schemata (i.e., independent schematics were told they were highly dependent and suggestible; dependent schematics were told they were highly independent and not at all suggestible; aschematics were randomly assigned to one of the two feedback groups). After receiving the schema-inconsistent feedback, all subjects again performed the "me"/"not me" latency response task described in Study 1. Results indicated that aschematics were more likely than either independent or dependent schematics to: (a) agree with the bogus feedback; (b) agree to take the test again; and (c) exhibit greater inconsistency in their "me"/"not me" responses. In her general discussion of these findings, Markus concluded that the results of these two studies "provide converging evidence for the concept of self-schemata, or cognitive generalizations about the self, which organize, summarize and explain behavior along a particular dimension." (p. 75)

In addition to replicating Markus' (1977) initial findings, Sentis and Markus (1979; cited in Markus & Sentis, 1982) tested the hypothesis that schematics differ from aschematics not only in the way they process stimuli, but also in the way they remember self-relevant information. After taking part in the "me/not me" judgment task used by Markus, subjects were exposed to a series of adjectives. Some of these adjectives had been part of the previous "me/not me" task and others had not. Subjects were asked to respond by pressing a button labeled "OLD" if the adjective had been used in the previous judgment task and a button labeled "NEW" if they did not remember being previously exposed to the adjective. As hypothesized, schematics showed superior recognition for schema-related information. Specifically, schematics responded faster and more accurately than aschematics when presented with schema-relevant adjectives.

A number of subsequent investigations have extended these findings by hypothesizing and empirically testing the information processing functions of self-schemata in a variety of behavioral domains. Similar schemata-related results have been demonstrated in the areas of creativity, extraversion, dominance, body weight, sex roles and social sensitivity (Markus & Sentis, 1982).

Although it is frequently implied that self-schemata can exert influences on behavior in the same way they have been shown to influence perception, inference and memory, few empirical investigations have examined the link between self-schema and behavior. One exception is a series of studies by Kendzierski (1988; 1990) which focuses on behavior by individuals classified as having either (a) a self-schema for exercising (exerciser schematics); (b) a self-schema for not exercising (nonexerciser schematics); or (c) a self-schema which favored neither exercising nor non-exercising (aschematics). Each subject rated 12 pairs of behavioral alternatives (one of which reflected a pro-exercise orientation, the other alternative did not) on a 100-point scale indicating the likelihood they would behave in the way described. Results indicated that exerciser schematics thought they would be more likely to choose the exercise-oriented alternative than did either aschematics or nonexerciser schematics. In addition, aschematics were more likely to predict they would choose the exercise-oriented alternative than the nonexerciser schematics.

In summarizing the findings of these empirical investigations, Markus and Sentis (1982) state that individuals with self-schemata in particular domains generally: "(1) process domain-related information with relative ease and certainty; (2) are consistent in their responses; (3) have relatively better recognition and recall memory for information relevant to this domain; and (4) can predict future behavior in the domain" (p. 62).

Self-Efficacy

Contrary to the lack of research examining the relationship between the accessibility (priming) of various social schemata and motor performance, another cognitive factor -- self-efficacy -- has long been a major focus of research by sport psychologists. According to Feltz (1992) more than two dozen studies have been published on the topic of self-efficacy in sport and physical activity in the past 15 years. Not surprisingly, situation-specific self-confidence is, in fact, one of the most frequently cited psychological variables thought to affect motor performance (e.g., Feltz, 1988b; McAuley & Gill, 1983; Weinberg, Gould & Jackson, 1979). In sport contexts, coaches, athletes and fans often consider a performer's confidence level to be a major determinant of success and failure. Although, in its everyday use, the term "self-confidence" typically refers to one's perceived ability to accomplish a particular performance objective (e.g., pass a final math examination, perform a gymnastic routine, etc.), Bandura (1977) has suggested that the use of the term self-confidence be reserved to describe the global personality trait that depicts an individual's overall level of performance optimism. Perceived self-efficacy, on the other hand, has been defined by Bandura (1986) as:

> People's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances. It is concerned not with the skills one has but with judgments of what one can do with whatever skills one possesses [and as such becomes] a significant determinant of performance that operates partially independently of underlying skills." (p. 391)

Based on this definition, self-efficacy can be thought to be something akin to a task- and/or situation-specific form of confidence (Feltz, 1988b).

Research lends support to Bandura's (1977; 1986) claim that a global or general measure of self-confidence is not as useful as situation-specific self-efficacy judgments in predicting subsequent performance. McAuley and Gill (1983), for example, compared female collegiate gymnasts' confidence in their general physical ability and their situation-specific self-efficacy by correlating both measures with their subsequent performance during an intercollegiate competition. They found that although general physical ability confidence was not a significant predictor of skilled performance, the gymnasts' task-specific self-efficacy judgments were highly correlated with actual performance scores.

According to Bandura (1977, 1986) an individual's efficacy expectations are derived from four major sources of self-referent information. The first, and generally most powerful source of efficacy expectations result from the perception of <u>previous performance attainments</u>. Simply put, a personal history of perceived successes in similar situations or on similar tasks will tend to raise efficacy assessments while a personal history of perceived failures on these tasks will tend to lower efficacy appraisals. It should be noted that it is the subjective feeling of success or failure in related situations -- not objective success or failure itself -- that drives the formation of efficacy judgments. A second, and somewhat related source of information regarding an individual's capabilities is based on observing or visualizing the results of others' (individuals perceived to be similar in some way to the observer) attempts to perform the task in question. Such <u>vicarious experience</u> rarely provides the powerful and accurate self-referent information available via previous personal performance but in the absence of such first-hand experience, information derived from the knowledge of others' performances can be used to accurately infer self-efficacy judgments. <u>Verbal persuasion</u> or encouragement, a technique frequently employed by coaches and teachers, can provide a third major source of self-referent information on which self-efficacy appraisals are made. In general, self-efficacy expectations resulting from persuasive techniques are only effective to the extent that the performer is given what he or she perceives to be relevant and realistic information regarding his or her ability to perform a specific task. Finally, Bandura suggests that the <u>assessment of physiological states</u> can provide valuable information upon which to base individual efficacy expectations. For example, because excessive physiological arousal is frequently associated with -- and therefore useful in predicting -- a poor performance on skilled tasks, individuals can make capability judgments, in part, on the basis of their current physiological arousal level. Arousal is not, however, the only physiological state that can provide such cues to performance. Bandura notes that other physical states such as fatigue, windedness, aches, and pains can all provide valuable information regarding an individual's performance of a particular task.

Feltz (1992; 1988b), in her reviews of the self-efficacy literature pertaining to sport and physical activity, summarizes research examining each of the four major sources of information used in the formation of efficacy expectations (i.e., previous performance attainments, vicarious learning, persuasion and assessment of physiological states). In regard to prior performance accomplishments, she concluded that considerable empirical evidence exists supporting Bandura's (1977; 1986) contention that performance-based information is not only associated with subsequent self-efficacy judgments (e.g., Feltz, 1982; Feltz, Landers & Raeder, 1979; Hogan & Santomier, 1984; McAuley, 1985; Weinberg, et al., 1979) but exerts more influence on self-efficacy judgments than any of the other three sources of information (Desharnais, Bouillon & Godin, 1986; Feltz, et al., 1979; Feltz & Mugno, 1983; McAuley, 1985; Weinberg, Sinardi & Jackson, 1982). Similarly, empirical support was found for the notion that vicarious experiences can likewise (albeit at a somewhat weaker level) influence efficacy judgments. Performance-related information gleaned by (a) being exposed to the results of a model's attempt at the task (Corbin, Laurie, Gruger & Smiley, 1984; Gould & Weiss, 1981), (b) visually imaging the outcome of a performance (Feltz, Marcotullio & Fitzgerald, 1985), or (c) learning more about a competitor's ability (Weinberg, et al, 1979; Weinberg, Gould, Yukelson & Jackson, 1981; Weinberg, Yukelson & Jackson, 1980) have all been shown to impact on efficacy judgments.

Somewhat surprising, given the emphasis placed on the role of verbal exhortation and physiological awareness in sport and physical activity, is the relatively small number of studies examining the extent to which information from the two remaining sources -- verbal persuasion and assessment of physiological states -- is used in the formation of efficacy expectations. One indication of the dearth of research into verbal persuasion as a source of efficacy judgments in the motor performance area is that in her extensive reviews of the literature, Feltz (1992; 1986b) cites only four published self-efficacy studies falling under the rubric of persuasive techniques. In fact, even those investigations did not directly address what is commonly thought to be the classic case of verbal persuasion -- performance-related encouragement from others. Instead, persuasion in these studies has been broadly defined as positive <u>self</u>-talk (Weinberg, 1986; Wilkes & Summers, 1984) imagery (Feltz & Riessinger, 1990; Wilkes & Summers, 1984) and cognitive restructuring of task-related arousal (Yan Lan & Gill, 1984). Unfortunately, even these peripheral investigations provide little in the way of unequivocal results concerning the effects of persuasive techniques on self-efficacy judgments (Feltz, 1992).

It is Feltz's own line of research (Feltz, 1982; Feltz & Albrecht, 1986; Feltz & Mugno, 1983) examining self-efficacy judgments for a high-avoidance motor task (modified back diving) that has provided the most insight into the manner in which physiological states (i.e., arousal) affect efficacy expectations in a motor performance situation. Using path analytic techniques to test Bandura's (1977) hypothesis that a reciprocal relationship exists between physiological arousal and self-efficacy, Feltz (1982) found that the heart rate → self-efficacy paths "were not at all useful in determining efficacy expectations for diving performance" (p. 771). In addition, only the initial (prior to performance) self-efficacy → heart rate path was found to be significant. Surprisingly, however, the relationship was in the opposite direction (positive) of that predicted by Bandura. Although these findings were successfully replicated in two subsequent investigations (Feltz & Albrecht, 1986; Feltz & Mugno, 1983) both of these studies found evidence that it is the individual's <u>perceived</u> level of autonomic arousal that is more closely associated with efficacy expectations than actual physiological arousal (i.e., heart rate). The extent to which Bandura's more recent writings (Bandura, 1986) have taken these findings into account is evidenced by the fact that the source of efficacy expectations originally referred to as "emotional arousal" (Bandura, 1977) now emphasizes the "<u>cognitive processing</u> of emotional reactivity" (Bandura, 1986; p. 406, italics added).

Although considerable attention has been given to Bandura's (1977, 1986) four major sources of efficacy information, sometimes overlooked has been his qualification that none of these sources -- either individually or in combination -- is inherently capable of generating efficacy expectations. Rather, it is the cognitive processing of the information from each of these sources that conveys an efficacy expectation. As Bandura (1986) puts it:

> The cognitive processing of efficacy information involves two separable functions: The first concerns the types of information people attend to and use as indicators of personal efficacy. . . The second concerns the combination rules or heuristics they employ for weighting and integrating efficacy information from different sources in forming their self-efficacy judgments. (p. 401)

It is, therefore, Bandura's contention that efficacy expectations result from an individual <u>selectively</u> attending, weighting and integrating a portion of all available information relevant to the likelihood of her or his successful performance on a particular task. Furthermore, this emphasis on selective information processing implies that any factor capable of making either positive or negative self-referent cognitions more accessible and salient during information processing (e.g., cognitive priming of positive or negative self-schemata) may exert considerable influence on subsequent self-efficacy judgments (and thereby, indirectly affect performance).

<u>Mediating (and Mediated) Effects of Mood States</u>

A considerable amount of empirical evidence can be cited supporting the contention that mood states, under certain conditions, can influence -- or be influenced by -- self-schemata, self-efficacy and performance. Unfortunately, a perusal of this literature is somewhat disconcerting in that mood appears to have the potential to be both a cause and/or an effect for nearly any cognitive variable of interest.

The relationship between mood and self-schemata. As generalized knowledge structures containing information about the self, self-schemata have, as their basis, an individual's past experiences. The fact that naturally occurring and experimentally induced mood states can alter the relative accessibility of memory structures has been demonstrated in a number of studies (e.g., Bower, 1981; Clark & Teasdale, 1982; Clark & Teasdale, 1985; Forgas, Bower & Krantz, 1984; Isen, Shalker, Clark & Karp, 1978; Natale & Hantas, 1982; Teasdale & Fogarty, 1979).

In one study examining the effect mood has on recall of past events, Isen, et al. (1978; Study 1) induced a good mood by having a confederate give people at a shopping mall a small gift (a notepad or a nail clipper). In an ostensibly unrelated event, another confederate later approached the individual and asked him or her to complete a "consumer survey." Subjects randomly assigned to the experimental condition (those receiving the free gift) gave higher ratings of the performance and service records of products they owned than subjects in the control (no gift) condition.

In another investigation of mood effects on memory, Bower (1981) had subjects record, in detail, all positive and negative emotional events that happened to them over the course of a week. In addition to recording the time, place, participants and overall gist of the event, the subject rated each event on a 10-point scale from "pleasant" to "unpleasant." At the end of the week, the subjects were induced into either a happy or sad mood via hypnotic suggestion and were asked to recall as many diary entries as possible. Subjects put into a pleasant mood were more likely to recall pleasant emotional experiences from the previous week whereas those in a negative mood recalled more negative emotional events. In addition, when asked to rate the current emotional intensity of each event, subjects in a good mood tended to rate the event as being even more pleasant than they had at the time it occurred. Conversely, subjects in a sad mood rated the emotional intensity of their recalled experiences to be even more unpleasant than they had originally indicated.

In summarizing the results of the myriad experimental investigations into the effects of mood on memory, Clark and Teasdale (1985) conclude:

> Memories of positive hedonic tone are more accessible in experimentally induced elated moods than in experimentally induced depressed mood. Conversely, memories of negative hedonic tone tend to be more accessible in induced depressed mood than in induced elated mood (p. 1595).

Similarly, after observing that individuals clinically diagnosed as depressives tended to selectively focus on past and present negative information about themselves, Beck (1967, 1976) proposed that naturally occurring mood states may be associated with distortions in the processing of information about the self. The depressed patient, according to Beck constructs a "cognitive triad" consisting of (a) a negative view of the world, (b) a negative self-concept, and (c) a negative appraisal of his or her future. Subsequent support for this contention has been provided by a number of investigations (e.g., Breslow, Kocsis & Belkin, 1981; Clark & Teasdale, 1982; Loyd & Lishman, 1975) which have found that "natural fluctuations in depressed mood within patients have effects on the accessibility of positive and negative information similar to those observed in studies of induced mood states" (Clark & Teasdale, 1985; p. 1595).

Given the extent of empirical and anecdotal evidence suggesting that the recall of positive or negative memories can be made more salient by mood, it is conceivable that mood-congruent generic knowledge structures based on past experiences (self-schemata) may be activated by the induction of a positive or negative mood.

The relationship between mood and self-efficacy. As a means of introducing their research examining the impact of happy and sad moods on efficacy judgments, Kavanagh and Bower (1985) succinctly frame the question of interest as follows: "Do people feel more competent when they are happy than when they are sad?" (p. 507). They then provide the reader with a preliminary answer based solely on intuition and experience: "Certainly when we consider our own experience, we would answer affirmatively. When we are sufficiently elated, we feel able to achieve our highest ambitions. On the other hand, when we are feeling low, failure seems inevitable" (p. 507). Although the notion that moods can directly impact on self-efficacy is intuitively appealing, the few empirical studies conducted in this area have produced equivocal results. An investigation by Wright and Mischel (1982), for example, supports the predicted relationship between mood and efficacy expectations. In the study, subjects were induced into positive, negative or neutral moods by having them recall highly positive, negative or neutral personal experiences. Once induced with the desired mood, the subjects were given bogus feedback related to their performance on a complex perceptual task. As hypothesized, high self-efficacy judgments were obtained when success feedback was given to subjects possessing a positive or neutral mood. In contrast, low self-efficacy judgments resulted when failure feedback was given to subjects in a negative or neutral mood. Even more interesting were the interactions obtained when the mood and feedback were incongruent. Subjects in positive moods receiving failure feedback, tended to overestimate their future performance while those in negative moods receiving success feedback underestimated the probability of future success.

Kavanagh and Bower (1985) similarly found support for the hypothesis of mood influences on self-efficacy. While in a hypnotic trance, all subjects were placed, at different times, into a happy, sad and neutral mood by having them recall happy, sad and neutral romantic experiences. Once in the desired mood, subjects responded to self-efficacy items on scales pertaining to (a) romantic situations, (b) social skills and assertiveness, and (c) academic, athletic and other physical activities. When the subjects were in negative moods, they produced the lowest efficacy ratings on all scales. On the other hand, the highest efficacy ratings for all scales were obtained when subjects were in a positive mood. Finally, as predicted, when in neutral moods, subjects scored between the two extremes on all three scales. Interestingly, recalling a happy, sad or neutral romantic experiences seemed to influence not only efficacy judgments in a closely related (romantic) context, but also generalized to efficacy judgments in less related areas of social, academic, athletic and general physical activity.

In contrast to investigations supporting the influence mood exerts on self-efficacy, Stanley and Maddux (1986; Experiment 2) not only failed to demonstrate that moods influence self-efficacy, but actually found evidence that this relationship was reversed -- self-efficacy has an effect on mood (Experiment 1). In order to examine self-efficacy effects on mood, Stanley and Maddux informed subjects they would be performing a social interaction task (meet another student, talk with him, make him feel comfortable, find a common interest and get him to like them). Prior to the task, however, subjects completed a questionnaire and were given bogus feedback regarding their social skills. The bogus feedback indicated the subject either possessed (a) below average (low self-efficacy expectancy) or (b) above average (high self-efficacy expectancy) social skills. Results of the study indicated that self-efficacy expectancy manipulation had a significant effect on subject mood state. Specifically, subjects in the low self-efficacy expectancy condition (those told they had below average social skills) reported having a more depressed mood than those in the high self-efficacy expectancy condition (those told they had above average social skills).

In the second part of their investigation (Stanley & Maddux, 1986; Experiment 2) the authors examined the effect mood has on self-efficacy. Using a mood induction procedure developed by Velten (1968), which involves reading 60 depression (e.g., "I want to go to sleep and never wake up") or 60 elation (e.g., "Things will be better and better today") self-referent mood statements, subjects were placed in either an elated or depressed mood state. Once this was accomplished, subjects completed self-efficacy judgments regarding the same social interaction task used in Experiment 1. In contrast to the findings of Wright and Mischel (1982) and Kavanagh and Bower (1985), the investigators reported that the Velten procedure of mood induction had no effect on subjects' self-efficacy expectancy ratings for the social interaction task or for social situations in general.

In another study that failed to clearly demonstrate the mediating effects of mood on self-efficacy (and the only study using a motor performance task), Kavanagh and Hausfeld (1986) manipulated subjects' mood by having them listen to happy, neutral (Experiment 1) and sad (Experiment 2) audiotapes. Once the desired mood had been attained, subjects rated their degree of confidence that they could (a) exert 18 different levels of force on a handgrip dynamometer (Experiment 1); and (b) do 18 levels of push-ups (Experiment 2). Although a manipulation check revealed that listening to the audiotapes significantly altered the subjects' mood, there was no difference in handgrip efficacy ratings in the three mood conditions. On the other hand, mood did have an effect on the subjects' push-up efficacy judgments (Experiment 2).

The results of the aforementioned investigations into the relationship between mood states and self-efficacy leaves many unanswered questions. Despite its intuitive appeal, the influences mood states have on self-efficacy has yet to be adequately demonstrated.

Priming of Self-Referent Cognitions

Priming of self-schemata. Although the priming of generalized abstracted knowledge structures (schemata) has a strong theoretical and empirical basis (Johnson & Dark, 1986), much of this research has focused on the accessibility of social categories not directly related to the "self." The intent of these studies has generally been to examine the role category accessibility plays in the processing of information relative to other social entities (Higgins, et al., 1977; Higgins, et al., 1982; Higgins, et al., 1985; Wyer & Srull, 1981; 1986). Somewhat more germane to the present investigation is research conducted by Baldwin and his colleagues (Baldwin, Carrell & Lopez, 1990; Baldwin & Holmes, 1987) examining the impact of priming cognitive representations of significant others on the experience of the self. In the Baldwin and Holmes study, for example, female subjects were primed with (presumably) permissive and non-permissive social attitudes by having them visualize the faces of either their parents (non-permissive) or two friends from school (permissive). Under the guise of a separate study, subjects were later asked to rate the enjoyableness of several written passages. The specific passage of interest contained a description of a sexual encounter which depicted a rather permissive attitude toward sexuality. Results supported the prediction that the visualization of the significant other (permissive vs. non-permissive) would serve to prime either a permissive or non-permissive social attitude and thus influence the relative enjoyment of the sexual passage. Specifically, subjects who had been primed by visualizing non-permissive significant others (i.e., parents) reported enjoying the sexually permissive passage less than their counterparts who had been primed by visualizing permissive significant others (peers).

In a similar investigation (Baldwin, et al., 1990; Study 1), graduate students evaluated their own research ideas after a 2 ms (subliminal) exposure to a slide depicting either a disapproving authority figure (department chair) or an approving non-authority figure (post-doctoral fellow). Results indicated that subjects evaluated their research ideas in a more positive manner after exposure to the approving prime relative to the disapproving stimulus. Extending this research, the authors (Baldwin, et al, 1990; Study 2) had Catholic women read a sexually permissive passage (Baldwin & Holmes, 1987) and then subliminally presented them with a slide depicting either a disapproving significant other (Pope John Paul II) or a disapproving non-significant other (the department chair from another institution). After the exposure to the prime, each subject completed a self-evaluation measure. Results of this study replicated the previous finding that subliminal exposure to a disapproving image of a significant other (Pope John Paul II) resulted in lower self-evaluations. Furthermore, no priming effect was observed when the disapproving image of a non-significant other was used as the prime.

Taken together, these studies demonstrate that positive and negative self-evaluations can be differentially primed by exposure to positive and negative prior social contexts. This effect, however, may be mediated by the degree to which the priming event is a relevant part of the subject's existing knowledge structures.

