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dissertation entitled

The Interactive Effect of Learners' Cognitive Information Style and Instructors' Feedback on Learners' Level of Arousal, Perceptions of Ability, and Self-Esteem

presented by

George Keith Chapin

has been accepted towards fulfillment of the requirements for

Ph.D. degree in Physical Education and Exercise Science

Martha E. Ewing
Major professor

Date August 3, 1995

ABSTRACT

THE INTERACTIVE EFFECT OF LEARNERS' COGNITIVE INFORMATION STYLE AND INSTRUCTORS' FEEDBACK ON LEARNERS' LEVEL OF AROUSAL, PERCEPTIONS OF ABILITY, AND SELF-ESTEEM

By

George Keith Chapin

According to Miller (1990) individuals cope with stressful situations via one of two cognitive information styles. Blunters attempt to block-out or avoid the stressful stimuli from the situation, whereas a monitor is characterized as an individual who seeks-out information about the stressful situation. Miller has proposed that individuals exhibit concomitant physiological responses along with the characteristic behavior associated with each respective cognitive information style. Previous research using the construct has been conducted in medical settings (e.g., Miller & Mangan, 1983) and in the context of viewing a horror film (e.g., Sparks & Spirek, 1988). The purpose of the study was twofold: (a) to test the construct in the psychomotor domain, and (b) to test the effect on participants' physiological arousal, performance on a tennis task, and self-perceptions when the participants were exposed to an information condition that was compatible or dissonant with the individual's cognitive information style.

Fifty-six, male undergraduate students from a mid-western university participated in the study. Each participant's cognitive

information style was determined using a modified-version of the Miller Behavioral Style Scale (MBSS; Miller, 1987). In Phase 1 of the study participants completed 20 trials on the anticipation timing task. Analysis of the data revealed that monitors sought performance-related information significantly more than did blunters. Further, the heart rates of the two groups did not differ because the elements of the situation were compatible with the cognitive information style of each participant.

During the experimental phase of the study, one half of the monitor and blunter groups were randomly assigned to a high information condition; while the other half of the groups were assigned to a low information condition. Participants completed three trial blocks of five trials each on the tennis task. Multivariate analyses revealed that the heart rates of participants in the high information condition were significantly lower that the heart rates of participants in the low information condition. Further, a three-way interaction effect (cognitive information style x information condition x trials) was divulged for performance on the motor task. However, post-hoc tests failed to find any group differences. Additionally, monitors in the low information condition expressed significantly lower levels perceived ability in tennis in comparison to participants in the three other groups. Finally, blunters indicated a stronger preference for internal sources of competence information in comparison to monitors. In summary, the data supported Miller's (1990) theoretical suppositions.

In loving memory

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my mother,

Helen Mae Chapin

(1920-1989)

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ACKNOWLEDGEMENTS

As I stand at the precipice of completing my doctoral studies, I would be remiss if I did not give credit where credit is due. Although the doctoral degree is awarded to an individual, the degree is earned only through the assistance of many. To each of you I offer a sincere and heartfelt, "Thank you for all that you did for me!"

Mr. Douglas Raerick who demonstrated great generosity by establishing the Wohlgamuth Memorial Fellowship which supported this doctoral research project.

Dr. Marty Ewing, my dissertation director and academic advisor, who over the course of the past seven years became a great friend as well as my mentor.

Dr. Vern Seefeldt who gave me numerous opportunities to contribute to the future of youth sport through the service mission of the Youth Sports Institute.

Dr. Evelyn Oka whose thoughtful guidance challenged me to think at another level and to try to understand the cognitions of others.

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George A. Chapin, my father, who provided much paternal support and guidance through this educational venture.

Lawrence and Mildred Wolf, my in-laws, who have given so much to us to help us through the challenging times over the past few years.

Prayer partners from First Christian in Middletown, OH, University Baptist in East Lansing, MI, and Dayspring Assembly of God in Bowling Green, OH who have been on their knees in earnest petition for our well-being.

My children, Kevin, Kara, and Kyle, who have allowed me to be absent and yet have demonstrated great unconditional love, the love of a child.

My wife, Monica, who has borne all the stress that has accompanied this incredible adventure. Her sacrifices are so numerous that I could never repay her. Her commitment to me and her family reflects the magnitude of her inner strength. This achievement would not have been possible without Monica's help.