Priming of self-efficacy. The extent to which self-efficacy expectations can be directly altered by exposure to an unrelated context has not been investigated. If one assumes, however, that positive or negative self-schemata can be primed, it is possible to assess the indirect affect of priming on self-efficacy by examining the relationship between self-schemata and self-efficacy. Building on theoretical assumptions set forth by Kuiper, MacDonald and Derry (1983), Bruch and his colleagues (Bruch, Chesser & Meyer, 1989; Bruch, Meyer & Chesser, 1987) examined the role of evaluative self-schemata in the prediction and evaluation of behavioral events. In their first study (Bruch, et al., 1987) the investigators demonstrated that individuals with negative self-schemas were more inclined to engage in pessimistic self-talk during performance compared to those with positive views of themselves. Subsequently, the authors (Bruch, et al., 1989) extended these findings by setting forth and testing the following line of reasoning:

> Self-schema might function as the locus where experiential data are stored at an abstracted and generalized level and must therefore be considered as a major source for self-efficacy. It can be assumed that their impact is further strengthened by the self-schema inherent bias mechanism which can be expected to suppress available situational information. (p. 74)

In this study, subjects' evaluative self-schema was operationalized as the discrepancy between real (myself as I am) and ideal (myself as I would like to be) self. Specifically, subjects with a relatively high real self to ideal self ratio were classified as positive self-schematics; subjects with a relatively low real to ideal self ratio were classified as negative self-schematics. After introducing a moderate amount of stress into the situation by emphasizing the importance of a good performance on the upcoming tasks, subjects were asked to offer predictions as to how they would perform on the tasks. After making their efficacy judgments, subjects completed three cognitive performance tasks. The results, as predicted, revealed that negative self-schematics had significantly lower self-efficacy expectations relative to positive self-schematics. In addition, although not statistically significant, negative schematics exhibited somewhat lower performance scores than did the positive schematics on the cognitive performance tasks. The authors discuss the implications of their findings as follows:

> In reference to Bandura's (1977) suggestions for processing of self-efficacy, our findings seem to suggest that achievement of performance accomplishments does not necessarily lead to enhancement of self-perceived mastery for coping achievement. In other words, if cognitive processing in self-regulation is at fault, potentially strong sources for enhancement of self-efficacy might not be sufficient to strengthen such expectations accordingly. Thus, to facilitate adaptive self-regulation via self-efficacy it appears to be crucial to challenge biased interference as supported by a negative self-schema. (p. 82)

As discussed previously, Bandura's more recent writings (Bandura, 1986) have incorporated this position that none of four major sources of efficacy is inherently capable of generating efficacy expectations. Rather, it is the <u>cognitive processing of the information from each of these sources</u> that conveys an efficacy expectation. Therefore, efficacy expectations are the result of an individual selectively attending, weighting and integrating information relevant to the likelihood of successful performance on a particular task.

<u>Priming of mood states</u>. It is worth noting that a review of the literature relative to priming and mood states produces more studies using alterations in mood as the priming (manipulating) mechanism than the primed (manipulated) variable. In fact, in any particular study, it can be difficult to discern whether mood states are the priming or the primed cognitive factor. For example, in the mood

induction studies cited earlier in this chapter, moods can either be thought of as being "primed" by having the individual recalling positive or negative events (Kavanagh & Bower, 1985; Wright & Mischel, 1982), giving them a small gift (Isen, et al., 1978), and by providing them with bogus feedback (Stanley & Maddux, 1986); or as priming subsequent dependent measures (e.g., self-efficacy on a upcoming task or the satisfaction with consumer products). Riskind (1989) further elaborates on this point that moods can serve as priming variables by stating the following: "When individual schemas or categories are primed by a mood-induction, such priming would enhance retrieval of schema-congruent material. . . priming by a mood-producing event may increase the encoder's readiness to elaborate schema -- or category -- congruent material. (p. 175)

Some priming studies, however, have more explicitly defined mood as the dependent measure. Baldwin, et al. (1990; Study 2), for example, found that subliminal exposure to a photograph of a disapproving face was capable of producing a significantly negative affect. This result was only observed, however, when the face was that of a familiar and relevant authority figure.

In addition, in their study examining the priming of affective self-perceptions, Skelton and Strohmetz (1990) found that subjects reported experiencing more physical symptoms of illness after they had been exposed to a health-related priming task. Specifically, subjects in the priming condition engaged in a task that required them to indicate which of two words "is more health-related -- makes you think more about health and illness." Subjects primed in this manner reported having more total symptoms of gastrointestinal, cold and sinus, aches and pains, cardiovascular and pulmonary, and skin problems relative to subjects who had not taken part in the priming task.

Although these studies seem to suggest mood states can be altered by priming, studies by Hornstein and his colleagues have failed to demonstrate a priming effect on mood (e.g., Holloway, Tucker & Hornstein, 1977; Hornstein, LaKind, Frankel & Moore, 1975).

In summary, relatively few studies have been specifically designed to investigate priming effects on self-referent cognitions. Those studies that do exist -- and those conducted in closely related areas -- suggest that priming may be capable of having an affect on self-schema and self-efficacy. On the other hand, studies examining the effects of priming of mood states have generally produced equivocal results.

Cognitions and Motor Performance

A number of cognitive factors such as anxiety (e.g., Bird & Horn, 1990; Pragman, 1986), attentional focus (e.g., Albrecht & Feltz, 1987; Nideffer, 1976; Van Schoyck & Grasha, 1981) and goal intentions (e.g., Hall & Byrne, 1988; Locke, 1991; Smith & Lee, 1992) have been proposed to influence the quality of motor performance. Two additional cognitive variables that have received a great deal of attention in the sport psychology literature are self-efficacy and mood states.

The relationship between self-efficacy and motor performance. The intuitively appealing notion that task-specific confidence (self-efficacy) is positively correlated with performance has received overwhelming support from a number of empirical investigations. The robustness of the efficacy-performance relationship is evidenced by the variety of settings in which it has been reported. Positive relationships between self-efficacy expectations and performance have been reported in such diverse motor activities as diving (Feltz, 1982; Feltz, 1988a; Feltz & Albrecht, 1986; Feltz, et al., 1979; Feltz & Mugno, 1983), leg endurance (Gould & Weiss, 1981; Weinberg et al., 1979; 1980; 1981), gymnastics (Lee, 1982; McAuley, 1985; McAuley & Gill, 1983; Weinberg, et al., 1982) reaction time and motor coordination (Ryckman, Robbins, Thornton & Cantrell, 1982), marathon running (Gayton, Matthews & Burchstead, 1986), tennis (Barling & Abel, 1983), handgrip strength (Kavanagh & Hausfeld, 1986), and golf putting (Woolfolk, Murphy, Gottesfeld & Aitken, 1985). Although several hypotheses can be set forth to explain the positive relationship between self-efficacy expectations and performance, Bandura (1986) has offered the following: "Those who judge themselves inefficacious in coping with environmental demands dwell upon their personal deficiencies and cognize potential difficulties as more formidable than they really are. . . . Research shows that people who regard themselves as highly efficacious act, think, and feel differently from those who perceive themselves as inefficacious. (pp. 394-395)

The relationship between mood and motor performance. The correlation between mood states and motor performance has been investigated so frequently in the past two decades that LeUnes, Hayward & Daiss (1989) were able to publish an annotated bibliography limited to only those studies examining the use of a single mood assessment instrument -- the Profile of Mood States (POMS; McNair, et al., 1971) -- in sport-related contexts. They reported that between 1975 and 1988, the POMS was cited in 56 sport-related papers, covering 19 different sport areas. During that 13-year period, articles were published examining POMS scores of athletes participating in such diverse sports as distance running (Tharion, Strowman & Rauch, 1988), track and field (Thaxton, 1982) exercise and fitness (Bahrke, Thompson & Thomas, 1986) football (Daus, Wilson & Freeman, 1986), swimming and diving (Berger & Owen, 1988; Morgan, Brown, Raglin, O'Conner & Ellickson, 1987), wrestling (Nagle, Morgan, Hellickson, Serfass & Alexander, 1975), body building (Freedson, Mihevic, Loucks & Girandola, 1983; Fuchs & Zaichkowsky, 1983), cycling (Hagberg, Mullin, Bahrke & Limburg, 1979; Johnson, et al., 1985), wheelchair athletics (Henschen, Horvat & French, 1984), basketball (Craighead, Privette, Vallianos & Byrkit, 1986), gymnastics (Edwards & Huston, 1984), karate (McGowan & Jordon, 1988), netball (Miller & Miller, 1985), rowing (Morgan & Johnson, 1978), rodeo participation (Meyers, Sterling & LeUnes, 1988), soccer (Robinson & Howe, 1987) speed skating (Gutman, Pollock, Foster & Schmidt, 1984), and volleyball (Wilson, Ainsworth & Bird, 1985).

The popular and scientific writings of Morgan and his colleagues (e.g., Farrell, Gates, Maksud & Morgan, 1982; Morgan, 1980a; 1980b; Morgan, et al., 1987; Morgan & Horstman, 1978; Morgan & Johnson, 1978; Morgan, O'Connor, Ellickson & Bradley, 1988; Morgan & Pollock, 1977; Nagle, et al., 1975) have done much to enhance the understanding of mood affects and motor performance. Perhaps Morgan's most important contribution has been to identify, describe and popularize the characteristics of a POMS profile frequently shown to be associated with superior motor performance -- the so-called "iceberg profile" (Morgan, 1980a; 1980b). As Morgan (1980b) describes it, the iceberg profile exists when "athletes score below the 50th T-Score on tension, depression, fatigue, and confusion, and above the 50th T-Score on vigor in comparison with published norms" (p. 63). A visual presentation of the iceberg profile is depicted in Figure 1 which plots actual POMS data collected from elite runners, wrestlers and oarsmen (Morgan & Pollock, 1977). Similar profiles have been shown by other investigators to be associated with successful body builders (Freedson, et al., 1983; Fuchs & Zaichkowsky, 1983), cyclists, (Hagberg, et al., 1979; Johnson, et al., 1985), football players (Nation & LeUnes, 1981), swimmers (Riddick, 1984), weightlifters (Mahoney, 1989) and wheelchair athletes (Henschen, et al., 1984). Conversely, the absence of the iceberg profile has recently been associated with athletic "staleness" (Morgan, et al., 1987). Although not universally supported by the empirical evidence (e.g., Craighead, et al., 1986; Daiss, LeUnes & Nation, 1986; Miller & Miller, 1985), the iceberg profile has gained considerable acceptance in the sport community as a correlate to elite performance. One example of the extremes to which the iceberg profile is sometimes considered the "gold-standard" mood profile for effective athletic performance is demonstrated by the women's cross-country track team at Brigham Young University (BYU). Not only did the team implement the POMS as part of a diagnostic testing program, but it was expected that athletes with POMS profiles differing from the iceberg profile undergo some form of intervention such as relaxation, or cognitive behavioral rehearsal (Poole & Henschen, 1984).

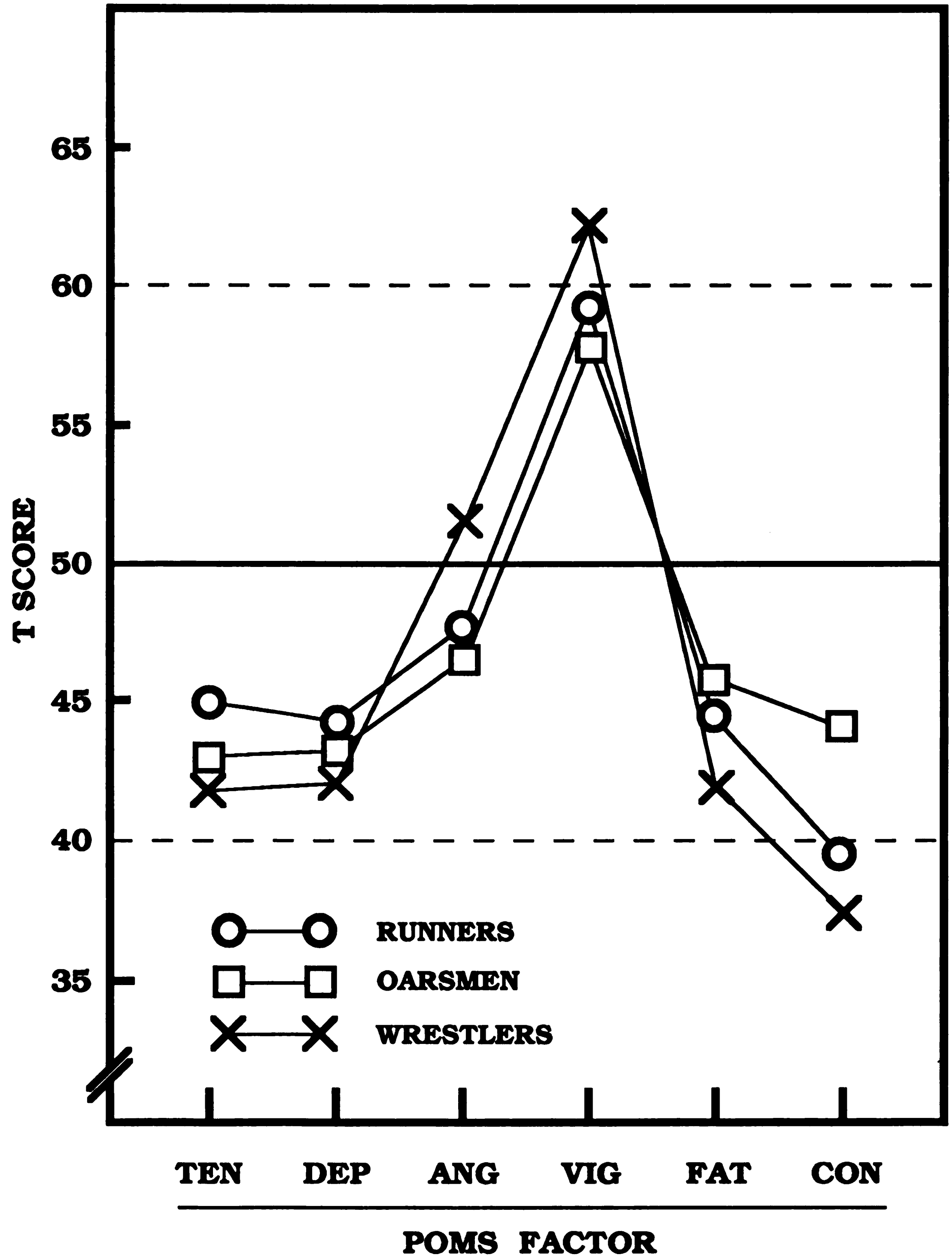


Figure 1. Classic "iceberg" profile exhibited by elite runners, oarsmen and wrestlers. Adapted from Morgan & Pollock (1977).

Although it is frequently assumed (as the case of the BYU cross-country team attests) that it is an athlete's mood that has an effect on his or her performance, most of the studies mentioned thus far are only capable of demonstrating a correlational, rather than a causal, relationship between mood and performance. Several studies, in fact, have found that the reverse is true. That is, manipulations in performance cause changes in mood states (e.g., Berger & Owen, 1988; Kowal, Patton & Vogel, 1978; Lichtman & Poser, 1983; Wilfley & Kunce, 1986, etc.).

Even if evidence could be assembled supporting the intuitively appealing notion that mood exerts a tremendous influence on the quality of motor performance, the cognitive mechanisms involved are, as yet, undetermined. It remains to be demonstrated, for example, whether mood exerts its influence on performance via changes in self-schemata or self-efficacy separately, via both schemata and efficacy or through some other mechanism entirely.

The relationship between priming and behavior. Although the effects of priming, per se, have yet to be investigated in regard to neuro-muscular performance, Anshel's (1988) investigation into the relationships among self-schemata, mood states, feedback and motor skill performance offers preliminary support for the contention that motor performance may be susceptible to cognitive priming. Despite being of relatively minor importance to the purposes of his study, Anshel reported that subjects within whom a negative mood had been primed (Anshel never uses this term) by reading negative self-referent statements (Velten, 1968) exhibited poorer performance on a pursuit rotor task than subjects who had been primed with either positive or neutral self-referent statements.

Two additional studies that involve priming of behavior in sport and recreational contexts have been conducted by Worchel (1972) and Josephson (1981; reported in Berkowitz & Rogers, 1986). In the Josephson study, young boys were intentionally frustrated and then made to watch scenes from a popular television program. Half of the boys saw a violent scene in which the villains used walkie-talkies during the commission of their violence. The remaining subjects watched a non-violent scene from the same program. After priming, all boys played a game of floor hockey which allowed them to act out their aggressive tendencies. During some games, the referees carried walkie-talkies which presumably would serve as retrieval cues for subjects who had been exposed to the violent scene. Results indicated that boys who had viewed the violent television program and then played in a floor hockey games in which the referees carried walkie-talkies acted in the most aggressive manner.

Worchel (1972) primed young summer campers by having them view either a film of a prize fight or a film of a boating trip. After administering the prime, subjects were given the opportunity to indicate whether they would rather participate in a pie fight or take a ride on a raft. Campers who had watched the prize fight were more likely to choose to participate in the pie fight while those who had seen the film of the boating trip indicated they would prefer to go on the raft ride.

Additional support can be found for the priming of other overt physical behaviors. Carver, Ganellen, Froming and Chambers (1983), in fact, provide evidence that some behaviors previously attributed to vicarious learning associated with modeling may actually be the result of schematic priming. In the first of two experiments examining this priming explanation for modeling effects, the investigators exposed subjects to either a hostile or neutral videotaped interaction between a businessman and his secretary. In accordance with protocol set forth by Srull and Wyer (1979), subjects later read a paragraph depicting an individual engaging in a number of ambiguous behaviors such as refusing to pay his rent until his landlord fixed the plumbing. Finally, subjects rated the degree to which they thought the person in the paragraph exhibited hostile behaviors. Results indicated that subjects exposed to the videotape of the hostile social interaction rated the target person as being more hostile. The findings of this first experiment indicated that it is possible to use the behavior of a model (as opposed to one's own actions) to prime interpretive knowledge structures.

In their second study (Carver, et al., 1983; Study 2) the investigators were no longer interested in priming hostile or aggressive attitudes -- something they (and others, e.g., Srull & Wyer, 1979) had already demonstrated -- but rather in the priming of aggressive behavior. Borrowing heavily on the research protocol made famous by Stanley Milgram (1963) in his classic work on obedience to authority, subjects were paired with a confederate under the guise of a "learning experiment." The subject was always assigned the role of "teacher" and the confederate was always the "learner." Subjects were to teach various concepts to their partner (the confederate) by rewarding (correct) and punishing (incorrect) his responses. Prior to the teaching task, however, the subject was asked to take part in another experiment (while they waited for the conveniently late-arriving confederate). During this "unrelated" scrambled sentence task, subjects engaged in Srull and Wyer's (1979) sentence formation task which involved creating meaningful sentences from sets of words. Each of the 30 four-word sets was constructed so that only two possible complete sentences could be formed. All sentences that could be formed were of either hostile (e.g., "leg break arm his") or neutral content (e.g., "her found know I"). Subjects randomly assigned to the hostile priming condition completed 24 (80%) hostile sentences and 6 (20%) neutral sentences. These percentages were reversed for subjects in the neutral priming condition. After the introduction of the prime, subjects returned to their primary task of teaching through the use of rewards and punishments. During the bogus learning task, the subject asked his partner 34 questions. If the response was correct (14 times), the subject rewarded the learner by turning on a "correct" light. If the answer was incorrect (20 times), the subject used his discretion to administer one of 10 linearly increasing shock intensities. Results indicated that subjects exposed to the hostile primes gave significantly more intense shocks to their incorrect partners than did control (neutral prime) subjects.

There is an apparent connection between the work of Carver and his colleagues (Carver, et al., 1983) and the broader literature involving "aggressive cueing" (e.g., Berkowitz & Alioto, 1973; Berkowitz & Green, 1967). In fact, when Carver, et al. discuss the notion of aggressive cueing in light of their research, they specifically mention the Berkowitz and Green study where provoked subjects watch a fight scene from a movie. Ravin and Rubin (1976) succinctly summarize this research as follows:

> Subjects were shown a particularly bloody seven-minute scene from the film Champion, in which a boxer, played by the actor Kirk Douglas, was beaten to a pulp. Some subjects were then introduced to a confederate named "Kirk"; other subjects were introduced to the same confederate, but in their case he was called "Bob." When named "Kirk," the confederate was much more apt to be given severe shocks by the subjects. (p. 138)

Although Berkowitz (1974) originally hypothesized these and similar findings to be the result of classical conditioning, he has recently come to favor a "cognitive-neoassociationistic" (e.g., Anderson & Bower, 1973) or priming explanation. After reviewing a number of fascinating studies in which highly publicized acts of violence seem to serve as triggers for similar violence, Berkowitz and Rogers (1986) conclude:

> All this research suggests that media depictions of violence can prompt people in the audience to act aggressively toward others or themselves, even when the portrayals of violence are fictional. . . . We propose that when people witness, read, or hear of an event via the mass media, ideas are activated which, for a short period of time, tend to evoke other semantically related thoughts. (p. 57-58; italics added)

A series of controlled experiments conducted by Hornstein and his colleagues (e.g., Blackman & Hornstein, 1977; Holloway, et al., 1977; Hornstein, et al., 1975) appears to lend support to Berkowitz's contention that priming can activate cognitions which subsequently find expression as aggressive behaviors toward others. In these studies, subjects' behavior toward others was observed after being exposed to positive or negative news broadcasts while they waited to take part in a decision-making study. Hornsten, et al. (1975; Study 1), for example, activated subjects' pro-social or anti-social cognitions by priming them with news stories that depicted either the "best" (a man donated a kidney to save the life of stranger) or "worst" (a man strangled a 72 year old woman) aspects of human nature. Following the priming, subjects participated in a nonzero sum competition/cooperation (prisoner's dilemma) game. As predicted, subjects primed with the positive news story behaved in a more cooperative manner -- and expected more cooperation from their partner -- than did subjects primed with the negative news story. A similar investigation conducted by Holloway, et al. (1977) indirectly exposed subjects to radio broadcasts containing good (human lives were saved) and bad (human lives were lost) news that was either social (the result of intentional human action) or nonsocial (the result of an act of nature) in content. After the priming manipulation, subjects engaged in a prisoner's dilemma game in which they chose to either cooperate or compete with an unseen partner for additional money. Results indicated a significant interaction with cooperative behavior being elicited most often by exposure to the positive social news and competitive behavior being elicited most often by exposure to the negative social news.

In summary, although no studies have been designed to specifically assess the effect of positive and negative priming on motor behavior, there is considerable evidence to suggest that behavior -- in general -- is susceptible to the effects of cognitive priming. The present investigation was undertaken, therefore, to extend these findings to the area of motor behavior.

CHAPTER III

METHOD

Pre-Experimental Schematicity Assessment

According to Markus (1977), self-schematicity for a particular attribute is a combined function of the extent to which the individual feels the attribute is self-descriptive, and the degree to which the attribute is perceived as being important to the individual's self-image. Using these two dimensions of self-description and importance as criteria by which to categorize individuals' schematicity for exercising, Kendzierski (1988) operationally defined individuals who perceived an attribute (exercising) as being both extremely self-descriptive and important as having a positive schema. Similarly, individuals perceiving this attribute as being extremely non-descriptive but important were categorized as having a negative self-schemata. A final category of "aschematic" was used to describe subjects who thought the attribute to be only moderately self-descriptive or non-descriptive and low in importance. Employing a methodology consistent with that used by Kendzierski, potential subjects were assessed regarding their self-schematicity for physical ability.

Subjects

As part of the procedure for recruiting and screening potential subjects for participation in the experimental manipulation phase of the investigation, 1018 female undergraduates attending any of five introductory psychology classes at Michigan State University were surveyed as to their schematicity for physical ability. In the first two classes, data were collected from all students in attendance. However, because only females were to be included in the experimental phase of the study, it was determined that continuing to collect screening data from male subjects would be inefficient and costly. Only female subjects were screened in the final three classes and only data from females were used in the classification of subjects' self-schemata. In terms of academic class standing, 51.6% of the female respondents classified themselves as freshmen, 26.5% sophomores, 14.9% juniors and 7.0% seniors.

Instrumentation

Perceived Physical Ability Scale ($PPA_{(des)}$). Respondents' self-descriptions of their physical abilities were obtained by administering the 10-item Perceived Physical Ability (PPA) subscale of the Physical Self-Efficacy Scale (Ryckman, et al., 1982). Although items contained in the original PPA (e.g., "I have excellent reflexes"; "I am not agile and graceful"; "I take pride in my ability in sports") are measured on a 6-point Likert-type scale (1 = strongly agree; 6 = strongly disagree) possible responses in the present study were modified by expanding the scale to 7-points (allowing for a midpoint response) and changing the anchors to read: (1) this describes me; (7) this does NOT describe me. (See Appendix A for a complete copy of the self-descriptive version of the PPA.)

Importance of Perceived Physical Ability Scale ($PPA_{(imp)}$). The importance subjects placed on having each of the physical abilities described in the PPA was assessed by administering a second modified version of the 10-item PPA. Items' stems and alternatives were modified so as to reflect an importance dimension. For example, the original self-description items "I have excellent reflexes" and "I am not agile and graceful" were modified to read "Having excellent reflexes" and "Being agile and graceful" and were measured on a 7-point Likert-type scale with anchors of: (1) this is very important to me; (7) this is NOT very important to me. (See Appendix B for a complete copy of the importance version of the PPA.)

Marlow-Crowne Social Desirability Scale. Given the self-report nature of the physical ability scales, subjects' self-descriptions and importance ratings of their physical abilities may be, in part, the result of intentional or unintentional response bias in favor of socially desirable behavior. Therefore, each subject's tendency to respond in a socially desirable manner was assessed by administering a 13-item (Form C) shortened version (Reynolds, 1982) of the Marlow-Crowne Social Desirability Scale (Crowne & Marlow, 1960). (See Appendix C for a complete copy of the shortened version of the Marlow-Crowne Social Desirability Scale.)

Procedure

Collection of physical ability schematicity data. On the first day of class, students attending introductory psychology courses were given information by their professor and a psychology department representative regarding an option to participate in several departmentally approved psychology research projects in return for partial course credit. After the requirements for this option were fully explained, the students were told the experimenter was currently involved in such a research project and needed to collect pre-experimental "screening information" from the class. Individuals meeting the criteria for participation in the actual study would then be contacted by telephone to arrange a mutually convenient time to conduct the experimental phase of the investigation. Because a complete understanding of the true purpose of the study would have seriously jeopardized the validity of the results, subjects were told only that the information they were providing was part of an ongoing investigation into the perceptions college students have regarding their physical ability.

A questionnaire packet including: (a) the Perceived Physical Ability Scale, (b) the Importance of Physical Ability Scale and (c) a shortened version (Reynolds, 1982; Form C) of the Marlow-Crowne Social Desirability Scale (Crowne & Marlow, 1960) was distributed to each student. When they had completed the three instruments, the students deposited their questionnaire packet in a collection box.

Classification of subjects' self-schemata for physical ability. Female students demonstrating a tendency toward socially desirable responses were excluded from further analyses. For the purposes of this investigation, a tendency toward making socially desirable responses was operationally defined as a total score above the sample mean of 5.43 (s.d. = 2.83) on the shortened version of the Marlow-Crowne Social Desirability Scale (Reynolds, 1982). On the basis of this criterion, 505 (49.6%) of the 1018 female subjects were defined as responding in a socially desirable manner and were therefore eliminated from the study. Sample means and standard deviations for perceived physical ability and the importance placed on these abilities were then calculated for the remaining 513 female subjects. Based on their responses to the self-description and importance of physical ability scales, subjects were placed into one of the four mutually exclusive physical ability self-schema categories presented in Table 3.

Table 3.

Decision Rules Employed in the Classification of Physical Ability Schematicity.

Schema Category	Physical Ability Self-Description Score	Physical Ability Importance Score
Positive Schematics [a]	greater than 43.03	greater than 50.16
Negative Schematics [b]	less than 43.03	greater than 50.16
Aschematics [c]	greater than 32.84 and less than 53.22	less than 50.16
Non-Classified [d]	scores not falling into any of the discrete categories listed above	

[a] $n = 162$. [b] $n = 73$. [c] $n = 208$. [d] $n = 70$.

These categories are in keeping with previous literature which has consistently emphasize the need to consider both self-description and importance dimensions in the classification of an individual's self-schema (Kendzierski, 1988; 1990; Markus, 1977). Kendzierski (1988) describes the way these two dimensions are combined to categorize self-schema as follows:

> As defined by Markus (1977) individuals are schematic in regard to a particular attribute when they consider that attribute to be either extremely self-descriptive [i.e., positive physical ability schematics] . . . or extremely non-descriptive [i.e., negative physical ability schematics] . . . and when they consider that attribute to be extremely important to their self-image. Likewise, individuals are considered aschematic when they consider the attribute to be only moderately descriptive or nondescriptive and they do not consider the attribute to be important to their self-image. (pp. 46-47)

Positive physical ability schematics were operationally defined as those subjects with both $PPA_{(des)}$ and $PPA_{(imp)}$ scores above the group mean ($PPA_{(des)}$ $\bar{x}$ = 43.03, sd = 10.19; $PPA_{(imp)}$ $\bar{x}$ = 50.16, sd = 11.15). Negative physical ability schematics were defined as subjects with $PPA_{(des)}$ scores below, and $PPA_{(imp)}$ scores above the group mean. Subjects were defined as being aschematic toward physical ability when their $PPA_{(des)}$ scores ranged between 1.0 standard deviation above to 1.0 standard deviation below the group mean and their $PPA_{(imp)}$ scores fell below the group mean. Finally, any subject with physical ability self-description and importance scores placing them outside the three previously defined schema categories were considered as having schemata <u>not-classified</u> for the purposes of the present study.

Experimental Data Collection

Subjects

Based on their physical ability schematicity classification, 81 female volunteers between the ages of 18 and 26 were recruited to serve as subjects in the experimental phase of the investigation. Because a completely randomized block design was employed, 27 subjects were selected from each of the following schematicity categories: (a) positive self-schema for physical activity, (b) negative self-schema for physical activity and (c) aschematic toward physical activity. Subjects were given course credit in exchange for participation. Because a complete understanding of the true purpose of the investigation would have seriously jeopardized the validity of the results, subjects were recruited ostensibly to take part in a nationwide study to develop performance norms for college students on a variety of motor tasks.

Instrumentation

Demographic/background questionnaire. Information pertaining to each subject's demographic and sports-related background was collected by administering an 11-item demographic/background questionnaire. Demographic information gathered included: subject's name, age, racial/ethnic affiliation, academic class, approximate grade point average and college major. Additional questions designed to assess the subject's previous sport experience were included in the demographic/background questionnaire. (See Appendix D for a complete copy of the demographic/background questionnaire.)

Profile of Mood States (POMS). To assess the impact that exposure to a positive, negative or neutral social environment has on the subjects' mood state, each subject completed a 37-item abbreviated version (Shacham, 1983) of the Profile of Mood States (McNair, et al., 1971). The original POMS consists of a set of 65 adjectives (e.g., "tense", "miserable", "muddled", "listless", etc.) or phrases (e.g., "sorry for things done", "ready to fight", "uncertain about things", etc.) developed to assess the six "transient, fluctuating affective states" of tension, depression, anger, fatigue, confusion, and vigor (McNair, et al., 1971, p. 5). The extent to which subjects felt a particular adjective or phrase described how they were feeling at the time was indicated on a 5-point Likert-type scale (0 = not at all, 1 = a little, 2 = moderately, 3 = quite a bit, 4 = extremely). Subjects expressing difficulty understanding the meaning of any particular POMS item were given a synonymous item from the POMS alternative word lists developed by Albrecht & Ewing (1989). (See Appendix E for a complete copy of the abbreviated version of the Profile of Mood States and Appendix F for a copy of the alternative word lists.)

Physical ability self-schemata. An indication of the respondents' self-schema for physical ability (subjects' self-descriptions and the importance they placed on these physical abilities) was obtained by administering the same 10-item self descriptions and 10-item importance ratings derived from the Perceived Physical Ability (PPA) subscale of the Physical Self-Efficacy Scale (Ryckman, et al., 1982) used in the pre-experimental schematicity assessment phase of the study. Subjects' self-schematicity for physical ability was computed by multiplying each self description item by the importance rating for that item and summing the 10 products.

Task-specific self-efficacy. Because previous "research from the sport literature provides clear evidence that a significant relationship exists between self-confidence [self-efficacy] and performance" (Feltz, 1988b; p. 451), a task-specific (golf putting task) measure of self-efficacy was constructed that enabled a microanalytic research methodology (Bandura, 1977; 1986) to be employed when "testing propositions about the origins and functions of perceived self-efficacy" (Bandura, 1986, p. 422). Specifically, each subject was asked to indicate, the strength of belief that she would be successful in hitting at least 1 out of 20 golf putts in such a manner as to make the ball come to rest within 12 in. (30.48 cm) of a specified target; at least 2 out of 20 golf putts within 12 in. (30.48 cm) of the target; at least 3 out of 20 golf putts within 12 in. (30.48 cm) of the target; all the way up to the maximum -- hitting all 20 out of 20 golf putts within 12 in. (30.48 cm) of the target. Each efficacy rating was made on a 10-point probability scale ranging from 0 (I am certain I cannot do this) to 10 (I am certain I can do this). (See Appendix G for a copy of the task-specific measure of self-efficacy.)

Golf putting task. Psychomotor performance was assessed via a golf putting task. The putting task consisted of 20 trials in which the subject putted a regulation golf ball a distance of 3.05 m, along a carpeted floor, toward a 2.54 cm by 2.54 cm square target that was formed by the intersection of two pieces of masking tape (each 1.83 m long and 2.54 cm wide) crossing at their midpoint (Figure 2). Both

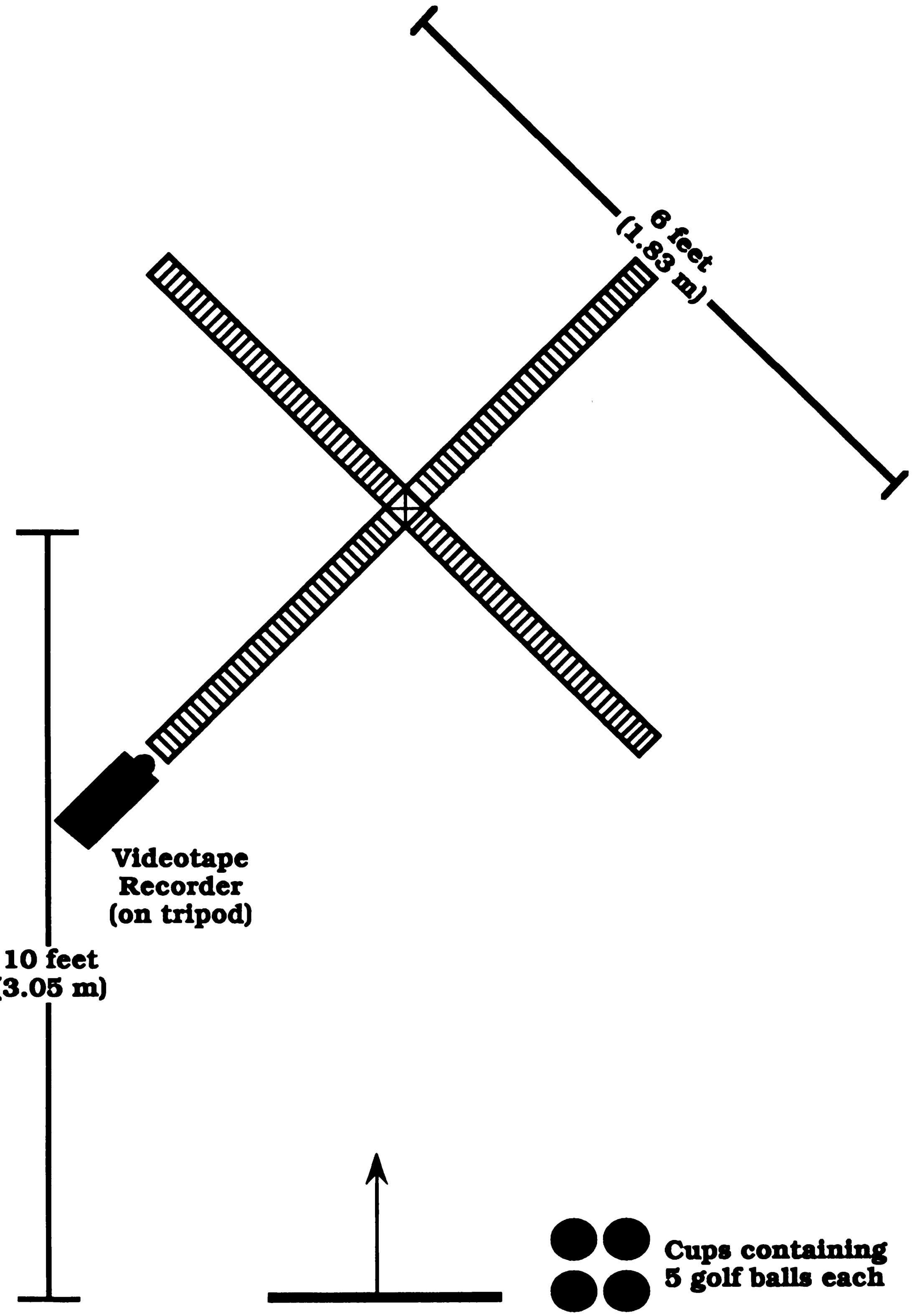


__Figure 2__. **Golf putting performance task.**

pieces of tape were marked at 1 in. (2.54 cm) intervals. Each subject was tested individually and no time limits were imposed. All trials were recorded on videotape thereby eliminating the need for an experimenter to be present during the performance.

Error associated with each putt was computed by summing the shot's vertical and horizontal deviation from the target's midpoint. Although several types of error scores were considered (e.g., variable error (VE), constant error (CE), total error (E), etc.; absolute error (AE) which, according to Spray (1986) "seems to be the strongest indicator of target accuracy under most conditions" (p. 237) was assumed to be the single best indicator of overall golf putting accuracy. This assumption was also based on the fact that absolute error "is a composite score that is mathematically derived from both CE and VE" (Magill, 1985, p. 31). The first five shots of the pre-test and the last five shots of the post-test were eliminated from the total error score in order to control for habituation and fatigue effects, respectively.

Coaching style videotapes. Three 5-minute VHS cassette videotapes were produced, each depicting a female coach addressing her basketball team. The same actor played the role of the coach in all three tapes. In two of the tapes, the coach commented on, and made references to, her team's performance. The only difference between the two tapes was that in one, the coach was shown employing a "negative" coaching style (e.g., criticizing and ridiculing the players for their poor performance) while in the other, the coach approached the same situation from a "positive" coaching perspective (encouraging, and reinforcing the players for the things they had done correctly). The third tape depicted the coach providing her team with "emotionally neutral" organizational information (such as the time the team bus will be leaving the school, etc.). (See Appendix H for a transcription of the content of the three manipulation videotapes.)

Upon completion, each videotape was reviewed using a modified version of the Coaching Behavior Assessment System (CBAS; Smith, Smoll & Hunt, 1977) to insure that: (a) the positive coaching style videotape contained the highest proportion of "mistake-contingent encouragements" relative to other coded behaviors, (b) the negative coaching style videotape contained the highest proportion of "punishments" and "punitive" behaviors relative to other coded behaviors, and (c) the neutral coaching videotape contained the highest proportion of "organizational" behaviors relative to other coded behaviors. Although the original CBAS consists of 12 behavioral categories, only those related to "reactions to mistakes" and "organization" were coded. (See Appendix I for a description of the CBAS categories.)

Manipulation Check Questionnaire. A 12-item questionnaire was administered to each subject at the end of the data collection session. Specifically, the items were designed to assess (a) the degree to which the subject was aware of the true purpose of the study, (b) the degree to which the subject was aware of the manipulation, and (c) the subject's perception of the effect the manipulation had on her performance. In addition to these three questions of interest, several irrelevant "filler" items were included in the manipulation check questionnaire in an attempt to conceal the true nature of the questionnaire. (See Appendix J for a copy of the Manipulation Check Questionnaire.)

Procedure

Collection of experimental data. At a pre-arranged time, each subject reported directly to the testing room. When the subject entered the room, the experimenter was seated in front of a 21-inch T.V. monitor, viewing a videotape of a physical education instructor giving a lecture. The instructor was presenting emotionally "neutral" information pertaining to the historical development of the sub-specializations of exercise physiology and biomechanics within the field of physical education (See Appendix H for a transcription of the lecture content). The experimenter was using a checklist to record information from the videotaped lecture.

After introducing himself, the experimenter gave each subject a brief overview of the bogus study (development of college student motor performance norms) and informed them as to what their actual participation in the current study would entail. Each subject was taken into an adjacent room and asked to stand behind the shooting line in order to get "a feel" for the task demands. Subjects were not misled regarding any of the tasks in which they would be participating (only the specific purpose of the study was concealed).

After completing an informed consent form (Appendix K) and the demographic and background questionnaire, each subject was asked to sit quietly for five minutes. Ostensibly, the purpose of this rest period was to "standardize the conditions under which the golf putting tests were administered." Each subject was given a BIODOT biofeedback button to place on the back of her hand and a small reference card explaining the degree of stress associated with each color. (See Appendix L for a copy of the BIODOT color reference chart.) The sole purpose of the BIODOT button was to reinforce the legitimacy of the rest period. While the subject was "resting," the experimenter returned to his previous task of coding the videotaped instruction. The audio on the T.V. monitor was set so the subject could clearly overhear the instructor's voice. The subject was seated at a 45-degree angle to the T.V., approximately 1.83 m from the screen. This positioning was selected for its "natural" appearance -- not forcing the subjects to look directly into the monitor, yet putting the monitor in plain view should they choose to look at the screen during the resting period.

After 5 minutes of "resting," each subject completed (a) the abbreviated version of the POMS, (b) the $PPA_{(des)}$ and $PPA_{(imp)}$ scales and (c) the task-specific self-efficacy scale. To control for possible order effects, presentation order of the three instruments was randomly counterbalanced between each of the six possible sequences (i.e., A-B-C; A-C-B; B-A-C; B-C-A; C-A-B; and C-B-A). When the pre-manipulation questionnaires were completed, the experimenter escorted the subject into the adjacent room and asked her to putt, at her own pace, 20 golf balls toward the target, trying to get the balls to come to a stop as close as possible to the center of the target. In order to reduce the likelihood of the balls hitting one another, subjects were asked to "clear the target area" after putting each cup of balls (5 balls) toward the target. Subjects were responsible for clearing the target because the experimenter was not present during the golf putting performance. This was done to remove the possibility of the experimenter providing subtle positive or negative feedback or reinforcement cues to the subjects during their performance. Instead, each performance was recorded using a video camera placed at a 45-degree angle from the target and aimed away from the subject (See Figure 2). Using the video camera to record performance, not only eliminated the possibility of experimenter cues, and allowed a more careful analysis of each performance, it also reduced the likelihood of social facilitation performance (audience) effects resulting from self-presentation (Bond, 1982) evaluation apprehension (Cottrell, 1972), distraction (Baron, 1986) or the mere presence of the investigator (Zajonc, 1965). After starting the camera, the experimenter returned to the T.V. room under the guise of continuing his coding duties. Upon completion of the 20 putts, subjects returned to the T.V. room.

Experimental manipulation and data collection. While the subject was performing the pre-manipulation golf putting task, the experimenter determined the manipulation group (positive, negative or neutral) to which the subject would be assigned. This was done by rolling a single die. If either 1 or 4 "pips" of the die were exposed, the subject was assigned to the positive coaching condition. If either 2 or 5 pips appeared, the subject was assigned to the negative coaching condition and if 3 or 6 pips were rolled, the subject was assigned to the neutral coaching condition. The only restriction was that each cell in the 3 X 3 randomized block matrix (Figure 3) contain an equal number of subjects. When the subjects returned to the T.V. room, the experimenter was again seated in front of the T.V. monitor. He was now, however, viewing a videotape of a basketball coach addressing her team. The videotape being viewed was determined by the group to which the subject had been randomly assigned. Consistent with the pre-manipulation procedures, the experimenter

	Condition 1 Video shows coach generally praising basketball team	**Condition 2** Video shows coach generally critizing basketball team	**Condition 3** Video shows coach giving "emotionally neutral" information to basketball team	
"Positive" Physical Ability Schematics	X_{111} X_{112} X_{113} X_{114} X_{115} X_{116} X_{117} X_{118} X_{119}	X_{211} X_{212} X_{213} X_{214} X_{215} X_{216} X_{217} X_{218} X_{219}	X_{311} X_{312} X_{313} X_{314} X_{315} X_{316} X_{317} X_{318} X_{319}	n = 27
"Negative" Physical Ability Schematics	X_{121} X_{122} X_{123} X_{124} X_{125} X_{126} X_{127} X_{128} X_{129}	X_{221} X_{222} X_{223} X_{224} X_{225} X_{226} X_{227} X_{228} X_{229}	X_{321} X_{322} X_{323} X_{324} X_{325} X_{326} X_{327} X_{328} X_{329}	n = 27
"Aschematics" for Physical Ability	X_{131} X_{132} X_{133} X_{134} X_{135} X_{136} X_{137} X_{138} X_{139}	X_{231} X_{232} X_{233} X_{234} X_{235} X_{236} X_{237} X_{238} X_{239}	X_{331} X_{332} X_{333} X_{334} X_{335} X_{336} X_{337} X_{338} X_{339}	n = 27
	n = 27	n = 27	n = 27	N = 81

Figure 3. Completely randomized block design with replications (blocking variable: Physical ability self-schematicity).

was again using a checklist to record information related to the coaches' behavior.

In accord with the pre-manipulation rest period, each subject was again asked to sit quietly for 5 minutes to "standardize the administration of the second set of self-perception and motor tasks." A new BIODOT biofeedback button was placed on the back of each subject's hand. In keeping with the pre-test protocol, the experimenter returned to his previous task of "coding" the videotape while the subject "rested." Again, the audio on the T.V. monitor was set so the subject could clearly overhear the coach's voice.

During the 5-minute resting period, the subject was unwittingly exposed to the videotaped orations of either the negative, positive or neutral coach (depending on the experimental condition to which they had been assigned). After 5 minutes of exposure to either the positive, negative or neutral coach, the subject again completed (a) the abbreviated version of the POMS, (b) the $PPA_{(des)}$ and $PPA_{(imp)}$ scales and (c) the task-specific self-efficacy scale. The three instruments were administered in the same order in which they were presented during the pre-test. When the instruments were completed, the subjects were again escorted into the adjacent room and asked to putt 20 golf balls toward the target. The testing of each subject's performance was identical to that set forth during the pre-test. After completing the golf putting task, the subject once again returned to the T.V. room to complete the Manipulation Check Questionnaire and for debriefing.

<u>Manipulation Check Questionnaire and debriefing</u>. Upon returning to the T.V. room, the subject completed the Manipulation

Check Questionnaire. Before being dismissed, each subject was informed as to the true purpose of the study. In addition, subjects were apprised of the fact that:

> Exposure to the videotape may have resulted in a change in the way you view yourself or performed on the golf task. You should not consider the perceptions you had of yourself or your performance on the motor task to be true indications of your abilities.

Because others were still participating, subjects were asked not to disclose the purpose of the study to anyone for at least two weeks.