God, the creator of all things, has given me talents that are to be shared with others. I am grateful for the special blessing that has been poured out on my life and my family. I shall serve the Lord all the days of my life.

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CHAPTER 1

Introduction and Review of Related Literature

In an analysis of the youth sport literature Martens and Seefeldt (1979) distinguished twenty potential outcomes of participation in youth sport programs. These hypothesized benefits were categorized into the following groupings: "learning motor skills; health related and motor fitness; participating and belonging; learning socially acceptable values and behaviors; long-term skills for leisure; and enhancing child-adult relationships" (Seefeldt, 1987, pp. 5-6). Ultimately, however, the benefits that are actually derived by youth sport participants are strongly influenced by the quality of the adult leadership that young athletes experience (Gould, 1987).

Because of the differential coaching behaviors that children experience in the sport setting, some youth persist and thrive in athletics while others are "driven" out of the sport context. Evidence, however, to suggest that engagement in sport and disengagement from sport by youth can be attributed one-hundred percent to the behavior of the coach is to ignore any contribution of the individual's reaction to the situation, differences in skill, or differences in commitment that each athlete brings to the athletic setting.

When studying the actions of individuals within the context of sport, the effects of the situation on behavior should be examined

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coincidentally with individual predispositions (Martens, 1975; Vealey, 1992). An investigation which utilizes this person-by-situation unit of analysis embraces an interactional paradigm for the conduct of research. Martens (1975) asserts that studies which focus solely on the effect of the environment on behavior along with those investigations that concentrate only on the influence of personality on subsequent responses cannot provide an adequate explanation of sport behavior. Thus, an interactional perspective must be adopted by researchers to better understand the dynamics of the relationships (e.g., between coaches and athletes) which occur in sport (Martens, 1975; Vealey, 1992).

To date, the research emphasis has been placed on the effectiveness of the leadership styles of coaches (Horn, 1992). Investigations in the area of leadership effectiveness in sport have taken one of two directions. Several studies attempted to identify preferred leadership styles as a function of the athletes' age (e.g., Terry & Howe, 1984), gender (e.g., Chelladurai & Saleh, 1978), or nationality (e.g., Chelladurai, Malloy, Imamura, & Yamaguchi, 1987). The results of these investigations have provided some evidence that the athlete's age and gender, and the cultural origin do impact athlete preferences for a particular style of leadership. Additionally, the characteristics of the sport (e.g., open vs. closed; independent vs. interdependent) in which an athlete is involved appear to effect an athlete's preference for a particular style of leadership (Terry, 1984).

The second aspect of research into leadership effectiveness has attempted to relate leadership style with desirable outcomes,

i.e., athlete satisfaction; performance outcomes. In one study, basketball players, wrestlers, and track and field competitors expressed higher levels of satisfaction with the leadership style of the coach when coaches exhibited greater amounts of training and instructing behaviors (Chelladurai, 1984). This finding was replicated by Horne and Carron (1985) using a similar sample of intercollegiate athletes.

In a closely-related vein of research, Smith, Smoll and their colleagues have studied the effects of coaching behaviors (in particular the type of feedback provided by coaches) on the psycho-social development of youth sport participants (e.g., Smith, Smoll, & Curtis, 1979). Additionally, this group of researchers has proposed a cognitive-behavioral model for the study of the coach-athlete interaction. Thus, a general purpose of the present investigation was to examine the interaction between a specific coaching behavior, i.e., the delivery of performance-related feedback from a coach, and an aspect of the athlete's personality, i.e., cognitive information style, which might mediate the participant's reaction to the feedback. This interaction may offer the most parsimonious explanation of why some youth persist and others drop out of sport when playing for the same coach.

A Mediational Model of Coach-Player Relationships

One of the primary roles that coaches of youth sport fulfill is that of teacher of sport skills. A critical component of effective instruction is the use of appropriate feedback. Research into teacher effectiveness has examined the effect of specific instructional behaviors (e.g., delivery of feedback) on the subsequent

performance of motor skills by children and youth (e.g., Silverman, Tyson, & Kampitz, 1992; Yerg, 1981).