Data entry and analyses. All data collected in the study were coded, verified and keypunched into a "flat" data file on the IBM 3090 VF mainframe computer at Michigan State University. Statistical analyses were generated using SPSS^{X} version 3.0 (SPSS Inc.) implemented through the IBM 3090 mainframe computer at Michigan State University.

Because this study had as its purpose examining the differential effects positive and negative coaching has on a non-targeted observer's self-schemata, mood state, self-efficacy and motor performance, several analyses were required. In addition to the calculation of general descriptive statistics (for the entire sample and each of the experimental conditions), reliability coefficients were computed for each of the self-schema measures and the POMS subscales. A series of inferential statistics were also used to examine the overall integrity of the research design. Specifically, multivariate analysis of variance (MANOVA) and oneway analysis of variance (ANOVA), with appropriate post hoc tests, were employed to assess mean differences between the

three experimental conditions prior to the experimental manipulation. Hypotheses regarding the effect of priming on self-schema, self-efficacy, mood state and performance were tested using a MANOVA formulated to test a doubly multivariate with repeated measures design (i.e., multiple dependent measures collected at multiple times). As a method of controlling for individual variation, changes between pre- and post-manipulation scores on the variables of interest were used as dependent measures. In addition, path analytic techniques (correlation and regression) were used to test the hypothesized causal relationships among the variables. All analyses employed an alpha level of .05.

CHAPTER IV

RESULTS AND DISCUSSION

Due to the nature of the study design and the fact that several research hypotheses were tested, pre- and post-manipulation results will be presented separately. In general, pre-manipulation analyses were conducted to assess the overall integrity of the research design. Post-manipulation analyses, on the other hand, were primarily conducted to test the research hypotheses.

Pre-Manipulation Results

Equivalence of Experimental Group Assignment

Descriptive statistics for the four pre-manipulation outcome variables (i.e., self-schema, mood state, self-efficacy and performance) are presented in Table 4. A one-way MANOVA revealed that prior to the experimental manipulation, no statistically significant differences existed among the three experimental groups on any of the outcome variables (Wilks' lambda F (8,150) = 0.59, p = .78). Because the magnitude of the intercorrelations among the dependent variables may, in some cases, result in "the seemingly anomalous situation in which the MANOVA is nonsignificant but some or even all of the ANOVAs are significant" (Bray & Maxwell, 1985; p. 35), the univariate "protected" F-tests were also examined. None of the univariate tests were found to be statistically significant (self-schema F (2,78) = 0.54, p = 0.58; mood state F (2,78) = 1.98, p = .14; self-efficacy F (2,78) = 0.08, p = .92; performance F (2,78) = 0.13, p = .87). It was thus demonstrated that in regard to the variables of interest, the random assignment of subjects to the three experimental conditions resulted in generally equivalent groups.

Table 4.

Descriptive Statistics for All Pre-Manipulation Dependent Variables.

		Positive Coach		Negative Coach		Neutral Coach		Total	
		$\overline{X}$	sd	$\overline{X}$	sd	$\overline{X}$	sd	$\overline{X}$	sd
Positive Schematics	Schema	334.22	(63.49)	341.67	(70.69)	334.00	(68.36)	336.67	(65.03)
	Mood	31.11	(6.11)	23.33	(6.58)	27.78	(13.16)	27.40	(9.41)
	Efficacy	101.33	(40.96)	108.78	(34.75)	104.78	(20.52)	104.96	(32.05)
	Performance	423.89	(110.36)	392.67	(86.48)	411.44	(110.20)	409.33	(99.78)
Negative Schematics	Schema	214.33	(49.48)	223.67	(67.72)	216.00	(61.28)	218.00	(57.77)
	Mood	34.67	(10.16)	32.44	(16.85)	30.78	(10.40)	32.63	(12.45)
	Efficacy	100.11	(33.89)	95.22	(37.03)	100.56	(44.00)	98.63	(37.11)
	Performance	432.56	(119.43)	427.33	(85.30)	422.78	(46.48)	427.56	(85.49)
Aschematics	Schema	191.33	(80.62)	237.33	(47.44)	185.44	(81.68)	204.70	(72.83)
	Mood	32.33	(9.15)	25.44	(9.17)	35.44	(11.60)	31.07	(10.54)
	Efficacy	106.11	(42.48)	106.00	(35.93)	93.78	(28.24)	101.96	(35.11)
	Performance	402.33	(95.73)	400.33	(87.05)	400.78	(88.54)	401.15	(86.97)
Total	Schema	246.63	(89.83)	267.59	(80.82)	245.15	(94.38)	253.12	(88.01)
	Mood	32.70	(8.44)	27.07	(11.93)	31.33	(11.76)	30.37	(10.96)
	Efficacy	102.52	(37.84)	103.33	(35.02)	99.70	(31.50)	101.85	(34.48)
	Performance	419.59	(105.47)	406.78	(84.27)	411.67	(83.05)	412.68	(90.52)

Equivalence of Schematicity Blocks

A second MANOVA was conducted to determine if the three physical ability schematicity blocks (i.e., positive schematics, negative schematics, aschematics) differed on any of the outcome measures prior to the experimental manipulation. A significant omnibus MANOVA (Wilks' lambda $\underline{F}$ (8,150) = 8.03, $\underline{p}$ < .001) indicated that at least one statistically significant difference existed among the three schematicity blocks. A follow-up examination of the univariate $\underline{F}$-tests revealed that the only significant pre-manipulation difference among the three blocks was on the self-schema variable ($\underline{F}$ (2,78) = 33.22, $\underline{p}$ < .001). Because the three schematicity blocks were constructed solely on the basis of differences on the self-schema measure (albeit several weeks earlier), this result was anticipated. An a posteriori multiple comparison test (Tukey's studentized range test) revealed that positive schematics ($\bar{x}$ = 336.78, $\underline{sd}$ = 65.03) differed significantly from the other two schematicity groups (negative schematics $\bar{x}$ = 218.00, $\underline{sd}$ = 57.77; aschematics $\bar{x}$ = 204.70, $\underline{sd}$ = 72.83).

Assessment of Order Effects

The order in which the instruments measuring self-schema, mood state and self-efficacy were presented to the subjects was counterbalanced to reduce the likelihood of establishing a "carry-over" response bias. This random presentation, however, may have produced its own systematic order effect. To examine this possibility, a MANOVA was conducted to determine if any of the outcome measures differed significantly on the basis of presentation order. Although the omnibus MANOVA did not attain the preset alpha level of .05 (Wilks' lambda $\underline{F}$ (20,240) = 1.53, $\underline{p}$ = .07), the fact that it approached statistical significance prompted an examination of the univariate protected $\underline{F}$-tests. None of the four univariate $\underline{F}$-tests were statistically significant at the .05 level (self-schema $\underline{F}$ (5,75) = 1.72, $\underline{p}$ = .14; mood state $\underline{F}$ (5,75) = 1.44, $\underline{p}$ = .22; self-efficacy $\underline{F}$ (5,75) = 0.40, $\underline{p}$ = .85; performance $\underline{F}$ (5,75) = 2.02, $\underline{p}$ = .09). It was therefore concluded that counterbalancing the presentation order of the outcome measures was successful in preventing response biases due to the order of presentation.

Reliability of Outcome Measures

Reliability of self-schema instruments. Because the two instruments used as indices of self-schematicity in the present study ($PPA_{(des)}$ and $PPA_{(imp)}$) were constructed by substantially modifying the Perceived Physical Ability (PPA) subscale of the Physical Self-Efficacy Scale (Ryckman, et al., 1982), it could not be assumed that the psychometric properties of the original instrument (Gayton, et al., 1986; McAuley & Gill, 1983; Ryckman, et al., 1982) were transferred to the modified versions. Therefore, two aspects of reliability -- stability and internal consistency -- were examined for each instrument. Stability of each instrument was assessed by calculating a test-retest reliability (correlation) coefficient between subjects' $PPA_{(des)}$ and $PPA_{(imp)}$ scores obtained during the in-class pre-experimental schematicity screening phase of the study and those obtained during the pre-manipulation assessments of the experimental phase of the study. Test-retest intervals ranged from 11 to 32 days with the mean interval being approximately three weeks in length ($\bar{x}$ = 21.7 days; $\underline{sd}$ = 6.3 days). With all 81 subjects included in the analysis, a test-retest reliability coefficient of .77 was obtained for the

$PPA_{(des)}$ and .84 for the $PPA_{(imp)}$. The degree to which the two schematicity scales were internally consistent (measured a single, homogeneous domain) was assessed by computing Cronbach alpha reliability coefficients (Cronbach, 1951) for each scale. The obtained alpha reliability coefficients for the $PPA_{(des)}$ and $PPA_{(imp)}$ scales were .81 and .90, respectively. Both self-schema assessment instruments were, therefore, assumed to measure self-descriptions and importance placed on physical abilities with adequate stability and internal consistency.

Reliability of the Profile of Mood State subscales. Estimates of alpha reliability (internal consistency) were computed for each of the six POMS subscales, as well as for the overall Total Mood Disturbance score which is a composite mood index derived by summing the six subscales (Vigor-Activity scale negatively weighted). Table 5 reveals that the reliability coefficients for four of the six POMS subscales as well as that for the Total Mood Disturbance score exceeded the .70 level set forth by Jensen (1978) as the generally acceptable standard for reliability estimates. The two subscales failing to meet this criterion were those purporting to assess the Confusion-Bewilderment (r = .59) and Anger-Hostility (r = .67) dimensions.

Post-Manipulation Results

Manipulation Check

Although priming effects have been observed even when the primes have been presented subliminally and/or when subjects are unable to recall the prime (e.g., Bargh, 1982; Bargh & Pietromonaco, 1982; Lombardi, et al., 1987), establishing that the manipulation conditions differed significantly in terms of their positive or negative

Table 5.

Alpha Reliability (Internal Consistency) Coefficients for Six POMS Subscales and Total Mood Disturbance Scores.

POMS Subscale	Coefficient Alpha
Tension-Anxiety	.73
Depression-Dejection	.86
Anger-Hostility	.67
Vigor-Activity	.90
Fatigue-Inertia	.88
Confusion-Bewilderment	.59
Total Mood Disturbance	.87

valence would further increase confidence placed in the results of the study. Therefore, subjects were asked, as part of the exit questionnaire, to rate, on a 5-point scale, the degree to which they felt the coach depicted in the videotape was behaving in a positive or negative manner toward her team (1 = very negative toward her team; 3 = neutral toward her team; 5 = very positive toward her team). A oneway ANOVA revealed a significant omnibus F ratio (F (2,78) = 64.18; $p < .001$) indicating that perceived differences existed among the three manipulation groups relative to the positive/negative behaviors exhibited by the coach in the videotapes. Figure 4 graphically depicts the finding that planned orthogonal contrasts among the three manipulation groups revealed statistically significant differences among the three groups (positive condition $\bar{x}$ = 4.22, sd = 1.28; neutral condition $\bar{x}$ = 3.63, sd = 1.04; negative condition $\bar{x}$ = 1.19, sd = 0.74). The significant differences among the three experimental groups indicate that the videotaped manipulations were successful in effectively depicting the coach exhibiting three distinct types of social interaction with her team. Specifically, subjects exposed to the positive coach perceived the videotaped behaviors as significantly more positive than did subjects who viewed either the neutral or negative coach videotape. Conversely, subjects exposed to the negative videotape perceived the coach's behaviors as significantly more negative than subjects in either the positive or neutral condition.

Effect of Priming on Outcome Variables

The major purpose of the present study was to assess the effect unobtrusive exposure to either a positive or negative social prime has on subsequent ratings of self-schema, self-efficacy, mood state and motor performance. Descriptive statistics for the four post-manipulation outcome variables are presented in Table 6.

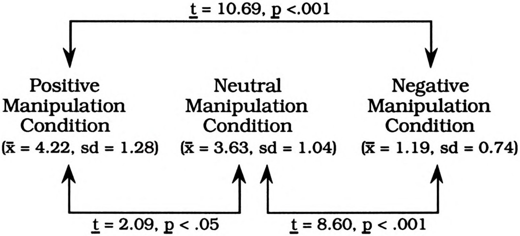


Figure 4. Results of planned orthogonal contrasts among manipulation groups on perceived positive/negative style of videotaped coach.

The most appropriate method for assessing the overall effect of priming on the four outcome variables was through the use of a MANOVA formulated to test a doubly multivariate with repeated measures design (i.e., multiple dependent measures collected at multiple times). Results of this omnibus MANOVA indicated that although there were no significant main effects for either priming condition (Wilks' lambda $F_{(8,150)} = 0.91$, $p = .51$) or time (Wilks' lambda $F_{(4,75)} = 0.94$, $p = .44$) there was a significant interaction between priming and time (Wilks' lambda $F_{(8,150)} = 3.95$, $p < .001$). Thus, there was an overall significant difference between subjects' pre- and post-manipulation outcome variables when examined as a function of the priming condition to which they had been exposed (i.e., a significant priming effect).

Table 6.

Descriptive Statistics for All Post-Manipulation Dependent Variables.

		Positive Coach		Negative Coach		Neutral Coach		Total	
		$\overline{X}$	sd	$\overline{X}$	sd	$\overline{X}$	sd	$\overline{X}$	sd
Positive Schematics	Schema	348.33	(70.05)	329.33	(66.35)	332.11	(70.00)	336.59	(66.67)
	Mood	29.00	(6.52)	26.00	(8.93)	28.56	(13.77)	27.85	(9.89)
	Efficacy	124.44	(38.29)	89.89	(24.67)	114.33	(37.91)	109.56	(36.05)
	Performance	419.33	(94.59)	423.00	(111.57)	395.00	(85.97)	412.44	(94.96)
Negative Schematics	Schema	229.00	(47.23)	208.89	(67.89)	210.89	(52.85)	216.26	(55.22)
	Mood	32.33	(9.76)	28.67	(14.64)	29.33	(13.97)	30.11	(12.57)
	Efficacy	119.44	(34.92)	84.89	(34.64)	100.11	(43.40)	101.48	(39.14)
	Performance	362.11	(102.27)	455.00	(91.40)	424.33	(75.92)	413.81	(95.46)
Aschematics	Schema	191.67	(85.30)	230.89	(47.61)	182.89	(77.11)	201.88	(72.23)
	Mood	31.22	(10.85)	26.00	(11.37)	35.78	(14.50)	31.00	(12.54)
	Efficacy	121.22	(36.07)	103.00	(35.72)	93.78	(37.88)	106.00	(37.00)
	Performance	384.67	(74.72)	426.11	(66.54)	384.44	(122.79)	398.41	(90.10)
Total	Schema	256.33	(95.24)	256.37	(79.49)	241.96	(92.48)	251.56	(88.47)
	Mood	30.85	(8.98)	26.89	(11.48)	31.22	(13.93)	29.65	(11.66)
	Efficacy	121.70	(35.09)	92.59	(31.77)	102.74	(39.24)	105.68	(37.10)
	Performance	388.70	(90.91)	434.70	(89.32)	401.26	(94.78)	408.22	(92.63)

Although the results of the doubly multivariate with repeated measures MANOVA clearly indicate that differential exposure to the positive, negative or neutral prime resulted in significant pre- to post-manipulation differences on the outcome variables, univariate analyses were required to explore the exact nature of these effects. A series of orthogonal contrasts between the positive, neutral and negative priming conditions were conducted comparing pre- to post-manipulation changes in each of the outcome variables. As depicted in Figure 5, when compared to the negative priming manipulation, exposure to the positive social prime resulted in significantly more positive self-schemata ratings ($t = 3.66$; $p < .001$) and self-efficacy judgments ($t = 4.33$; $p < .001$) as well as a general improvement in motor performance scores ($t = 2.97$; $p < .01$). Of the four outcome variables measured, only mood state was unaffected by differential exposure to the positive or negative social prime. In addition, significant differences in self-schema ratings ($t = 2.33$; $p < .05$) and self-efficacy judgments ($t = 2.54$; $p < .05$) were observed between subjects exposed to the positive and neutral social prime. Comparable differences, however, did not exist between the negative and neutral priming conditions. Therefore, when taken as a whole, exposure to the positive social prime appears to have exerted a greater influence on self-referent cognitions than did the negative prime.

Based on previous findings that schematics, relative to aschematics, are more successful in resisting counterschematic information (Markus, 1977; Markus, Crane & Siladi, 1978; Markus & Sentis, 1982; Sweeney & Morland, 1980), it was hypothesized

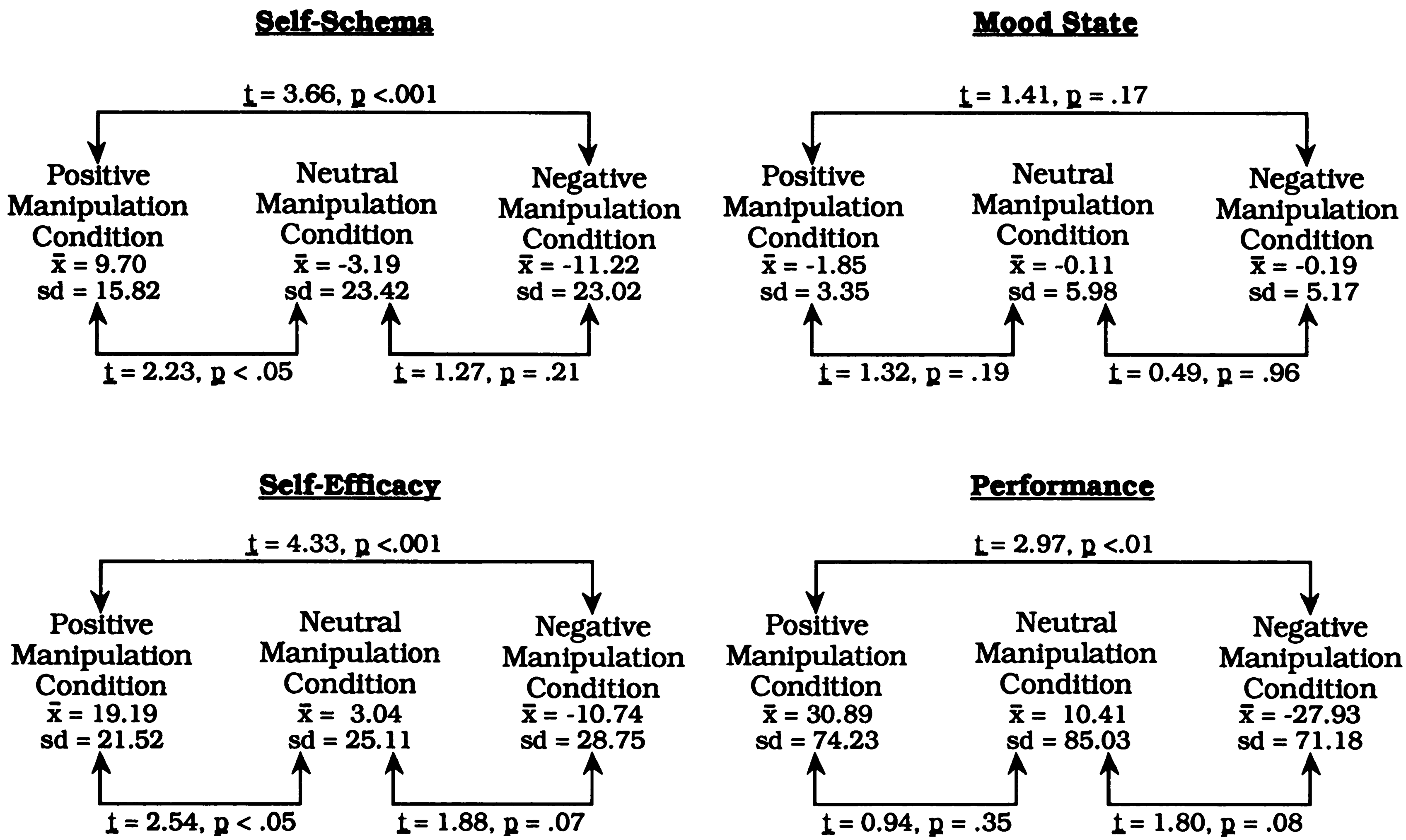


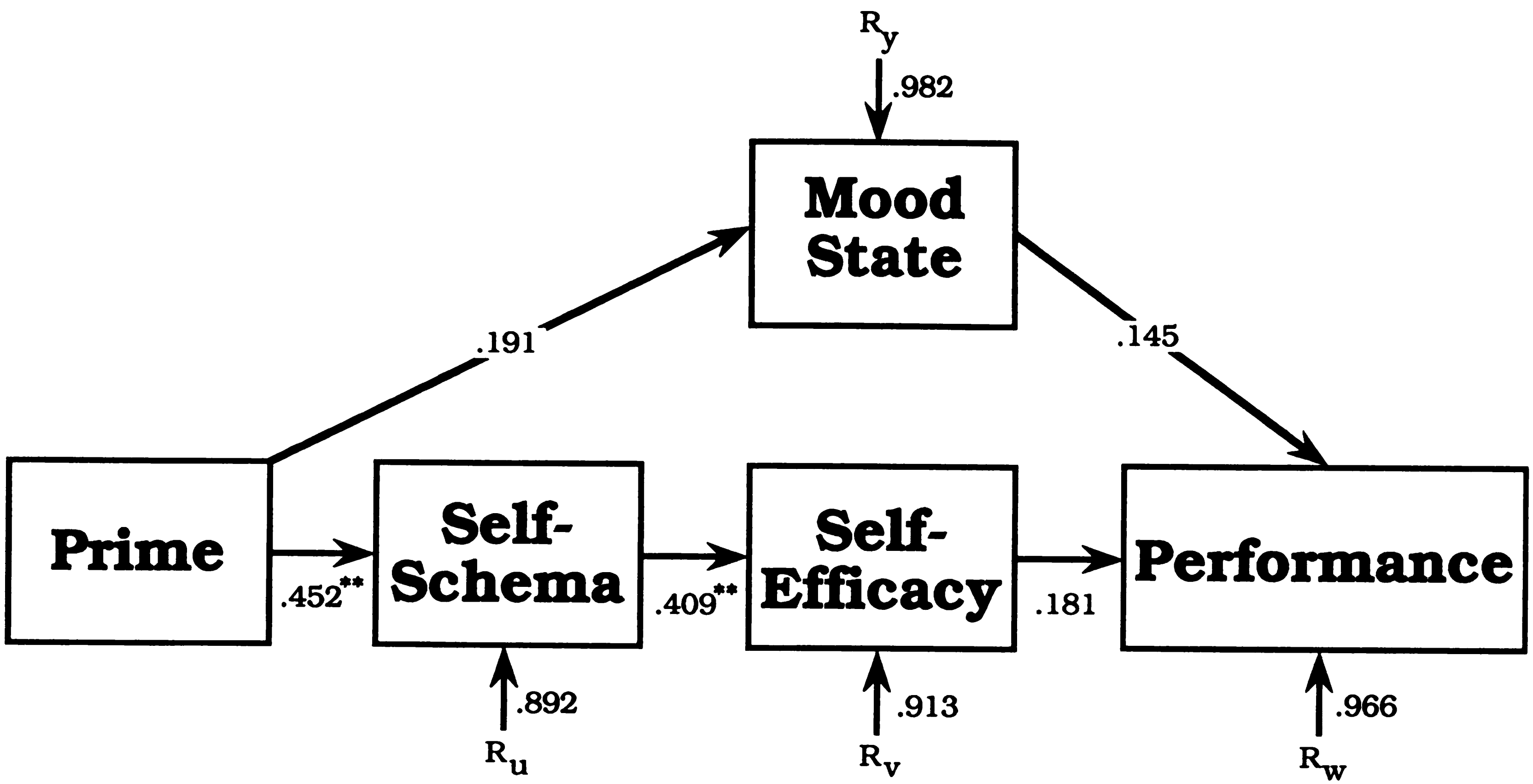
Figure 5. Contrasts between manipulation conditions for pre to post differences in each outcome variable.

(Research Hypothesis 5) that there would be a significant "prime x self-schematicity" interaction. Specifically, it was predicted that both positive and negative schematics would be most effective in resisting primes that were inconsistent with their prevailing self-schema for physical ability (i.e., positive schematics would effectively resist the influence of the negative prime and negative schematics would effectively resist the influence of the positive prime). In contrast, due to the lack of a prevailing self-schema, aschematics should be equally susceptible to both forms of priming. To test this hypothesis, a 3 X 3 (priming manipulation by self-schematicity block) MANOVA was conducted with pre-post difference scores on the four outcome variables serving as multiple dependent measures. Although there was a significant main effect for priming condition (F (8,138) = 3.87, p < .001), thereby supporting the previously described doubly multivariate findings, the results failed to support either a main effect for schematicity block (F (8,138) = 0.83, p = .57) or the prime by schema interaction hypothesis (F (16,211) = 0.79, p = .69). The effects of priming were, therefore, not mediated by the subjects' pre-existing self-schema for physical ability (i.e., positive, negative, aschematic).

Causal Relationships Among the Variables

The finding that self-schemata, self-efficacy and motor performance can be differentially primed by exposure to positive or negative social contexts served as an impetus to investigate the nature of the causal relationships existing among these variables. Three conditions must exist in order to establish causation between variables. First, there must be a statistical relationship (i.e., correlation) between the variables. Second, there must be temporal precedence (i.e., the "causal variable" must precede the "effected variable"). Finally, the error terms associated with the variables must not be correlated (i.e., there can exist no confounding variables). By specifying the temporal relationship, and assuming the non-correlation of error terms, path analysis enables the examination of the correlation between two variables (or multiple correlations among more than two variables) to establish proof of causation (Asher, 1983).

To examine the causal relationships among priming and the outcome variables, a recursive (non-reciprocal) path analysis using ordinary regression techniques was conducted to test the model specified in the research hypotheses. Specifically, it was predicted that: (a) a positive or negative self-schema would be differentially primed as a result of exposure to either the positive or negative manipulation (Research Hypothesis 1), (b) information upon which task-specific self-efficacy predictions are based would be selectively and differentially processed depending on the type of self-schema that had been invoked through the priming process (Research Hypothesis 2), and (c) due to a positive relationship between self-efficacy and performance, subjects in the negative priming condition would perform less well on a subsequent motor task relative to subjects assigned to the positive priming condition (Research Hypothesis 4). In addition, it was predicted that exposure to the priming condition would have a direct effect on mood state which would, in turn, impact on performance (Research Hypothesis 3). These hypothesized relationships among the variables are illustrated by the recursive model depicted in Figure 6 and the correlation matrix to be analyzed presented in Table 7. In path analytic terms, the priming variable (a



<u>Figure 6</u>. Path coefficients for hypothesized relationships among priming and difference scores on all outcome variables.

Table 7.

Correlations Among Priming and Pre-Post Difference Scores on All Outcome Variables.

	Prime	Self-schema	Self-efficacy	Mood state	Performance (absolute error)
Prime	1.00	$.45^{**}$	$.52^{**}$	-.19	$-.38^{**}$
Self-schema		1.00	$.41^{**}$	$-.33^{**}$	$-.28^{*}$
Self-efficacy			1.00	.23	-.21
Mood state				1.00	.19
Performance					1.00

* $p < .05$.
** $p < .01$.

dummy variable which was coded either "0" (negative prime) or "1" (positive prime) to represent priming condition membership) is said to be "exogenous" to the system in that it is not influenced by any of the other variables in the proposed model. On the other hand, the four outcome variables are considered "endogenous" because they are proposed to be the result of other variables in the model. The observed standardized path coefficients (β), which serve as estimates of the magnitude of the causal linkages between the variables, are also provided for each predicted relationship. Finally, all unspecified sources of variation in each endogenous variable is estimated by a residual (error) term (R_js). Residual path coefficients are calculated using the equation:

$$Rj = \sqrt{1 - R_j^2}$$

where R_j^2 is the multiple correlation coefficient representing the amount of the total variance explained by the predictor variables.

By examining Figure 6, it can be seen that, as predicted, there was a significant path between priming condition and physical ability self-schema ratings (β = .452, t = 3.66, p < .01). Specifically, exposure to the positive social prime significantly predicted positive changes in self-schema ratings.

A second significant path existed between self-schema ratings and self-efficacy expectations (β = .409, t = 3.24, p < .01). Positive changes in pre-post self-schema ratings (after exposure to the social prime) significantly predicted positive changes in self-efficacy expectations (higher efficacy judgments).

However, Research Hypothesis 3, which predicted a significant causal relationship between priming condition and Total Mood Disturbance score and Research Hypothesis 4 which predicted a significant causal relationship between self-efficacy expectations and motor performance, were not supported by the path analysis.

Because only hypothesized relationships among the variables are incorporated into the hypothesized model (in path analytic terms the model is said to be "overidentified"), it is possible to assess the overall quality of the model by comparing its "goodness of fit" to that of the complete (fully-identified) model (Figure 7). Using a formula suggested by Pedhazur (1982), a chi square goodness of fit test was calculated revealing a statistically significant difference between the fully identified and the predicted causal models ($\chi^2_{(5)} = 18.90$; $p < .01$; see Appendix M for the calculation of χ^2). This rejection of the null hypothesis (i.e., that there is no difference between the two models) indicates, according to Pedhazur, "that the model does not fit the data" (p. 617).

It is worth noting that inspection of the fully-specified model (Figure 7), reveals significant paths between priming condition and self-schema ratings ($\beta = .452$; $t = 3.66$; $p < .01$), self-efficacy expectations ($\beta = .414$; $t = 3.16$; $p < .01$) and performance ($\beta = .321$; $t = 2.00$; $p < .05$). None of the other path coefficients in the full model attained the .05 level of statistical significance.

General Discussion of the Results

Findings in the present study support the contention that even brief and indirect exposures to seemingly irrelevant positive and negative social contexts are capable of exerting considerable influence

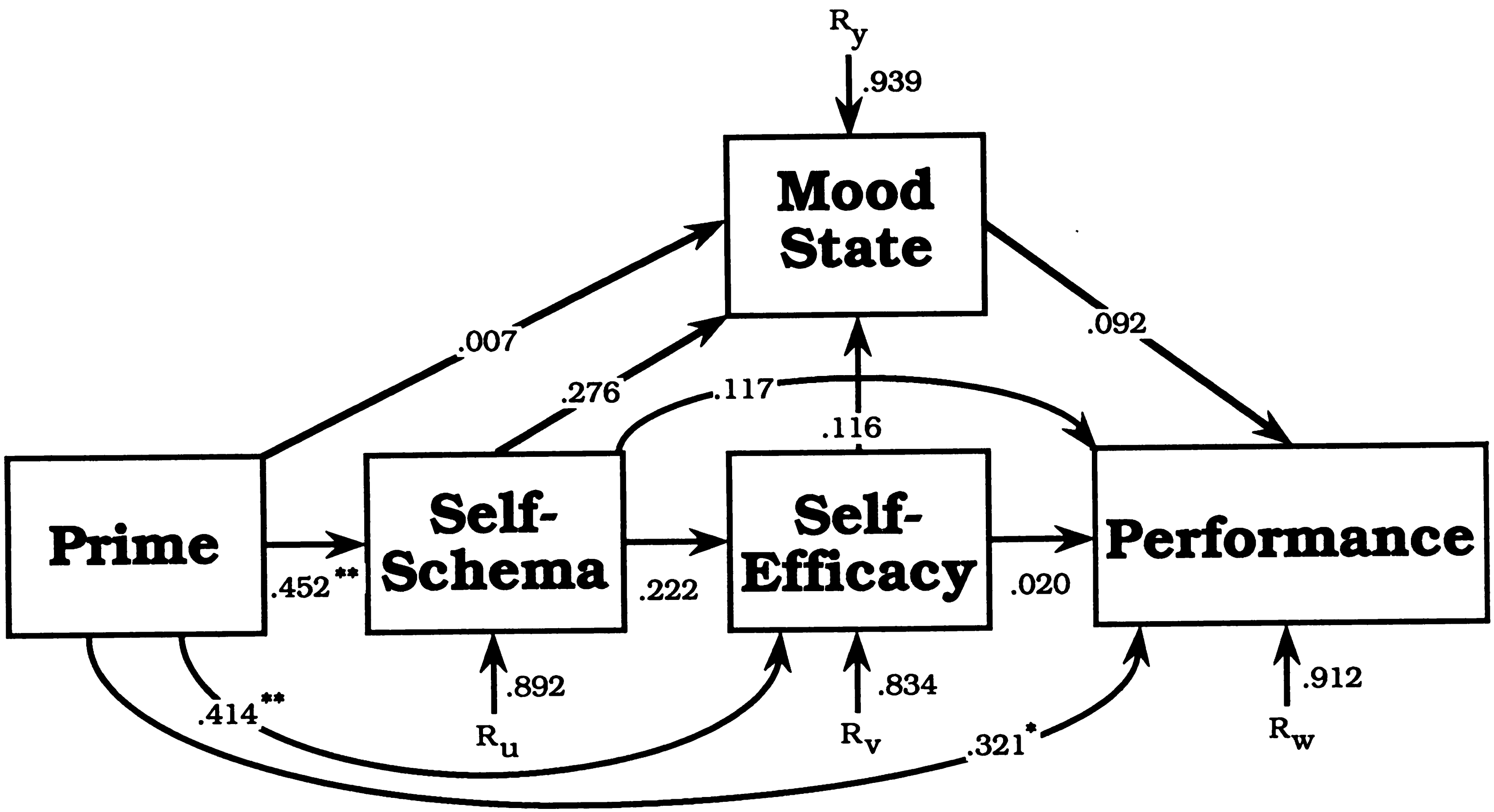


Figure 7. Path coefficients for the full model relationships among priming and difference scores on all outcome variables.

on the activation of self-referent cognitions. Additionally, and of even more importance, was the unique finding that such positive and negative social priming can also have an effect on the execution of a subsequent motor performance task. Given the subtle nature of the priming exposure, the influence priming had on performance is noteworthy despite accounting for less than 15% of the total variance in performance ($\underline{r}^2 = .144$). Although there is considerable theoretical support for these findings, this was the first empirical investigation to hypothesize and test the simultaneous effects of cognitive priming on physical ability self-schemata, self-efficacy expectations, mood states and motor performance.

It was further hypothesized that priming would not only directly affect self-schema ratings but it would indirectly influence self-efficacy and performance. Although path analysis revealed that priming produced significant changes in self-schema ratings which, in turn, resulted in significant changes in self-efficacy judgments, performance was not related to self-efficacy (see Figure 6). By demonstrating that priming can influence self-efficacy expectations, however, this study confirms -- and thus demands further investigation of -- Bandura's (1986) generally overlooked position that none of the four major sources of self-efficacy he proposes (i.e., previous performance attainments, vicarious experience, verbal persuasion, assessment of physiological states) is inherently capable of generating efficacy judgments. As Bandura suggests, it is the <u>cognitive processing of information</u> from each of these sources that conveys an efficacy expectation. A noteworthy finding in the present study is that priming -- by exposure to positive or negative social contexts -- appears to be one factor capable of altering the manner in which this cognitive processing occurs.

Given the robust nature of previous findings linking self-efficacy expectations with performance (See Feltz, 1992; 1988b) it is interesting to note that despite cognitive priming's significant effect on both self-efficacy expectations and motor performance, no relationship existed between self-efficacy expectations and performance. Although unexpected, a number of possible explanations exist for such a finding. Bandura (1986), for example, has identified several variables which can affect the strength of the relationship between self-efficacy judgment and performance. In the present study, at least three factors outlined by Bandura may have contributed, to some extent, to the lack of a positive relationship between self-efficacy and performance: (a) lack of consequences of misjudgment; (b) temporal disparities; and (c) obscure aims and performance ambiguities.

Not only were there no negative consequences associated with subjects' misjudgments of their self-efficacy, but little or no motivation was provided for accurate efficacy judgments. In addition, temporal disparities between self-efficacy judgments and performance were inadvertently created by counterbalancing the sequence of instrument administration. For example, some subjects completed the self-efficacy instrument immediately prior to performing the golf putting task whereas another subjects completed the mood states and/or the self-schema assessments in the interval between the efficacy ratings and performance. Partial support for this temporal explanation is provided by the fact that the omnibus MANOVA conducted to determine if any of the outcome measures differed on the basis of presentation order approached (but did not attain) the preset alpha level of .05 (Wilks' lambda $\underline{F}$ (20,240) = 1.53, $\underline{p}$ = .07). Furthermore, although none of the four univariate F-tests conducted on the dependent variables were found to be statistically significant at the .05 level, the $\underline{F}$ value associated with performance again approached statistical significance ($\underline{F}$ (5,75) = 2.02, $\underline{p}$ = .09).

Finally, and perhaps most importantly, using pre- to post-manipulation change scores as dependent measures assumes that the only intervening variable between pre- and post-manipulation assessments is the experimental variable of interest (i.e., priming). Although this assumption may be justified when considering the self-schemata, mood state and performance variables, self-efficacy judgments present a unique problem. Subjects' pre-manipulation efficacy judgments were made prior to performing the task. Therefore, expectations were the made solely on the basis of verbal information provided by the experimenter. Post-manipulation efficacy expectations, on the other hand, were the result of both exposure to the experimental manipulation <u>and</u> previous personal experience (pre-manipulation performance) on the task. Considerable support for this explanation is provided by the fact that if only post-manipulation performance scores (as opposed to performance change scores) are examined, the expected positive correlation exists between self-efficacy and performance ($r = .38$; $p < .01$).

Another unanticipated finding was that priming did not influence self-perception of mood states. Other investigators have reported similar non-significant effects of priming on mood states. Hornstein et al. (1975), for example, found no statistically significant differences in subjects' mood as measured by the Mood Adjective Check List after exposure to good or bad news broadcasts -- despite the changes they elicited in aggression (Study 1) and attitude toward others (Study 2). Similarly, Holloway, et al. (1977) found no mood effects after administering priming manipulations consisting of good and bad social and nonsocial news stories. Although it may appear that the true relationship between priming and mood may have also been obscured by the unreliability of the POMS instrument (two subscales had internal consistency coefficients below .70), it must be remembered that individual POMS subscales were not used as dependent measures of mood state. Instead, overall Total Mood Disturbance (TMD) scores were derived by summing the six subscales and the reliability of TMD scores was a very respectable .87. Further indication that the lack of priming effects on mood was not due to unreliability in mood state measurement is provided by the fact that even correcting for attenuation due to unreliability (Ghiselli, Campbell & Zedeck, 1981) does not appreciably increase the correlation between priming conditions and mood states (uncorrected $\underline{r}$ = .19; corrected $\underline{r}$ = .21). A more feasible explanation for the lack of priming effects on mood may be gleaned from the results reported by Baldwin et al. (1990). In their study, affect was primed only when the social stimulus was a meaningful authority figure. Because the present investigation employed a manipulation which depicted an unknown and unidentified basketball coach interacting with her team, it is possible that she was not perceived by the subjects as a significant authority figure.

Schematicity blocks were constructed to take into account possible individual x priming condition interactions (Higgins, et al., 1982; Martin,1986). Despite statistically significant pre-manipulation differences between the schematicity groups, no schematicity x priming condition interactions were observed. The fact that exposure to either the positive or negative social prime had the same effect regardless of the subjects' prevailing self-schemata, does not support previous findings that schematics are more successful in resisting counterschematic information than aschematics (Markus, 1977; Markus, Crane & Siladi, 1978; Markus & Sentis, 1982; Sweeney & Morland, 1980). Because the previous studies did not employ a priming paradigm, one possible explanation for the divergent findings may involve the way priming stimulates increased cognitive elaboration during information processing. In their work on persuasion, Petty and Cacioppo (1986) have set forth a theoretical framework -- the elaboration likelihood model -- asserting that information can be processed either with considerable mental effort (central route) or in a relatively effortless fashion (peripheral route) depending on situation-specific cues and contexts. Central route processing generally involves thoughtful consideration of the message content whereas peripheral processing is accomplished through the use of available heuristics and mental shortcuts. It is possible, therefore, that exposure to either schematic or counterschematic primes serve as cues for further cognitive elaboration, and thus force a more critical examination of the message content relative to information which is presented without a prime.

CHAPTER V

SUMMARY AND CONCLUSIONS

Summary

The present study examined the extent to which unobtrusive exposure to an irrelevant positive or negative social context was capable of producing differential (priming) effects on subsequent self-perceptions and motor performance. Specifically, female college students were exposed to the positive or negative communications of an athletic coach to determine the effect of cognitive social priming on self-schema, self-efficacy, mood states and performance on a golf-putting task. On the basis of previous theory and research it was hypothesized that: (a) a positive or negative self-schema would be differentially primed as a result of exposure to either the positive or negative manipulation, (b) information upon which task-specific self-efficacy predictions are based would be selectively and differentially processed depending on the type of self-schema that had been invoked through the priming process, and (c) due to a positive relationship between self-efficacy and performance, subjects in the positive priming condition would perform better on a subsequent motor task than those subjects assigned to the negative priming condition. Furthermore, it was predicted that exposure to the priming condition would have a direct effect on mood state which would, in turn, impact on motor performance.

Using a two-stage data collection procedure, 1018 female undergraduates were initially screened to assess their physical ability self-schemata. After eliminating 505 subjects for responding in a socially desirable manner, the remaining 513 subjects were classified as having either: (a) a positive self-schema for physical ability, (b) a negative self-schema for physical ability, (c) no self-schema for physical ability (aschematic), or (d) none of the above self-schemata for physical ability. On the basis of their physical ability schematicity classification, a total of 81 subjects (27 positive schematics; 27 negative schematics; 27 aschematics) were recruited to participate in the experimental phase of the study. Prior to exposure to the experimental manipulation, each subject was assessed as to her self-schema for physical ability, current mood state, task-specific self-efficacy expectations and performance on a golf putting task. Subjects within each self-schematicity block were randomly assigned for unobtrusive exposure to a 5-minute videotape which depicted either a positive, negative or neutral social context. All social contexts were similar in that they portrayed a female basketball coach addressing her team. In the positive priming condition, the coach was shown encouraging and reinforcing positive aspects of the team's performance. In the negative priming videotape, however, the coach was seen criticizing and ridiculing her players for their poor performance. Finally, the neutral prime consisted of the coach giving the team emotionally neutral information about an upcoming road trip. After exposure to the experimental manipulation, each subject again completed written assessments related to her physical ability self-schema, current mood state and task-specific self-efficacy. In addition, each subject performed a second (post-manipulation) trial on the golf putting task.

A multivariate analysis of variance (MANOVA) formulated to test a doubly multivariate with repeated measures design (i.e., multiple dependent measures collected at multiple times) revealed that there was an overall statistically significant interaction between the priming condition to which subjects had been exposed and differences between pre- and post- manipulation scores on the dependent measures. Although no evidence was found to support the hypothesis that there would be a main effect of priming on mood state, subsequent univariate analyses (orthogonal contrasts) revealed that when compared to the negative social prime, exposure to the positive social prime resulted in significantly more positive self-schemata and self-efficacy judgments as well as a general improvement in motor performance scores. In addition, significant differences in self-schema ratings and self-efficacy judgments were observed between subjects exposed to the positive and neutral social prime. Because comparable differences did not exist between the negative and neutral priming conditions, it was concluded that the positive social prime exerted a greater influence on self-referent cognitions than did the negative prime. In addition, there was no evidence of a hypothesized priming x pre-existing physical self-schematicity interaction. Thus, the results of this study do not support the previous findings that schematics are more successful than aschematics in resisting counterschematic information (Markus, 1977; Markus, Crane & Siladi, 1978; Markus & Sentis, 1982; Sweeney & Morland, 1980). Finally, a causal model of the hypothesized relationships among the variables was tested against a fully-identified model and was found to not fit the data.

Conclusions

Based on the findings, and within the limitations of the present study, the following conclusions are warranted:

1) When pre-existing self-efficacy expectations are controlled for by using pre- to post-manipulation change scores as a dependent measure, unobtrusive exposure to either a positive or negative prior social context produces a differential priming effect on subsequent self-efficacy expectations. Specifically, self-efficacy judgments become more positive after exposure to a positive social prime.
2) When pre-existing self-schema ratings are controlled for by using pre- to post-manipulation change scores as a dependent measure, unobtrusive exposure to either a positive or negative prior social context produces a differential priming effect on subsequent self-schema ratings. Specifically, self-schema ratings become more positive after exposure to a positive social prime.
3) When the level of pre-existing motor performance is controlled for by using pre- to post-manipulation change scores as a dependent measure, unobtrusive exposure to either a positive or negative prior social context produces a differential priming effect on subsequent motor performance. Specifically, motor performance is improved after exposure to a positive social prime.

4) A model that adequately explains the causal relationships between self-schemata, self-efficacy, mood states and motor performance has yet to be specified.

Implications for Practitioners and Suggestions for Future Research

The findings of the present study hold practical implications for teachers and coaches as well as methodological implications for future research examining the effects of cognitive social priming. Although the impact a positive or negative coaching style can have on an athlete's self-perception and performance has long been a fertile topic for speculation among athletes, coaches and spectators, it has only recently gained the attention of the scientific community. Impeding scientific inquiry into the effects of coaching style has been the fact that much of the previous research has been conducted from an atheoretical perspective. Furthermore, interest in the area of coaching styles has tended to narrowly focus on the effects coaching behaviors (e.g., verbal rewards and punishments) have on the specific target(s) of those behaviors (e.g., the self-concept of the particular athlete(s) being praised or punished) -- as opposed to the broad manner in which a coach's public praise or criticism (such as that frequently witnessed during locker room "critiques") may affect the perceptions and/or performances of seemingly uninvolved (i.e., non-targeted) observers (e.g., other team members) who are often forced to witness such behaviors. Because the emphasis has been on atheoretical investigations employing quasi-experimental research paradigms, even fundamental questions such as: "Is a negative coaching style more or less conducive to performance enhancement?" cannot be answered with any degree of certainty.

The present study hypothesized and tested relationships among three distinct psychological theories -- cognitive priming theory, self-schema theory and self-efficacy theory -- in a way that may shed light on cognitive mechanisms underlying the commonly held belief that relatively stable and predictable relationships exist between coaching style and athlete self-concept, confidence and motor performance. It was demonstrated that -- at least within a controlled laboratory setting -- it is possible to systematically alter the self-schema ratings, self-efficacy expectations and motor performances of uninvolved observers simply by exposing them to a coach interacting with others in either a positive or negative manner.