Lee, Keh, and Magill (1993) reviewed the teacher effectiveness literature in physical education and found ambiguous results across the studies on the beneficial effect of teacher feedback on motor skill performance. For example, Yerg (1981) found that feedback had a negative effect on the performance of cartwheels by elementary-aged students. Whereas, other studies have yielded non-significant results when examining the effect of feedback on achievement (e.g., Silverman, Tyson, & Kampitz, 1992). Additionally, Masser (1987) suggested that feedback had a positive effect on learning when the feedback was directed to "the quality of specific body actions" (p. 176).

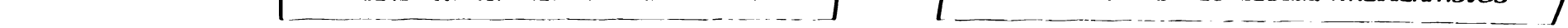
In light of the equivocal results generated by the aforementioned studies, Lee, Keh, and Magill (1993) suggested that the research on the relationship between feedback and motor skill achievement was clouded, in part, by methodological concerns. Another point of contention raised by these reviewers was the failure of researchers to recognize and address the mediating effect of student perceptions on the feedback that was provided to them by teachers (Lee, Keh, & Magill, 1993). Additionally, according to Lee, Keh, and Magill (1993), the complexity of the instructional setting requires a more comprehensive approach in comparison to the approach utilized in the motor learning laboratory.

A model that clearly addresses the specific concerns raised by Lee, Keh, and Magill (1983) is the Mediational Model of Coach-Player Relationships which was conceptualized by Smoll, Smith, Curtis, and

Hunt (1978) (see Figure 1). This theoretical framework explicitly links the coach and the athlete together in the dynamic sport environment. Smoll, Smith and their colleagues have used the Mediational Model of Coach-Player Relationships to guide several research studies into the effect of leadership behaviors on the psycho-social development of youth sport participants (e.g., Smith, & Smoll, 1990; Smith, Smoll, & Curtis, 1979; Smoll, Smith, Curtis, & Hunt, 1978).

The core of this cognitive-behavioral model is formulated around three cornerstone constructs - coach behaviors, player's perception and recall, and player's evaluative reactions. Smoll et al. (1978) have identified "coach behaviors" (p. 530), which includes performance-related instructional feedback, as being the principle, observable behavior that impacts the psycho-social development of the athlete. The model suggests that behaviors that are directed towards an individual by the coach (in this case performance-related feedback from the coach) and the resultant behavioral and attitudinal responses that are formed by the athlete are mediated by the manner in which the athlete perceives and interprets those behaviors. Smoll and Smith (1989) stated the following affirmation regarding their model:

> This model stipulates that the ultimate effects of coaching behaviors are mediated by the meaning that players attribute to them. In other words, cognitive and affective processes serve as filters between overt coaching behaviors and youngsters' attitudes toward their coach and their sport experience (p. 1527).



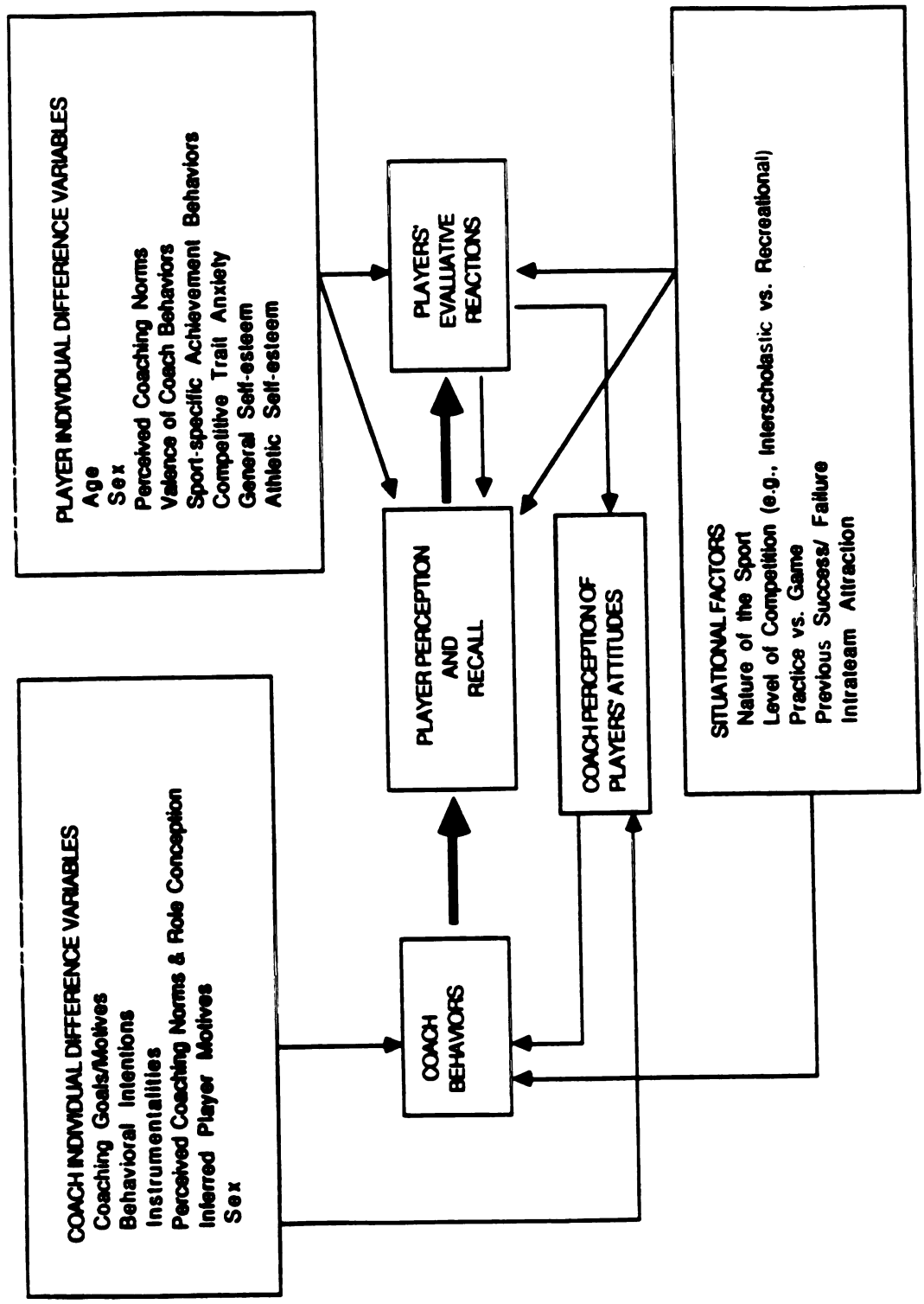


Figure 1. A Mediational Model of Coach-Player Relationships (Smoll, Smith, Curtis, and Hunt, 1978)

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In expanding the model outside its core elements, Smoll et al. (1978) indicate that individual differences of the coach (e.g., gender, behavioral intentions) affect the comportment of the coach and "coach perception of players' attitudes" (p. 530). For example, the competitive orientation (Gill & Deeter, 1988) of the individual would be one aspect of the coach's personna that could have a substantial effect on subsequent coaching behavior. Gill and Deeter (1988) describe an individual whose dominant orientation is goal-directed as one who tends to focus on the achievement of personal goals. The behavior of an individual with this goal orientation would be in stark contrast with that of an individual who subscribes to a win orientation which focuses on the outcome of the competitive activity. Thus, the coaching behavior, i.e., delivery of feedback, of the goal-oriented individual would, in all likelihood, be directed towards performance-related aspects of an individual's mastery attempts. This could take the form of reinforcement of correct elements of the performance along with specific corrective instruction. Whereas, a coach, who subscribes to the contrasting perspective of win orientation, would provide feedback which consisted primarily of a judgment relative to the outcome of the individual's efforts, i.e., win or lose.

Further, Smoll et al. (1978) proposed that situational factors (e.g., nature of the sport, level of competition) can have an influence on the overt behaviors of the coach. Aggressive collision-type sports such as football or hockey would most likely elicit coaching behaviors which foster this quality of the sport. Football coaches frequently engage in actions which could best be described as

emotional outbursts which encourage or demand aggressiveness from the athlete. In a contrasting manner, the sport of golf requires a much more placid setting. Because of the nature of golf, coaches would most likely exhibit calming, or certainly less emotional, behaviors than their football counterparts.