In the immediate future, research is needed to replicate the preliminary findings of this study. If reproducible in the laboratory setting, the next step would be to embark on a path of programmatic research into the effects of positive and negative coaching/teaching styles -- by elaborating, refining and subsequently validating and cross-validating the theoretical models through field experiments. One useful elaboration may be to design a study employing several sequential priming manipulations. For example, an A-B design may be used to expose the same subject (each subject would act has his/her own control) to one type of prime (e.g., positive), then the other (e.g., negative), to assess the impact of each successive prime. Using this design would also allow more elaborate causal models to be hypothesized and tested in "waves" or "panels" (e.g., Feltz, 1982).

Furthermore, although the present study demonstrated motor skill <u>performance</u> can be positively or negatively influenced by exposure to prior social contexts, a logical extension of this finding would involve the examination of priming effects on motor skill acquisition. In the meantime, practicing coaches (and teachers of all kinds) may do well to consider the way their behavior may be inadvertently influencing their athletes' and students' self-image, self-confidence and performance.

FOOTNOTES

[1] The four criteria used for inclusion in the Thesaurus of Psychological Index Terms are: (1) the frequency of the term's occurrence in the psychological literature, (2) the term's potential usefulness in providing access to a concept, (3) the term's relationship to or overlap with existing Thesaurus terminology, and (4) user feedback and need. (American Psychological Association, 1988).

[2] The Oxford English Dictionary credits Immanuel Kant as the originator of the term "schema" as follows: "In Kant: Any one of certain forms of rules of "productive imagination" through which the understanding is able to apply its "categories" to the manifold of sense-perception in the process of realizing knowledge or experience."

APPENDICES

APPENDIX A

Self-Descriptive Version of the Perceived Physical Ability Scale ($PPA_{(des)}$)

APPENDIX A:

Directions: Please circle the ONE number that best indicates the extent to which each of the following items describe you. PLEASE CIRCLE THE NUMBER -- DO NOT MARK BETWEEN THE NUMBERS.

		This describes me						This does NOT describe me
1.	I have excellent reflexes.	1	2	3	4	5	6	7
2.	I am not agile and graceful.	1	2	3	4	5	6	7
3.	My physique is rather strong.	1	2	3	4	5	6	7
4.	I can't run fast.	1	2	3	4	5	6	7
5.	I don't feel in control when I take tests involving physical dexterity.	1	2	3	4	5	6	7
6.	I have poor muscle tone.	1	2	3	4	5	6	7
7.	I take little pride in my ability in sports.	1	2	3	4	5	6	7
8.	My speed has helped me out of some tight spots.	1	2	3	4	5	6	7
9.	I have a strong grip.	1	2	3	4	5	6	7
10.	Because of my agility, I have been able to do things which many others could not do	1	2	3	4	5	6	7

APPENDIX B

Self-Importance Version of the Perceived Physical Ability Scale ($PPA_{(imp)}$)

APPENDIX B:

Directions: Please circle the ONE number that best indicates the extent to which each of the following items are important to you. PLEASE CIRCLE THE NUMBER -- DO NOT MARK BETWEEN THE NUMBERS.

		This is very important to me						This is NOT very important to me
1.	Having excellent reflexes.	1	2	3	4	5	6	7
2.	Having agility and grace.	1	2	3	4	5	6	7
3.	Having a physique that is rather strong.	1	2	3	4	5	6	7
4.	Being able to run fast.	1	2	3	4	5	6	7
5.	Feeling in control when I take tests involving physical dexterity.	1	2	3	4	5	6	7
6.	Having good muscle tone.	1	2	3	4	5	6	7
7.	Taking pride in my ability in sports.	1	2	3	4	5	6	7
8.	Having enough speed to help me out of tight spots.	1	2	3	4	5	6	7
9.	Having a strong grip.	1	2	3	4	5	6	7
10.	Being able to do things which many others can not do.	1	2	3	4	5	6	7

APPENDIX C

Shortened Version (Form C) of the Marlow-Crowne Social Desirability Scale

APPENDIX C:

Listed below are a number of statements concerning personal attitudes and traits. Read each item and decide whether the statement is *true* or *false* as it pertains to you personally. Please circle either the word True or False for each item below.

1. **It is sometimes hard for me to go on with my work if I am not encouraged .... True False**
2. **I sometimes feel resentful when I don't get my way .... True False**
3. **On a few occasions, I have given up doing something because I thought too little of my ability ..... True False**
4. **There have been times when I felt like rebelling against people in authority even though I knew they were right .... True False**
5. **No matter who I'm talking to, I'm always a good listener .... True False**
6. **There have been occasions when I took advantage of someone .... True False**
7. **I'm always willing to admit it when I make a mistake .... True False**
8. **I sometimes try to get even rather than forgive and forget .... True False**
9. **I am always courteous, even to people who are disagreeable .... True False**
10. **I have never been irked when people expressed ideas very different from my own .... True False**
11. **There have been times when I was quite jealous of the good fortune of others .... True False**
12. **I am sometimes irritated by people who ask favors of me .... True False**
13. **I have never deliberately said something that hurt someone's feelings .... True False**

APPENDIX D

Demographic/Background Questionnaire

APPENDIX D:

BACKGROUND QUESTIONNAIRE

NAME: ____________________________

How old are you? _________

How do you describe yourself?

0 Native American
0 Black or African-American
0 Mexican or Chicano
0 Puerto Rican or other Latin American
0 Oriental or Asian-American
0 White or Caucasian

What is your current academic class standing?

0 Freshman
0 Sophomore
0 Junior
0 Senior
0 Graduate Student

What is your approximate college G.P.A.?

0 3.50 - 4.00
0 3.00 - 3.49
0 2.50 - 2.99
0 2.00 - 2.49
0 1.50 - 1.99
0 Below 1.50

What is your college major? ________________________

In your entire life, on how many total occasions have you played golf (either miniature or regulation)?

0 None at all
0 1 - 2 times
0 3 - 5 times
0 6 - 10 times
0 11 - 20 times
0 More than 20 times

In the past calander year (12 months), on how many occasions have you played golf (either miniature or regulation)?

0 None at all
0 1 - 2 times
0 3 - 5 times
0 6 - 10 times
0 11 - 20 times
0 More than 20 times

Have you ever owned your own set of golf clubs?

0 No
0 Yes

Have you ever played in a competitive **team** sport (for example, baseball, football, basketball, hockey, soccer, etc.) in which you had a designated coach(es)?

0 No
0 Yes

How much experience would you say you have playing in **competitive team sports** with a coach or coaching staffs? (please circle **one** of the numbers below)

1	2	3	4	5
None				A great deal

APPENDIX E

Abbreviated Version of the Profile of Mood States

	NOT AT ALL	A LITTLE	MODERATELY	QUITE A BIT	EXTREMELY
Fatigued	❑	❑	❑	❑	❑
Annoyed	❑	❑	❑	❑	❑
Discouraged	❑	❑	❑	❑	❑
Resentful	❑	❑	❑	❑	❑
Nervous	❑	❑	❑	❑	❑
Miserable	❑	❑	❑	❑	❑
Cheerful	❑	❑	❑	❑	❑
Bitter	❑	❑	❑	❑	❑
Exhausted	❑	❑	❑	❑	❑
Anxious	❑	❑	❑	❑	❑
Helpless	❑	❑	❑	❑	❑
Weary	❑	❑	❑	❑	❑
Bewildered	❑	❑	❑	❑	❑
Furious	❑	❑	❑	❑	❑
Full of pep	❑	❑	❑	❑	❑
Worthless	❑	❑	❑	❑	❑
Forgetful	❑	❑	❑	❑	❑
Vigorous	❑	❑	❑	❑	❑
Uncertain about things	❑	❑	❑	❑	❑
Bushed	❑	❑	❑	❑	❑

	NOT AT ALL	A LITTLE	MODERATELY	QUITE A BIT	EXTREMELY
Fatigued	❑	❑	❑	❑	❑
Annoyed	❑	❑	❑	❑	❑
Discouraged	❑	❑	❑	❑	❑
Resentful	❑	❑	❑	❑	❑
Nervous	❑	❑	❑	❑	❑
Miserable	❑	❑	❑	❑	❑
Cheerful	❑	❑	❑	❑	❑
Bitter	❑	❑	❑	❑	❑
Exhausted	❑	❑	❑	❑	❑
Anxious	❑	❑	❑	❑	❑
Helpless	❑	❑	❑	❑	❑
Weary	❑	❑	❑	❑	❑
Bewildered	❑	❑	❑	❑	❑
Furious	❑	❑	❑	❑	❑
Full of pep	❑	❑	❑	❑	❑
Worthless	❑	❑	❑	❑	❑
Forgetful	❑	❑	❑	❑	❑
Vigorous	❑	❑	❑	❑	❑
Uncertain about things	❑	❑	❑	❑	❑
Bushed	❑	❑	❑	❑	❑

APPENDIX F

Alternative Word List for the Profile of Mood States

APPENDIX F:

Original POMS item	First Alternative	Second Alternative
Tense	Under a strain	Stressed
Angry	Mad	Aggravated
Worn out	Tired	Burned out
Unhappy	Feeling low	Displeased
Lively	Spirited	Full of energy
Confused	Not knowing what to do	Baffled
Peeved	Ticked off	Miffed
Sad	Heart broken	Sorrowful
Active	On the go	Keeping busy
On edge	Jittery	Touchy
Grouchy	Crabby	Grumpy
Blue	Down in the dumps	Down
Energetic	Enthusiatic	Peppy
Hopeless	Feeling things are impossible	Having no alternatives
Uneasy	Uncomfortable	Ill at ease
Restless	Unable to relax something to do	In need of
Unable to concentrate	Easily distracted	Unable to focus
Fatigued	Petered out	Run down
Annoyed	Bothered	Bugged
Discouraged	Wanting to give up	Dampened spirit
Resentful	Holding a grudge	Harboring
Nervous	Worried	Uptight
Miserable	In poor spirits	Woeful
Cheerful	In a good mood	Happy

Original POMS item	First Alternative	Second Alternative
Bitter	Sore	Hateful
Exhausted	Completely spent	Unable to continue
Anxious	Concerned	Fearful
Helpless	Unable to act	Vulnerable
Weary	Drained	Beat
Bewildered	Puzzled	Dumbstruck
Furious	Enraged	Fuming
Full of pep	Ready to go	Full of gusto
Worthless	Useless	Valueless
Forgetful	Unable to remember	Absent-minded
Vigorous	Powerful	Potent
Uncertain about things	Up in the air	Doubtful
Bushed	Pooped out	All done in

APPENDIX G

Golf Putting-Specific Self-Efficacy Scale

APPENDIX G

GOLF PUTTING TASK

1. How confident are you that you will be able to hit at least 1 **of your 20** golf shots within 12 inches of the cross?

1	2	3	4	5	6	7	8	9	10
I'm certain I **can't** do this				I'm moderately certain I can do this					I'm certain I **can** do this

2. How confident are you that you will be able to hit at least 2 **of your 20** golf shots within 12 inches of the cross?

1	2	3	4	5	6	7	8	9	10
I'm certain I **can't** do this				I'm moderately certain I can do this					I'm certain I **can** do this

3. How confident are you that you will be able to hit at least 3 **of your 20** golf shots within 12 inches of the cross?

1	2	3	4	5	6	7	8	9	10
I'm certain I **can't** do this				I'm moderately certain I can do this					I'm certain I **can** do this

4. How confident are you that you will be able to hit at least 4 **of your 20** golf shots within 12 inches of the cross?

1	2	3	4	5	6	7	8	9	10
I'm certain I **can't** do this				I'm moderately certain I can do this					I'm certain I **can** do this

5. How confident are you that you will be able to hit at least 5 **of your 20** golf shots within 12 inches of the cross?

1	2	3	4	5	6	7	8	9	10
I'm certain I **can't** do this				I'm moderately certain I can do this					I'm certain I **can** do this

6. How confident are you that you will be able to hit at least 6 **of your 20** golf shots within 12 inches of the cross?

1	2	3	4	5	6	7	8	9	10
I'm certain I **can't** do this				I'm moderately certain I can do this					I'm certain I **can** do this

7. How confident are you that you will be able to hit at least 7 **of your 20** golf shots within 12 inches of the cross?

1	2	3	4	5	6	7	8	9	10
I'm certain I **can't** do this				I'm moderately certain I can do this					I'm certain I **can** do this

8. How confident are you that you will be able to hit at least 8 **of your 20** golf shots within 12 inches of the cross?

1	2	3	4	5	6	7	8	9	10
I'm certain I **can't** do this				I'm moderately certain I can do this					I'm certain I **can** do this

9. How confident are you that you will be able to hit at least **9 of your 20** golf shots within 12 inches of the cross?

1	2	3	4	5	6	7	8	9	10
I'm certain I can't do this				I'm moderately certain I can do this					I'm certain I can do this

10. How confident are you that you will be able to hit at least **10 of your 20** golf shots within 12 inches of the cross?

1	2	3	4	5	6	7	8	9	10
I'm certain I can't do this				I'm moderately certain I can do this					I'm certain I can do this

11. How confident are you that you will be able to hit at least **11 of your 20** golf shots within 12 inches of the cross?

1	2	3	4	5	6	7	8	9	10
I'm certain I can't do this				I'm moderately certain I can do this					I'm certain I can do this

12. How confident are you that you will be able to hit at least **12 of your 20** golf shots within 12 inches of the cross?

1	2	3	4	5	6	7	8	9	10
I'm certain I can't do this				I'm moderately certain I can do this					I'm certain I can do this

13. How confident are you that you will be able to hit at least **13 of your 20** golf shots within 12 inches of the cross?

1	2	3	4	5	6	7	8	9	10
I'm certain I can't do this				I'm moderately certain I can do this					I'm certain I can do this

14. How confident are you that you will be able to hit at least **14 of your 20** golf shots within 12 inches of the cross?

1	2	3	4	5	6	7	8	9	10
I'm certain I can't do this				I'm moderately certain I can do this					I'm certain I can do this

15. How confident are you that you will be able to hit at least **15 of your 20** golf shots within 12 inches of the cross?

1	2	3	4	5	6	7	8	9	10
I'm certain I can't do this				I'm moderately certain I can do this					I'm certain I can do this

16. How confident are you that you will be able to hit at least **16 of your 20** golf shots within 12 inches of the cross?

1	2	3	4	5	6	7	8	9	10
I'm certain I can't do this				I'm moderately certain I can do this					I'm certain I can do this

17. How confident are you that you will be able to hit <u>at least</u> **17 of your 20** golf shots within 12 inches of the cross?

1 I'm certain I **<u>can't</u>** do this	2	3	4	5 I'm <u>moderately</u> certain I can do this	6	7	8	9	10 I'm certain I **<u>can</u>** do this

18. How confident are you that you will be able to hit <u>at least</u> **18 of your 20** golf shots within 12 inches of the cross?

1 I'm certain I **<u>can't</u>** do this	2	3	4	5 I'm <u>moderately</u> certain I can do this	6	7	8	9	10 I'm certain I **<u>can</u>** do this

19. How confident are you that you will be able to hit <u>at least</u> **19 of your 20** golf shots within 12 inches of the cross?

1 I'm certain I **<u>can't</u>** do this	2	3	4	5 I'm <u>moderately</u> certain I can do this	6	7	8	9	10 I'm certain I **<u>can</u>** do this

20. How confident are you that you will be able to hit **<u>all</u> of your 20** golf shots within12 inches of the cross?

1 I'm certain I **<u>can't</u>** do this	2	3	4	5 I'm <u>moderately</u> certain I can do this	6	7	8	9	10 I'm certain I **<u>can</u>** do this

APPENDIX H

Transcripts of Manipulation Videotapes

APPENDIX H

Pre-Manipulation Tape (presented in a straight-forward, but pleasant lecturing style).

Certainly, we want to have some sense of historical development. Maybe not to the degree that we did with the field at large, but certainly you want to pay attention to that. We also want to pay attention -- I'm going to drop down to the bottom -- to some of the issues and problems that are inherent to each subdiscipline and you will see some themes emerge from one subdiscipline to the other. And these are some of the debates and discussions that we find in the field at large. Also, we will want to pay attention to the role in modern society -- thus trying to take the study of a subdiscipline and make it practical. And, to a lesser degree, you'll want to be aware of the other categories. And Seidentop does a nice job of presenting the subdisciplines in this fashion. So as you read those chapters and as I present the material, I will try to adhere to this outline and you should try to pull those points forward from your reading.

The first subdiscipline we're going to discuss is the one that came into play the earliest in our field and that is exercise physiology. If we think of the definition of physiology -- and you don't need to write this down, it's in the book -- physiology is the study of the functioning of plants and animals and of the activities by which life is maintained and reproduced including the functioning of, and inter-relationships among cells, tissues, organs and systems such as nervous, circulatory and respiratory. Exercise physiology is the study of those activities in that definition, under the stress of exercise -- under the stress of exercise. One of the early leaders in the field of exercise physiology was Dr. George Fitts. In fact, Dr. George is given the title of the "father of exercise physiology." And exercise physiology had its origins in the early 20th century when there was this debate about the systems -- the gymnastic systems -- which one's better? Which one is the "right" system? We should have noted that Fitts was the keynote speaker at the AAPE conference and also to his credit, he developed the first ex. phys. lab and that was at Harvard. Now as we consider exercise physiology -- its role in modern society is rather well-developed. Exercise physiology is probably the most widely known subdiscipline. Part of that is due to the explosion of interest in the adult population. Where are the greatest number of active participants coming from as far as the "fitness craze?" -- In the adult population. More fitness centers are booming. The fitness equipment business is raging, almost out of control -- there's a new shoe every week. And the clothes -- you've got to look it -- you've got to have the "look" if you're going to be in fitness. Videotapes, cable T.V., books -- go out to the bookstore sometime, out at the mall -- look at the shelves of fitness books. So, one of the roles in modern society is to debunk myths.

That's one of the roles of exercise physiology. Certainly another role, as well as debunking myths, is to provide information to the public -- particularly to the layperson -- to the average person. We know there are enough journals out there -- technical journals -- but that information has to become synthesized so it becomes usable by the average person. So, two roles in modern society.

What are the principal areas of specialization? Well, there are two traditional areas. One is the utilization of oxygen in the C.V. system and that's particularly with aerobic activities -- VO_2 max, oxygen uptake. And the second area of specialization has been that of metabolic responses to exercise and training. As we might expect, given this area is growing, two new areas -- one that you're probably very familiar with -- cardiac rehab. and a new flourishing area is that of exercise biochemistry. Really trying to move to the micro-level of analysis in this area.

When we look at the field and we look at exercise physiology, you can look at it from two perspectives -- one, from this new idea of "wellness." A second perspective would be performance improvement or performance enhancement.

Exercise physiology has a pretty broad umbrella right now. Some people come through athletic training and work under the auspices of exercise physiologists. Certainly we recognize the adult fitness being under there -- the athletic training, strength training. And the anticipation is that this area is going to continue to grow. So in some circles there is this urge to become separate -- that we are big enough to support ourselves -- that we don't need to be under the umbrella. A blanket statement as to the roles of professionals. . . if you work at the university -- and many exercise physiologists do -- what are they expected to do at the university level -- and this will be true throughout our discussion of subdisciplines. Teach. Research. Advise. And there may -- with exercise physiologists -- be clinical work. That's not true with every subdiscipline. But these will be the three principal roles of professionals at the university level: Teach, conduct research and advise students. What are the employment opportunities for someone in exercise physiology? What do you think? We talked about career opportunities last week. . . good, bad? If it's the largest growing area what do you think? Pretty good. There are more and more adult fitness centers opening. Corporations are beginning to open more and more corporate fitness programs. There are opportunities in hospitals, certainly in athletic programs. And because of its popularity, there is greater pressure on universities to have a full staff of exercise physiologists to meet the demand of the students. What is the education and/or professional preparation that is required? What can you do with a bachelors degree? Nothing. What can you do with a master's degree in exercise physiology? Are there any possibilities? Yeah, there are. With a master's degree you could get a position as an exercise technician working in cardiac rehab or working in corporate fitness. If you want to go to the university what do you have to have? Got to have a Ph.D. and that's going to become more and more prevalent at all levels. It used to be at some of the smaller institutions, a master's degree would gain you entry. But almost from top to bottom now, as far as size, a Ph.D. is going to be required.

What are some of the issues and problems that face exercise physiologists? Well, one is going to be -- and you'll see this argument throughout -- is the issue of basic versus applied research. Developing the theoretical versus developing the practical. Which way we going to go? There is also some debate about being too narrow and then there is the other side of it -- being too broad. Being too narrow -- going to the cellular level and even below that, as far as understanding. Well what's the utility of, say, exercise biochemistry at the cellular level, to a coach? It's beyond them. It's just not relevant. So one of the issues is that many people are critiquing saying "Look, you're too narrow. You're going so microscopic that the information you're producing is useless -- it just fills the library shelves." And others say: "Well, when we try to broaden out, we can't really hone in on an understanding."

<u>Negative Manipulation Tape</u> (presented in a sarcastic, critical manner)

All right you guys, I don't think I have to tell you this but you guys are doing a piss-poor job of shooting your free throws. I don't want to see any more of this so I'm going to sit here and for the umpteenth time I'm going to explain something to you I have already gone over probably a million times. We are in our sixteenth game this season. That means you've probably heard the same thing sixteen times already so I would think that it would start to sink into your heads after a while -- but NO, NO -- what do you do? You go out there, you get up to the free-throw line, you do whatever you want, you don't follow directions. I want to see you guys start following directions! First of all, remember, the word, the F word -- fundamentals. How many times have I told you, we can make our free throws if we practice the fundamentals. We've been practicing them again and again and again in practice but you get out there in the game and you keep on blowing it. I don't want to see this anymore. Now, the first thing I want you to do when you get up to the free-throw line -- and I want you to do it -- I don't want you to say "but coach, but coach" I don't want to hear that -- just do it! Now the first thing is you're going to have to get up there and relax. You guys are getting up there and you're all jittery -- I don't know what your problem is but you got to just get up there and relax. Start by taking a deep breath, get up to the line and bounce the ball a few times, do whatever it takes -- I don't care as long as you can get the ball in the basket! The second thing I want you to do is concentrate more. Shooting free throws is 90% mental. The way you guys are, you look like you have mental illness rather than you're concentrating and it's 90% mental. The third thing is I want you to get your body in the correct position. Most of you guys are not squaring up to the basket. Some of you are over here, some of you are over there. I want you to be squared up to the basket. I want you to get your index finger on the air hole. How many times have I told you that if you get the proper hand to ball relationship you're going to have an easier time making the basket? Get yourselves squared up. I don't want to see your toes pointing to the left, I don't want to see them pointing to the right. I just want them pointing directly at the basket. The other thing you guys are not doing -- and I've told you a million times -- if I've told you once I've told you a million times, you're not shooting at the front of the rim. I want to see you guys sighting in on the basket, I want to see you sighting in on the front of the basket. Instead, you guys are just banging your shots off the back of the rim or the backboard. I might as well stick a little rubber bumper on the back of the rim because you're never going to make it any other way -- you're just banging them in off the backboard. I want to see you shoot for the front of the rim. The other thing is that you guys aren't using any backspin. When it comes off your hand you have to get a

nice soft touch, you have to get some backspin on it so you have to have your fingertips pushing the ball so you get some backspin. I don't see you guys doing that! In fact, you might as well be standing up there shooting "granny" (underhanded) shots for all I care because you're not going to get any backspin on the ball any other way. The other thing I want you to do is follow-through. And I'm not just talking to the shooter -- I'm now talking to the whole team. First of all, for the shooter, get your finger over the air hole, I want to see your elbow lined up with the basket, I want to see the ball come off your fingertips and then I want to see your wrist look like a "goose-neck" when you get done. Not a "turkey-neck" -- you guys are shooting so horrible that I should just call your's a turkey-neck. As long as we're talking about follow-through, what I want the rest of the team to be doing -- I don't want the rest of you to be lollygaging around out there! You guys are just standing out there with your hands on your hips, you don't have your hands up while you're waiting for the rebound. You guys aren't even getting ready. While the shooter is trying to follow-through, what I want the rest of you guys to be doing is to think about what you're going to do to box out that woman next to you. How are you going to get in front of that person? GET IN FRONT OF THAT PERSON! You guys are not doing a good job of boxing the other team out. It's just a simple matter of stepping in front of the person -- but NO, what are you guys doing? "Oh, I'm too tired, I have my hands on my hips, oh gee, I'm really tired." I DON'T WANT TO SEE ANY MORE OF THAT! When the ball is released, I want you guys to be ready. I want you to have your hands up, I want you to get ready to step out in front of the other person and get the other team boxed out. We're just not doing what we've practiced over and over again. These are fundamentals. You should have learned these things in the second grade! GIVE ME A BREAK! Finally, another thing I want to say about free throws -- and then we'll go on to talk about the rest of all the other things you're doing wrong -- which means we may be in the locker room for a whole hour -- you're doing so many things wrong. The other thing I want to tell you is that you've played a really poor first half -- just a really poor first half. I can't tell you how disappointed I am in that. You guys just have not done a good job at all! You guys are embarrassing me, you guys are embarrassing yourselves, you guys are embarrassing the whole school. If you guys want to get on the bus with your head hanging because you've been such an embarrassment to everyone -- including yourselves -- fine, go ahead and be that way. But I expect you to at least do something to make the school proud, at least do something to make me proud because I'm sick and tired of seeing you guys just lollygaging around out there.