In addition to the influence of individual differences associated with the coach and situational effects, Smoll et al. (1978) acknowledge the fact that individual differences of the player (e.g., age, gender, self-esteem) can sway the athlete's perception of the coach's behavior as well as the athlete's affective appraisal of those behaviors. Smith, Smoll, and Curtis (1978) provided evidence that low self-esteem athletes, in contrast to high and moderate self-esteem athletes, exhibited a less favorable attitude towards a coach who provided low levels of technical instruction and encouragement. Additionally, the low self-esteem athletes rated the sport and teammates less positively when the coach was low in technical instruction and encouragement in comparison to athletes who reported high and moderate levels of self-esteem. Thus, the self-esteem level of an athlete clearly has an effect on how the sport experience is evaluated.

Further, Smoll and his colleagues (1978) suggest that there is a bi-directional relationship between "player perception and recall" and a "players' evaluative reactions." This circular relationship suggests that if the athlete has a positive "evaluative reaction," then the individual will be predisposed to perceive the next action of the coach in a more favorable light. On the other hand, a negative "evaluative reaction" would most likely lead to a negative

interpretation of subsequent coach behaviors. The hypothesized reciprocal relationship suggests how an athlete's 'attitude' can color his/her interpretation of the coach's actions.

Additionally, the way in which the athlete perceives and recollects the coach's behavior and actions in response to the assessment of the coach's behavior can be affected by elements of the situation which were previously mentioned (Smoll et al., 1978). In many instances, the practice setting is a more relaxed learning environment; whereas, the competitive situation is much more tension-filled. The distinct difference between the competitive context and the practice setting is indicative of how "situational factors" can impact players' interpretations of coaching behaviors (Horn, 1985). This would be particularly true when coaching behaviors may be in direct conflict with the anticipated climate for the practice or game context. When the coach exhibits more assertive, almost game-like, behaviors in the practice situation, athletes who are expecting a relaxed practice setting may interpret the coach's actions in a negative manner. A similar negative perception by the athletes could occur when the coach demonstrates a very relaxed, almost care-less, manner in either the practice or the competitive situation. Thus, elements of the situation can have a dramatic effect on how the athlete perceives and interprets the coach's behaviors.

Finally, although not specifically associated with temporal occurrence, the "player evaluative reactions" impels the formation of a notion by the coach about the demeanor of the athlete (Smoll et al., 1978) which subsequently impacts coaching behaviors. The

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coach's interpretation or assessment of the player's attitude may activate an expectancy effect (Brophy, 1982). Should a coach perceive his/her athletes in a positive light, the coach might respond with more positive forms of instructional feedback; whereas, a negative perception might result in criticism or punishment of the athlete by the coach. The results of research into the expectancy effect in the psychomotor setting have provided empirical evidence for the importance of understanding how the perceptions of the teacher can shape teaching behaviors (e.g., Martinek, 1981).

While Smoll and Smith (1984) acknowledge the complexity of the hypothesized model, the researchers suggest that "the model provides a theoretical framework for studying direct and interactive influences" (p. 385) that are simultaneously operating and influencing behavior in the sport context. Specifically, the Mediational Model of Coach-Athlete Relationships (Smoll et al., 1978) has served, on several occasions, as the theoretical paradigm for the purpose of studying the effects of coaching behaviors on the psycho-social development of youth sport participants (e.g., Smith, Zane, Smoll, & Coppel, 1983; Smoll et al., 1978). However, a question that arises in the present investigation is the appropriateness of the use of the Mediational Model as a theoretical framework to guide the development of research hypotheses for the study of an older sample (e.g., college-aged students).

An age-related developmental trend first discovered by Smith et al. (1978) offers evidence in support of the use of this theoretical framework in a research investigation involving college-aged

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students. Specifically, Smith and his colleagues found that older athletes' (ages 13-15 years) attitudes about coaches and sport were distinguished from younger athletes by the "amount and the quality of technical instruction" given by the coach (Smoll & Smith, 1989, p. 1537). Specifically, the youngest athletes in the study (ages 8-9 years) and athletes aged 10 to 12 years differentiated among coaches based on the punitive nature of the coach's actions and the encouragement and positive reinforcement provided by the coach, respectively.