The other thing I wanted to point out to you is that on offense -- we might as well come up with another name for it -- because we're certainly not making it look as if it's supposed to be offense. We're certainly not making it look as if we're attacking the other team. We're certainly not making it look like we're even trying to make a basket! So what I want to see is this person who is playing point, I want to see some action, I want to see some movement out on the floor. I'm not seeing anything that looks like movement out there. You guys are just standing still. You're standing back on your heels. When the point guard is passing you the ball, you're not going to meet the ball, instead, you're just standing there waiting for it to come to you. WAITING FOR IT TO COME TO YOU! We're not playing some kind of slow-motion game here. Basketball is a game of action -- you're supposed to be moving! I want to see the point, if you throw it over on the strong side, I want to see you cut through. Now the other thing is, this guard over here on the weak side, I want you to move out to protect against the fast break! Were getting killed on the fast break! They are fast breaking us to death because you're not moving out here and you're not getting ready to play defense. So I want to see this person slide over and get to move out. And, by the way, this person at the free-throw line, yeah, sure, we call you high post but it not because you're supposed to stand there like a stick in the mud, alright? Instead, I want you sliding down, sliding down and be ready for a pass or a rebound. Alright, now, the other thing I want to talk about is on our press. The thing we're doing wrong -- the first thing were doing wrong -- we're doing a lot of things wrong on our press. I just don't know where your heads have been at for the last sixteen games, I just really don't. But the first thing I want see on our press is I want to see, when the in-bounds pass comes in, I do not want to see that person dribble more than three times. I want to see that dribble stopped! Because we are not going to be able to stop them unless we get that person to pick the ball up and pass it from there. So I want to see that woman's dribble stopped. I do not want to see that person dribbling down -- or halfway down the court-- like I've seen in the past.

Now, I probably have a lot of other things to say to you but I guess you guys can just sit here and think about the things I've been telling you.

<u>Positive Manipulation Tape</u> (presented in an encouraging, positive manner)

Hey, you guys, you know were having a little trouble out there on the free-throw line. You know I've seen you in practice and every time we're in practice you guys are great free-throw shooters and I think we can really help ourselves in this game. We're not down by too much so if we just do a little better job on our free throws I think we'll be right back in the game and we'll be able to win this game. I've told you some of these things before, and I'm not telling them to you to make you nervous or anything like that -- I just want to remind you of them. Just try to think like we're in practice. Because I've seen you guys in practice -- one right after the other you get up there and you just swish, swish, swish, swish -- you know I've seen it again and again so I know you guys can do a really good job on this. Let me just remind you about some of the things that maybe you're just forgetting a little bit while you're up there. The first thing is that I think you guys are just a little too tense and you just need to relax. So when you get up to the free-throw line, dribble the ball a few times, flex your knees a little bit, don't be so tense while you're up there, take a deep breath just before you get ready to shoot and then let the ball go when you feel relaxed. Now, sure, the ref's standing there counting 10 seconds, O.K., but 10 seconds is a long time and you can take the whole 10 seconds so don't let anybody pressure you or make you feel like you have to just jump up there and shoot it, and don't be quite so tense. The other thing I want you to do -- and it's related to not being so tense -- is you do need to concentrate just a little bit more. Like I've seen you in practice and you guys have really good concentration when you're in practice. Maybe it's just the crowd that's just throwing you off a little bit, I'm not really sure. But you guys have done this again and again in practice so let's just think about: "O.K. I can do this, I've done this in practice, I'm just going to do this just like I did it in practice. Because shooting and making a free throw is 90% mental -- alright? So just forget about everything else and just think about it like it's in practice. The other thing I want you to do is to remember that I want you guys to square-up to the basket. I noticed that some of you guys, when you're out there, there were a couple people off to the right-hand side, and there were a couple people off to the left-hand side. Instead, I want to see your toe up to the free-throw line, pointing at the basket and I just want to see you squared-up to the basket. I want to see that elbow square in there -- O.K.? So make sure that your body is in the right position -- just like in practice -- we've done it hundreds of times in practice and you guys have done a good job. I've even make you guys run suicides and your tongues have been hanging out in practice and you've still gone up there an make a lot of free throws so I know that you guys can do this. The other thing I want you to remember -- and it's something else we've talked about in practice -- make sure that you are shooting at the front of the rim -- not the back of the rim, O.K.? Make sure you're shooting at the front of the rim. Because the other thing I want you to do is when you're shooting, put a little more backspin on the ball -- a little more backspin. Make sure it's got that nice soft shooter's "touch." That way we'll get a lot of swishers. Let's see how many swishers we can get O.K.? And I know you guys can do it because again, I've seen you guys ripping the nets during practice and it's just that right now we just somehow got a little bit off in this game. So shoot for the front of the rim and when you get that backspin then, the ball is going to be more likely to bounce in because it has that backspin on it. The other thing that you need to remember, O.K.? and I've seen you guys do this again in practice, so I know that you know this. I want you to remember that when you release the ball it's wrist action. A lot of it's wrist action. It's in the knees, it's in the legs and it's wrist action. So what I want to see is some follow-through with your wrist, O.K.? I want to see your wrist look like a "goose-neck." Now, I know you've probably heard that since second grade and it's just something that you have to keep in mind -- I know it's already in your mind -- it's just something you have to keep it a little more in the front of your mind. The other thing is -- O.K., we didn't have a very good first half. So let's just admit it -- we didn't have a very good first half. But that doesn't mean we're going to have a bad second half. In fact, I have seen you guys come from behind in the past -- I have seen you guys pull out a victory. So let's just pull together, let's just have a little bit of teamwork and let's just try to remember the fundamentals that we've learned in practice along the way. The other thing I wanted to mention about free throws -- and I wanted to talk to not just the shooter, but the rest of the team too. I want to see you guys boxing out the other players a little more. We practiced that a lot in practice and you guys have always done a good job. I mean, you guys have always been able to keep the scrimmage team out. You're always able to step out in front of them and keep them out of there. You've kept them out every time in practice and these guys aren't any different. They aren't any better than you so let's just get out there and make sure were boxing out our players. The other thing I'd like to see a little more of is -- I'm not seeing as much action as I'd like to see out on the floor. I'd like to see more movement on the floor. I'd like to see some real nice crisp passes just like we've been doing in practice. We've had that medicine ball and our arms get really heavy but you guys still come right back and you just snap the pass, O.K.? So I've seen that lots of times and I know that you can do it. So what I'd like to see is the person who's playing point -- I want to see a nice crisp pass over here -- say we go on the strong side -- and then I want to see some motion through here. Now I've seen a few times you've been running this play correctly, but every now and again we kind of just forget our positions so I just want to see you guys remember to do it every time -- not just a few times. So I want to see this person cut through, and over here, on the weak side, don't forget to slide back out because we don't want to get killed on the fast break or anything, so don't forget to slide back out. And I really think we need to just forget about the first half, O.K.? The first half is the first half and we're not very far behind and I know we can catch these guys and I know we can catch up and I know that you guys can do it. So let's just forget about the first half and concentrate on some of these fundamentals that we've learned and hey, let's work hard. As long as we work hard, that's all we can ask. Then, when we get on the bus we can hold our heads up.

<u>Neutral Manipulation Tape</u> (presented in a straightforward, pleasant manner)

Hey you guys, before you leave practice for today, I have to give you some extra information about our tournament that we are going to be in over the weekend. Now the procedures are a little bit different from what we usually do for a game because we don't usually stay overnight -- we just usually take a bus and come back after the game. This time, we will be playing on both Friday and Saturday and we're not coming back between games. So, I want to give you a little bit of information about the trip. I know that this is the first overnight trip some of you have ever made with the team. First of all, as you guys know, we're going to Grand Rapids. It's approximately about an hour or an hour and fifteen minutes from here so that's how long the bus ride will be. Now the one thing that you need to know for sure is that you guys are not responsible for paying for your hotel. You guys are not responsible for paying for breakfast or meals or anything like that -- all the necessities will be taken care of for you. You might, however, want to bring just a little bit of spending money along with you because, who knows, you might want to buy some little thing like a t-shirt in the hotel souvenir shop or something like that. Or you might want to have just a little bit of spending money, but, I really wouldn't recommend bringing along very much money because there's always a chance that it could get stolen or it could get lost or something like that. So, I don't know, you might want to bring $10.00 or so, but I wouldn't bring any more than that. After all, between the bus ride to and from Grand Rapids and the games we play, we won't have a lot of time for shopping. Again, you're not responsible for paying for the hotel, you're not responsible for your meals or anything like that. That will all be provided for you. And I think it should be a pretty good time all-in-all. Now, we will be playing in two games there. We will be playing on Friday night at 7 o'clock so the bus is going to leave here -- we want to go, get checked into our hotel, get all these things done, and then go over to the gym for the tournament -- so the bus is going to be leaving here almost directly after school at 3:30. So your folks should bring you back to school -- if you're going home after school to maybe pick up your duffel bag or whatever -- but you need to be back at the school at 3:15. We're going to get on the bus at 3:30, we're going to head over there, as soon as we get there we're going to check into the hotel and we'll grab something to eat. Now we're going to eat pretty light because we have the game at 7 o'clock. So we don't want to be eating a big meal or anything like that. So we're going to eat kind of light and then we got this game at 7:00. Now, as you know, if we win that game we will be playing in the championship game the next day. If we don't win the game, we will be playing in the consolation game the next day, O.K.? So, if your folks are interested in coming, there are two games they can come to -- Friday at 7 o'clock and one of the two games on Saturday. Now the exact time of the Saturday game is obviously going to depend on whether we win or lose on Friday night. We are scheduled to stay for the championship game anyway on Saturday. If we are not in that game, we'll just stay on and watch the game anyway. Now, what we're going to do is we're going to divide up -- and I've got a list -- I've put people in alphabetical order and I've got a list of who's going to be staying in what rooms together with each other. We're not bringing -- there's just myself and the junior varsity coach that will be coming along and there's only the 12 of you so we pretty much figure that you guys are adults and you guys can handle this and stuff. We'll be just down the hall, so if your folks are concerned about that, we'll be just down the hallway. We'll be checking on you guys periodically. We're going to have a little bit of a curfew -- I know you guys don't really like that but were going to check to make sure you're back in your room at 11:30, O.K.? Because we're going to have to be ready for the game the next day. So you can tell your folks we'll be checking on you so everything will be cool that way. Now on Saturday, after the game, what we'll do is go back to the hotel and you guys can take a shower there if you want and we'll leave from there. We'll be back at the school then -- we should be back at the school by 8 p.m. at the latest. So your folks can pick you back up at the school at 8 o'clock. So, I think this will be a good time and these are the pieces of information that you need. Can you guys think of any other questions that you might have? O.K., well, if you need any more information, or if your folks need any more information --- oh, by the way, I guess the other piece of information you need is that I will provide your folks with the phone number for the hotel and so forth. If they need any additional information, please have them call me.

APPENDIX I

Description of Coaching Behavior Assessment System (CBAS)

APPENDIX I:

COACHING BEHAVIOR ASSESSMENT SYSTEM (CBAS) SCALES USED IN THE PRESENT STUDY.

A. Reactions to Mistakes:

1. Mistake-Contingent Encouragement. Encouragement of a player by a coach following a player's mistake.

2. Mistake-Contingent Technical Instruction. Telling or showing a player who has made a mistake how to make the play correctly.

3. Punishment. A negative response by the coach following an undesirable behavior. May be verbal or nonverbal.

4. Punitive. When mistake-contingent technical instruction and punishment occur in the same communication.

B. Game Related Spontaneous Behaviors:

1. General Technical Instruction. A communication that provides instruction relevant to techniques and strategies of the sport in question.

2. General Encouragement. Encouragement that does not immediately follow a mistake.

3. Organization. Behavior directed at administrative organization.

APPENDIX J

Manipulation Check Questionnaire

APPENDIX J:

EXIT QUESTIONNAIRE

The following questions are to see what kinds of things caught your attention during the testing session.

1. What color was the box (on the tape) you were shooting at? ________

2. During your first "rest period", the experimenter was viewing a videotape. What was the tape about?

   ____

3. After you shot your first set of putts, the experimenter was viewing a different videotape. What was on this tape?

   ____

4. How many putts did you shoot in the total study? _______

5. What was the major purpose of the experiment in which you just participated? ______________________________

6. Please judge your performance on your **first set of 20 golf putts**.

1	2	3	4	5
I performed **worse** than I thought I would		I performed about as well as I thought I would		I performed **better** than I thought I would

7. Please judge your performance on your **second set of 20 golf putts**.

1	2	3	4	5
I performed **worse** than I thought I would		I performed about as well as I thought I would		I performed **better** than I thought I would

8. How many putts did you hit so they stopped directly on the red X during your **first set** of 20? ______

9. How many putts did you hit so they stopped directly on the red X during your **second set** of 20? ______

10. What color was the biofeedback dot when it was placed on your hand? __________

11. Watching the videotape of the coach while I was resting:

1	2	3	4	5
Helped my performance		Had no affect on my performance		Hurt my performance

12. Do you feel the coach on the videotape was:

1	2	3	4	5
Very Negative Toward Her Team		Neutral Toward Her Team		Very Positive Toward Her Team

APPENDIX K

Informed Consent Form

APPENDIX K

INFORMED CONSENT FORM

Michigan State University
Department of Physical Education and Exercise Science

Principal Investigator: Richard R. Albrecht, M.A.
Doctoral Candidate/Research Assistant
Dept. of Physical Education and Exercise Science
Telephone: 353-9400 (A-212 East Fee Hall)

Faculty Advisor: Deborah L. Feltz, Ph.D.
Chairperson and Professor
Dept. of Physical Education and Exercise Science
Telephone: 355-4732 (138 I.M. Sports-Circle)

I, ______________________________, hereby agree to participate as a volunteer in the study of college student performance on a golf putting task. The purpose of this study is to collect normative data regarding this motor task and conduct a preliminary investigation into the way feelings and perceptions affect performance. The results of the study will be used to address previously neglected areas in the sport performance literature.

Data will be collected by the principal investigator. The session will take approximately 45-50 minutes and be held in room E-4, East Fee Hall on the M.S.U. campus. I will be tested individually and will: (a) sit quietly for about 5 minutes; (b) complete three short questionnaires regarding my current feelings and perceptions about various physical activities and my confidence in performing these activities, and (c) attempt 20 golf putts.

None of the information collected will be of a "sensitive" nature. In addition, the researchers have taken steps to protect the confidentiality of all individuals participating in the study. No one except the principal investigator will have access to the my answers and/or performance results. In reporting the results of this study, only summary data will be reported and no individual(s) will ever be identified in any way.

My participation in this study is strictly voluntary. If I choose not to participate, there will be no penalty. If I do participate, I may choose to omit questionnaire items I do not wish to answer or I may discontinue my participation in the study at any time. If I complete the study, I will receive 2 half-hour "participation in psychology research" credits.

I have read the above and I understand its contents and I freely agree to participate in this golfing study. I acknowledge that I am 18 years of age or older.

______________________________ ______________________
Signature **Date**

APPENDIX L

BIODOT Color Reference Chart

APPENDIX L

BIODOTS

Color approximations and general Interpretations of stress:

Violet 94.6°F. - Very relaxed

Blue 93.6°F. - Calm

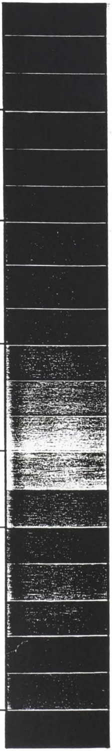
Turquoise 92.6°F. - Relaxing

Green 91.6°F. - Involved (nml)

Yellow 90.6°F. - Unsettled

Amber 89.6°F. - Tense

Black 87°F. - Very Tense



APPENDIX M

Calculations for χ^2 "goodness of fit" test between hypothesized and fully-identified causal models

APPENDIX M

The following formula for testing a hypothesized (overidentified) causal model against the fully-identified model is taken from Pedhazur (1982; pp. 617-628).

It is first necessary to calculate $\underline{R}^2_m$ which is the generalized squared multiple correlation. For the fully recursive model:

$$\underline{R}^2_m = 1 - (1 - \underline{R}^2_1)(1 - \underline{R}^2_2)\ldots(1 - \underline{R}^2_p)$$

Where:

$\underline{R}^2_i$ = the ordinary squared multiple correlation coefficient of $\underline{i}$th equation.

A statistic similar to $\underline{R}^2_m$ is then calculated for the overidentified model ($\underline{M}$):

$$\underline{M} = 1 - (1 - \underline{R}^2_1)(1 - \underline{R}^2_2)\ldots(1 - \underline{R}^2_p)$$

To quote Pedhazur (1982):

$\underline{M}$ is calculated in the same manner as is $\underline{R}^2_m$, except that some or all of the $\underline{R}^2$s are based on a model in which some of the paths have been deleted, whereas the $\underline{R}^2$s [used in the calculation of $\underline{R}^2_m$] are based on a fully recursive model. Therefore, $\underline{M}$ can take values between zero and $\underline{R}^2_m$. When the fit of an overidentified model is perfect (i.e., when $\underline{R}$ is exactly reporduced), $\underline{R}^2_{m'} = \underline{M}$. The smaller M is in relation to $\underline{R}^2_m$ the poorer the fit of the overidentified model. (p. 619)

Therefore, a measure of goodnes of fit ($\underline{Q}$) is calculated by taking the ratio between $\underline{M}$ and $\underline{R}^2_m$ as follows:

$$\underline{Q} = \frac{1 - \underline{R}^2_m}{1 - \underline{M}}$$

Finally, $\underline{Q}$ is tested for significance using the $\underline{W}$ statistic which has an approximate χ^2 distribution with degrees of freedom equal to the number of path coefficients hypothesized to be equal to zero. $\underline{W}$ is calulated using the following equation:

$$\underline{W} = -(\underline{N} - \underline{d}) \log_{\underline{e}} \underline{Q}$$

Where:

$\underline{N}$ = sample size
$\underline{d}$ = number of path coefficients hypothesized to be zero
$\log_{\underline{e}}$ = the natural logarithm

In the present study:

$$\underline{R}^2{}_m = 1 - (1 - \underline{R}^2{}_1)(1 - \underline{R}^2{}_2)(1 - \underline{R}^2{}_3)(1 - \underline{R}^2{}_4)$$

$$\underline{R}^2{}_m = 1 - (.892)^2 (.834)^2 (.912)^2 (.939)^2$$

$$\underline{R}^2{}_m = 1 - (.795)(.696)(.832)(.882)$$

$$\underline{R}^2{}_m = 1 - .406$$

$$\underline{R}^2{}_m = .594$$

$$\underline{M} = 1 - (1 - \underline{R}^2{}_1)(1 - \underline{R}^2{}_2)(1 - \underline{R}^2{}_3)(1 - \underline{R}^2{}_4)$$

$$\underline{M} = 1 - (.892)^2 (.913)^2 (.966)^2 (.982)^2$$

$$\underline{M} = 1 - (.795)(.834)(.933)(.964)$$

$$\underline{M} = 1 - .596$$

$$\underline{M} = .403$$

$$\underline{Q} = \frac{1 - \underline{R}^2{}_m}{1 - \underline{M}}$$

$$\underline{Q} = \frac{1 - .594}{1 - .403} = .680$$

$\underline{W} = -(\underline{N} - \underline{d}) \log_{\underline{e}} \underline{Q}$

$\underline{W} = -(54 - 5) \log_{\underline{e}} .680$

$\underline{W} = -(49) \log_{\underline{e}} .680$

$\underline{W} = 18.90$

Because the statistic $\underline{W}$ approximates a χ^2 distribution with degrees of freedom equal to the number of path coefficients hypothesized to be equal to zero:

$\underline{W} = \chi^2_{(5)} = 18.90;\ \underline{p} < .01$

APPENDIX N

University Approval for Use of Human Subjects

APPENDIX N

MICHIGAN STATE UNIVERSITY

OFFICE OF VICE PRESIDENT FOR RESEARCH
AND DEAN OF THE GRADUATE SCHOOL

EAST LANSING • MICHIGAN • 48824-1046

March 6, 1992

Richard R. Albrecht
Office of Medical Education
A-214 E. Fee Hall

RE: THE INFLUENCE OF POSITIVE AND NEGATIVE COACHING STYLES ON THE COGNITIVE PRIMING OF SUCCESS--AND FAILURE-RELATED SELF-SCHEMATA, SELF-EFFICACY AND MOTOR PERFORMANCE, 90-604

Dear Mr. Albrecht:

UCRIHS' review of the above referenced project has now been completed. I am pleased to advise that the rights and welfare of the human subjects appear to be adequately protected and the Committee, therefore, has approved this project.

You are reminded that UCRIHS approval is valid for one calendar year. If you plan to continue this project beyond one year, please make provisions for obtaining appropriate UCRIHS approval one month prior to March 2, 1993. There will be a maximum of four renewals possible. If you wish to continue a project beyond that time, it must again be submitted for complete review.

Any changes in procedures involving human subjects must be reviewed by the UCRIHS prior to initiation of the change. UCRIHS must also be notified promptly of any problems (unexpected side effects, complaints, etc.) involving human subjects during the course of the work.

Thank you for bringing this project to our attention. If we can be of any future help, please do not hesitate to let us know.

Sincerely,

David E. Wright

David E. Wright, Ph.D., Chair
University Committee on Research
Involving Human Subjects (UCRIHS)

DEW/deo

cc: Dr. Deborah Feltz

APPENDIX O

Raw Data

APPENDIX O

```
TITLE "DISSERTATION"
SUBTITLE "CLEANING FREQUENCIES"
FILE HANDLE DATA1/NAME="PHASE2 DATA A1"
DATA LIST FILE DATA1 RECORDS = 9
 /1 ID 1-3 REC1 4 AGE 6-7 RACE 8 CLASS 9 GPA 10 MAJOR 11-12 GOLF 13
    GOLFYR 14 CLUBS 15 TEAM 16 COACH 17 PREDES1 TO PREDES10 19-28
    PREIMP1 TO PREIMP10 30-39
 /2 TENSE1 6 ANGRY1 7 WORN1 8 UNHAP1 9 LIVELY1 10 CONFUS1 11 PEEVED1 12
    SAD1 13 ACTIVE1 14 EDGE1 15 GROUCH1 16 BLUE1 17 ENERGY1 18
    HOPELES1 19 UNEASY1 20 RESTLES1 21 CONCENT1 22 FATIG1 23 ANNOY1 24
    DISCOUR1 25 RESENT1 26 NERV1 27 MISER1 28 CHEER1 29 BITTER1 30
    EXHAUST1 31 ANX1 32 HELPLS1 33 WEARY1 34 BEWILD1 35 FURY1 36
    PEP1 37 WORTHLS1 38 FORGET1 39 VIGOR1 40 UNCERT1 41 BUSH1 42
 /3 PRESE1 TO PRESE20 6-45
 /4 PRPERF1 6-7 PRPERF2 9-10 PRPERF3 12-13 PRPERF4 15-16 PRPERF5 18-19
    PRPERF6 21-22 PRPERF7 24-25 PRPERF8 27-28 PRPERF9 30-31
    PRPERF10 33-34 PRPERF11 36-37 PRPERF12 39-40 PRPERF13 42-43
    PRPERF14 45-46 PRPERF15 48-49 PRPERF16 51-52 PRPERF17 54-55
    PRPERF18 57-58 PRPERF19 60-61 PRPERF20 63-64
 /5 ORDER 6-8 SCHEMA 10 COND 11 PSTDES1 TO PSTDES10 19-28
    PSTIMP1 TO PSTIMP10 30-39
 /6 TENSE2 6 ANGRY2 7 WORN2 8 UNHAP2 9 LIVELY2 10 CONFUS2 11 PEEVED2 12
    SAD2 13 ACTIVE2 14 EDGE2 15 GROUCH2 16 BLUE2 17 ENERGY2 18
    HOPELES2 19 UNEASY2 20 RESTLES2 21 CONCENT2 22 FATIG2 23 ANNOY2 24
    DISCOUR2 25 RESENT2 26 NERV2 27 MISER2 28 CHEER2 29 BITTER2 30
    EXHAUST2 31 ANX2 32 HELPLS2 33 WEARY2 34 BEWILD2 35 FURY2 36
    PEP2 37 WORTHLS2 38 FORGET2 39 VIGOR2 40 UNCERT2 41 BUSH2 42
 /7 PSTSE1 TO PSTSE20 6-45
 /8 PTPERF1 6-7 PTPERF2 9-10 PTPERF3 12-13 PTPERF4 15-16 PTPERF5 18-19
    PTPERF6 21-22 PTPERF7 24-25 PTPERF8 27-28 PTPERF9 30-31
    PTPERF10 33-34 PTPERF11 36-37 PTPERF12 39-40 PTPERF13 42-43
    PTPERF14 45-46 PTPERF15 48-49 PTPERF16 51-52 PTPERF17 54-55
    PTPERF18 57-58 PTPERF19 60-61 PTPERF20 63-64
 /9 COLOR 6 TAPE1 7 TAPE2 8 PUTTS 9 PURPOSE 10 FIRST20 11 NEXT20 12
    HOLE1 13 HOLE2 14 DOT 15 HELPHURT 16 POSNEG 17
VARIABLE LABELS
 GOLF GOLF PLAYED IN LIFETIME
 GOLFYR GOLF PLAYED IN LAST YR.
 CLUBS EVER OWN GOLF CLUBS?
 TEAM EVER PLAYED ON COMPET TEAM?
 COACH EXPERIENCE ON COMP.TEAM W COACH
 PREDES1 PRETEST-EXCELLENT REFLEXES
 PREDES2 PRETEST-NOT AGILE AND GRACEFUL
 PREDES3 PRETEST-STRONG PHYSIQUE
 PREDES4 PRETEST-CAN'T RUN FAST
 PREDES5 PRETEST-NO PHYSICAL DEXTERITY
 PREDES6 PRETEST-POOR MUSCLE TONE
 PREDES7 PRETEST-LITTLE PRIDE IN ABILITY
 PREDES8 PRETEST-SPEED HAS HELPED ME
 PREDES9 PRETEST-STRONG GRIP
 PREDES10 PRETEST-CAN DO WHAT OTHERS CAN'T
 PREIMP1 PRETEST-EXCELLENT REFLEXES
 PREIMP2 PRETEST-NOT AGILE AND GRACEFUL
 PREIMP3 PRETEST-STRONG PHYSIQUE
 PREIMP4 PRETEST-CAN'T RUN FAST
 PREIMP5 PRETEST-NO PHYSICAL DEXTERITY
 PREIMP6 PRETEST-POOR MUSCLE TONE
 PREIMP7 PRETEST-LITTLE PRIDE IN ABILITY
 PREIMP8 PRETEST-SPEED HAS HELPED ME
 PREIMP9 PRETEST-STRONG GRIP
```

PREIMP10 PRETEST-CAN DO WHAT OTHERS CAN'T
TENSE1 PRETEST POMS-TENSE
ANGRY1 PRETEST POMS-ANGRY
WORN1 PRETEST POMS-WORN OUT
UNHAP1 PRESTEST POMS-UNHAPPY
LIVELY1 PRETEST POMS-LIVELY
CONFUS1 PRETEST POMS-CONFUSED
PEEVED1 PRETEST POMS-PEEVED
SAD1 PRETEST POMS-SAD
ACTIVE1 PRETEST POMS-ACTIVE
EDGE1 PRETEST POMS-ON EDGE
GROUCH1 PRETEST POMS-GROUCHY
BLUE1 PRETEST POMS-BLUE
ENERGY1 PRETEST POMS-ENERGETIC
HOPELES1 PRETEST POMS-HOPELESS
UNEASY1 PRETEST POMS-UNEASY
RESTLES1 PRETEST POMS-RESTLESS
CONCENT1 PRETEST POMS-UNABLE TO CONCENTRATE
FATIG1 PRETEST POMS-FATIGUED
ANNOY1 PRETEST POMS-ANNOYED
DISCOUR1 PRETEST POMS-DISCOURAGED
RESENT1 PRETEST POMS-RESENTFUL
NERV1 PRETEST POMS-NERVOUS
MISER1 PRETEST POMS-MISERABLE
CHEER1 PRETEST POMS-CHEERFUL
BITTER1 PRETEST POMS-BITTER
EXHAUST1 PRETEST POMS-EXHAUSTED
ANX1 PRETEST POMS-ANXIOUS
HELPLS1 PRETEST POMS-HELPLESS
WEARY1 PRETEST POMS-WEARY
BEWILD1 PRETEST POMS-BEWILDERED
FURY1 PRETEST POMS-FURIOUS
PEP1 PRETEST POMS-PEP
WORTHLS1 PRETEST POMS-WORTHLESS
FORGET1 PRETEST POMS-FORGETFUL
VIGOR1 PRETEST POMS-VIGOROUS
UNCERT1 PRETEST POMS-UNCERTAIN ABOUT THINGS
BUSH1 PRETEST POMS-BUSHED
PRESE1 PRE 1 OF 20
PRESE2 PRE 2 OF 20
PRESE3 PRE 3 OF 20
PRESE4 PRE 4 OF 20
PRESE5 PRE 5 OF 20
PRESE6 PRE 6 OF 20
PRESE7 PRE 7 OF 20
PRESE8 PRE 8 OF 20
PRESE9 PRE 9 OF 20
PRESE10 PRE 10 OF 20
PRESE11 PRE 11 OF 20
PRESE12 PRE 12 OF 20
PRESE13 PRE 13 OF 20
PRESE14 PRE 14 OF 20
PRESE15 PRE 15 OF 20
PRESE16 PRE 16 OF 20
PRESE17 PRE 17 OF 20
PRESE18 PRE 18 OF 20
PRESE19 PRE 19 OF 20
PRESE20 PRE 20 OF 20
PRPERF1 PRE PERF TRIAL 1
PRPERF2 PRE PERF TRIAL 2
PRPERF3 PRE PERF TRIAL 3
PRPERF4 PRE PERF TRIAL 4

PRPERF5 PRE PERF TRIAL 5
PRPERF6 PRE PERF TRIAL 6
PRPERF7 PRE PERF TRIAL 7
PRPERF8 PRE PERF TRIAL 8
PRPERF9 PRE PERF TRIAL 9
PRPERF10 PRE PERF TRIAL 10
PRPERF11 PRE PERF TRIAL 11
PRPERF12 PRE PERF TRIAL 12
PRPERF13 PRE PERF TRIAL 13
PRPERF14 PRE PERF TRIAL 14
PRPERF15 PRE PERF TRIAL 15
PRPERF16 PRE PERF TRIAL 16
PRPERF17 PRE PERF TRIAL 17
PRPERF18 PRE PERF TRIAL 18
PRPERF19 PRE PERF TRIAL 19
PRPERF20 PRE PERF TRIAL 20
ORDER PRESENTATION ORDER
SCHEMA SELF-SCHEMA TYPE
COND TREATMENT CONDITION
PSTDES1 POSTTEST-EXCELLENT REFLEXES
PSTDES2 POSTEST-NOT AGILE AND GRACEFUL
PSTDES3 POSTEST-STRONG PHYSIQUE
PSTDES4 POSTEST-CAN'T RUN FAST
PSTDES5 POSTEST-NO PHYSICAL DEXTERITY
PSTDES6 POSTEST-POOR MUSCLE TONE
PSTDES7 POSTEST-LITTLE PRIDE IN ABILITY
PSTDES8 POSTEST-SPEED HAS HELPED ME
PSTDES9 POSTEST-STRONG GRIP
PSTDES10 POSTEST-CAN DO WHAT OTHERS CAN'T
PSTIMP1 POSTEST-EXCELLENT REFLEXES
PSTIMP2 POSTEST-NOT AGILE AND GRACEFUL
PSTIMP3 POSTEST-STRONG PHYSIQUE
PSTIMP4 POSTEST-CAN'T RUN FAST
PSTIMP5 POSTEST-NO PHYSICAL DEXTERITY
PSTIMP6 POSTEST-POOR MUSCLE TONE
PSTIMP7 POSTEST-LITTLE PRIDE IN ABILITY
PSTIMP8 POSTEST-SPEED HAS HELPED ME
PSTIMP9 POSTEST-STRONG GRIP
PSTIMP10 POSTEST-CAN DO WHAT OTHERS CAN'T
TENSE2 POSTEST POMS-TENSE
ANGRY2 POSTEST POMS-ANGRY
WORN2 POSTEST POMS-WORN OUT
UNHAP2 POSSTEST POMS-UNHAPPY
LIVELY2 POSTEST POMS-LIVELY
CONFUS2 POSTEST POMS-CONFUSED
PEEVED2 PRETEST POMS-PEEVED
SAD2 POSTEST POMS-SAD
ACTIVE2 POSTEST POMS-ACTIVE
EDGE2 POSTEST POMS-ON EDGE
GROUCH2 POSTEST POMS-GROUCHY
BLUE2 POSTEST POMS-BLUE
ENERGY2 POSTEST POMS-ENERGETIC
HOPELES2 POSTEST POMS-HOPELESS
UNEASY2 POSTEST POMS-UNEASY
RESTLES2 POSTEST POMS-RESTLESS
CONCENT2 POSTEST POMS-UNABLE TO CONCENTRATE
FATIG2 POSTEST POMS-FATIGUED
ANNOY2 POSTEST POMS-ANNOYED
DISCOUR2 POSTEST POMS-DISCOURAGED
RESENT2 POSTEST POMS-RESENTFUL
NERV2 POSTEST POMS-NERVOUS
MISER2 POSTEST POMS-MISERABLE

CHEER2 POSTEST POMS-CHEERFUL
BITTER2 POSTEST POMS-BITTER
EXHAUST2 POSTEST POMS-EXHAUSTED
ANX2 POSTEST POMS-ANXIOUS
HELPLS2 POSTEST POMS-HELPLESS
WEARY2 POSTEST POMS-WEARY
BEWILD2 POSTEST POMS-BEWILDERED
FURY2 POSTEST POMS-FURIOUS
PEP2 POSTEST POMS-PEP
WORTHLS2 POSTEST POMS-WORTHLESS
FORGET2 POSTEST POMS-FORGETFUL
VIGOR2 POSTEST POMS-VIGOROUS
UNCERT2 POSTEST POMS-UNCERTAIN ABOUT THINGS
BUSH2 POSTEST POMS-BUSHED
PSTSE1 POST 1 OF 20
PSTSE2 POST 2 OF 20
PSTSE3 POST 3 OF 20
PSTSE4 POST 4 OF 20
PSTSE5 POST 5 OF 20
PSTSE6 POST 6 OF 20
PSTSE7 POST 7 OF 20
PSTSE8 POST 8 OF 20
PSTSE9 POST 9 OF 20
PSTSE10 POST 10 OF 20
PSTSE11 POST 11 OF 20
PSTSE12 POST 12 OF 20
PSTSE13 POST 13 OF 20
PSTSE14 POST 14 OF 20
PSTSE15 POST 15 OF 20
PSTSE16 POST 16 OF 20
PSTSE17 POST 17 OF 20
PSTSE18 POST 18 OF 20
PSTSE19 POST 19 OF 20
PSTSE20 POST 20 OF 20
PTPERF1 POST PERF TRIAL 1
PTPERF2 POST PERF TRIAL 2
PTPERF3 POST PERF TRIAL 3
PTPERF4 POST PERF TRIAL 4
PTPERF5 POST PERF TRIAL 5
PTPERF6 POST PERF TRIAL 6
PTPERF7 POST PERF TRIAL 7
PTPERF8 POST PERF TRIAL 8
PTPERF9 POST PERF TRIAL 9
PTPERF10 POST PERF TRIAL 10
PTPERF11 POST PERF TRIAL 11
PTPERF12 POST PERF TRIAL 12
PTPERF13 POST PERF TRIAL 13
PTPERF14 POST PERF TRIAL 14
PTPERF15 POST PERF TRIAL 15
PTPERF16 POST PERF TRIAL 16
PTPERF17 POST PERF TRIAL 17
PTPERF18 POST PERF TRIAL 18
PTPERF19 POST PERF TRIAL 19
PTPERF20 POST PERF TRIAL 20
COLOR COLOR OF BOX
TAPE1 WHAT WAS FIRST TAPE ABOUT?
TAPE2 WHAT WAS SECOND TAPE ABOUT?
PUTTS TOTAL NUMBER OF PUTTS TAKEN
PURPOSE WHAT WAS PURPOSE OF STUDY?
FIRST20 JUDGE YOUR PERF ON FIRST 20 PUTTS
NEXT20 JUDGE YOUR PERF ON SECOND 20 PUTTS
HOLE1 HOW MANY PUTTS IN BOX ON FIRST 20?

```
 HOLE2 HOW MANY PUTTS IN BOX ON SECOND 20?
 DOT WHAT WAS COLOR OF BIODOT?
 HELPHURT DID WATCHING TAPE HELP,HURT OR NEITHER?
 POSNEG WAS THE COACH POSITIVE OR NEGATIVE?
RECODE PREIMP1 TO PREIMP10 (1=7) (2=6) (3=5) (4=4) (5=3) (6=2) (7=1)
RECODE PSTIMP1 TO PSTIMP10 (1=7) (2=6) (3=5) (4=4) (5=3) (6=2) (7=1)
RECODE PREDES1 (1=7) (2=6) (3=6) (4=4) (5=3) (6=2) (7=1)
RECODE PREDES3 (1=7) (2=6) (3=6) (4=4) (5=3) (6=2) (7=1)
RECODE PREDES8 (1=7) (2=6) (3=6) (4=4) (5=3) (6=2) (7=1)
RECODE PREDES9 (1=7) (2=6) (3=6) (4=4) (5=3) (6=2) (7=1)
RECODE PREDES10 (1=7) (2=6) (3=6) (4=4) (5=3) (6=2) (7=1)
RECODE PSTDES1 (1=7) (2=6) (3=6) (4=4) (5=3) (6=2) (7=1)
RECODE PSTDES3 (1=7) (2=6) (3=6) (4=4) (5=3) (6=2) (7=1)
RECODE PSTDES8 (1=7) (2=6) (3=6) (4=4) (5=3) (6=2) (7=1)
RECODE PSTDES9 (1=7) (2=6) (3=6) (4=4) (5=3) (6=2) (7=1)
RECODE PSTDES10 (1=7) (2=6) (3=6) (4=4) (5=3) (6=2) (7=1)
COMPUTE PRESCH1 = PREDES1*PREIMP1
COMPUTE PRESCH2 = PREDES2*PREIMP2
COMPUTE PRESCH3 = PREDES3*PREIMP3
COMPUTE PRESCH4 = PREDES4*PREIMP4
COMPUTE PRESCH5 = PREDES5*PREIMP5
COMPUTE PRESCH6 = PREDES6*PREIMP6
COMPUTE PRESCH7 = PREDES7*PREIMP7
COMPUTE PRESCH8 = PREDES8*PREIMP8
COMPUTE PRESCH9 = PREDES9*PREIMP9
COMPUTE PRESCH10 = PREDES10*PREIMP10
COMPUTE PSTSCH1 = PSTDES1*PSTIMP1
COMPUTE PSTSCH2 = PSTDES2*PSTIMP2
COMPUTE PSTSCH3 = PSTDES3*PSTIMP3
COMPUTE PSTSCH4 = PSTDES4*PSTIMP4
COMPUTE PSTSCH5 = PSTDES5*PSTIMP5
COMPUTE PSTSCH6 = PSTDES6*PSTIMP6
COMPUTE PSTSCH7 = PSTDES7*PSTIMP7
COMPUTE PSTSCH8 = PSTDES8*PSTIMP8
COMPUTE PSTSCH9 = PSTDES9*PSTIMP9
COMPUTE PSTSCH10 = PSTDES10*PSTIMP10
COMPUTE PRESCHEM = PRESCH1+PRESCH2+PRESCH3+PRESCH4+PRESCH5+PRESCH6+
   PRESCH7+PRESCH8+PRESCH9+PRESCH10
COMPUTE PSTSCHEM = PSTSCH1+PSTSCH2+PSTSCH3+PSTSCH4+PSTSCH5+PSTSCH6+
   PSTSCH7+PSTSCH8+PSTSCH9+PSTSCH10
COMPUTE PREBLK1 = PRPERF1+PRPERF2+PRPERF3+PRPERF4+PRPERF5
COMPUTE PREBLK2 = PRPERF6+PRPERF7+PRPERF8+PRPERF9+PRPERF10
COMPUTE PREBLK3 = PRPERF11+PRPERF12+PRPERF13+PRPERF14+PRPERF15
COMPUTE PREBLK4 = PRPERF16+PRPERF17+PRPERF18+PRPERF19+PRPERF20
COMPUTE TOTPERF1 =           PREBLK2+PREBLK3+PREBLK4
COMPUTE PSTBLK1 = PTPERF1+PTPERF2+PTPERF3+PTPERF4+PTPERF5
COMPUTE PSTBLK2 = PTPERF6+PTPERF7+PTPERF8+PTPERF9+PTPERF10
COMPUTE PSTBLK3 = PTPERF11+PTPERF12+PTPERF13+PTPERF14+PTPERF15
COMPUTE PSTBLK4 = PTPERF16+PTPERF17+PTPERF18+PTPERF19+PTPERF20
COMPUTE TOTPERF2 = PSTBLK1+PSTBLK2+PSTBLK3
COMPUTE POMSTA1 = TENSE1+EDGE1+UNEASY1+RESTLES1+NERV1+ANX1
COMPUTE POMSDD1 = UNHAP1+SAD1+BLUE1+HOPELES1+DISCOUR1+
   MISER1+HELPLS1+WORTHLS1
COMPUTE POMSAH1 = ANGRY1+PEEVED1+GROUCH1+ANNOY1+RESENT1+BITTER1+FURY1
COMPUTE POMSVA1 = LIVELY1+ACTIVE1+ENERGY1+CHEER1+PEP1+VIGOR1
COMPUTE POMSFI1 = WORN1+FATIG1+EXHAUST1+WEARY1+BUSH1
COMPUTE POMSCB1 = CONFUS1+CONCENT1+BEWILD1+FORGET1+UNCERT1
COMPUTE POMSTA2 = TENSE2+EDGE2+UNEASY2+RESTLES2+NERV2+ANX2
COMPUTE POMSDD2 = UNHAP2+SAD2+BLUE2+HOPELES2+DISCOUR2+
   MISER2+HELPLS2+WORTHLS2
COMPUTE POMSAH2 = ANGRY2+PEEVED2+GROUCH2+ANNOY2+RESENT2+BITTER2+FURY2
COMPUTE POMSVA2 = LIVELY2+ACTIVE2+ENERGY2+CHEER2+PEP2+VIGOR2
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COMPUTE POMSFI2 = WORN2+FATIG2+EXHAUST2+WEARY2+BUSH2
COMPUTE POMSCB2 = CONFUS2+CONCENT2+BEWILD2+FORGET2+UNCERT2
COMPUTE POMSTMD1 = POMSTA1+POMSDD1+POMSAH1+POMSFI1+POMSCB1-POMSVA1
COMPUTE POMSTMD2 = POMSTA2+POMSDD2+POMSAH2+POMSFI2+POMSCB2-POMSVA2
COMPUTE SE1 = PRESE1+PRESE2+PRESE3+PRESE4+PRESE5+
              PRESE6+PRESE7+PRESE8+PRESE9+PRESE10+
              PRESE11+PRESE12+PRESE13+PRESE14+PRESE15+
              PRESE16+PRESE17+PRESE18+PRESE19+PRESE20
COMPUTE SE2 = PSTSE1+PSTSE2+PSTSE3+PSTSE4+PSTSE5+
              PSTSE6+PSTSE7+PSTSE8+PSTSE9+PSTSE10+
              PSTSE11+PSTSE12+PSTSE13+PSTSE14+PSTSE15+
              PSTSE16+PSTSE17+PSTSE18+PSTSE19+PSTSE20
COMPUTE SCHEMDIF = PRESCHEM - PSTSCHEM
COMPUTE SEDIF = SE1-SE2
COMPUTE POMSDIF = POMSTMD1-POMSTMD2
COMPUTE PERFDIF = TOTPERF1-TOTPERF2
RECODE ORDER (123=1) (132=2) (213=3) (231=4) (312=5) (321=6)
IF (COND EQ 1) OR (COND EQ 3) DUMMY = 0
IF (COND EQ 2) OR (COND EQ 4) DUMMY = 1
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