Inasmuch as technical instruction is a teaching behavior that, in many instances, is related to the enhancement of motor skills (Lee, Keh, & Magill, 1993), there would seem to be little reason why individuals who are slightly older (ages 18 to 35 years), yet are 'novices' at a particular motor task, would not have a similar orientation as the oldest group in the Smoll, et al. (1978) study. That is to say, that older individuals would also expect a coach/teacher to provide a sufficient amount of quality technical instruction to guide personal improvement at a particular motor task. Further, just like their younger counterparts, cognitive processes or structures may affect the individual's interpretation/perception of the coaching behavior.

While Smoll and Smith (1984, 1989) acknowledge the mediating effect of individual differences on the athlete's cognitive interpretation of the coach's behavior, these researchers do not speculate about any specific cognitive disposition that may be identified as the particular mediating agent. A psychological construct that may fill this void and provide additional insight into

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the differential behaviors that are often exhibited by athletes is the athlete's cognitive information style.

Cognitive Information Style

Cognitive information style is a construct that has its roots in the psychophysiology literature. Averill and Rosenn (1972) examined two classes of coping strategies that subjects utilized when confronted with the threat of electric shock. All subjects who participated in the study experienced four different levels of electric shock. Additionally, subjects were randomly assigned to either an avoidance condition (subjects were provided with the opportunity to push a button and avoid the shock altogether) or to a no-avoidance condition (shock was unavoidable).

Results of the study (Averill & Rosenn, 1972) indicated that at lower levels of shock intensity subjects more often adopted a strategy of vigilance, i.e., the subject chose to listen to a channel that provided a warning tone prior to the onset of electric shock. This same behavior was predominant at higher levels of electric shock for the subjects who were in the avoidance experimental condition. However, when subjects were in a no-avoidance, high shock condition a nonvigilant strategy was preferred, i.e., subjects chose to listen to a music channel that provided no information regarding the onset of electric shock.

In addition to the behavioral measures that were secured, two aspects of physiological arousal were assessed - heart rate and basal skin conductance. Analysis of the data revealed that vigilant subjects in the low shock intensity experimental condition exhibited significantly lower mean changes in heart rate across seventeen 10-

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second intervals than did nonvigilant subjects (Averill & Rosenn, 1972). When basal skin conductance measures were subjected to multiple regression analysis, a rather ambiguous interaction between coping style and avoidance condition was disclosed. Specifically, in the zero shock condition vigilant subjects in the avoidance group exhibited greater changes in basal skin conductance measures across the seventeen 10-second intervals than did non-vigilant subjects. However, this finding was reversed for the no-avoidance group (Averill & Rosenn, 1972). Averill and Rosenn (1972) stated that "the meaning of this interaction is not entirely clear, but it does indicate that listening to music was not arousing in itself" (p. 134).

Perhaps most importantly, Averill and Rosenn (1972) suggested that coping style is a unique disposition. The evidence for this claim comes from nonsignificant multivariate and univariate analyses of variance using five personality measures as dependent variables (Averill & Rosenn, 1972). In other words, vigilant and non-vigilant subjects were not readily identifiable by any of five personality assessments that the subjects completed. Further, no combination of these measures predicted either coping style. Thus, coping style was reported to be a singular construct.

Averill and Rosenn's (1972) line of research has been extended and additional empirical evidence provided by Miller and her colleagues (Miller, 1979a; Miller, 1987; Miller, Brody, & Summerton, 1988; Miller & Mangan, 1983). At the outset of her research, Miller (1979a) pilot tested a self-report measure that was hypothesized to differentiate between "monitors", the label for vigilant subjects

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(see Averill & Rosenn, 1972), and non-vigilant subjects, those who were tagged as "distractors" in Miller's study. The scale was comprised of a fear of flying scenario followed by 10 statements, half of which represented monitoring behaviors while the other half characterized distracting behaviors. Behavioral indices of information-seeking as well as physiological and subjective measures of arousal/anxiety were gathered.

The analysis of the data revealed that monitoring subjects experienced more arousal as measured by tonic skin resistance level and subjective report (Miller, 1979a). Further, subjects preferred information when there was an instrumental use to the information, i.e., subjects who had the option of avoiding the electric shock more often sought the warning information (Miller, 1979a). In addition to the findings above, a majority of the subjects in the no-avoidance group adopted an inconsistent pattern of monitoring, i.e., on some of the trials the subjects listened to the warning signal while on other trials the subjects listened to the music channel (Miller, 1979a).

The pilot efforts with the coping style questionnaire (Miller, 1979a) provided some evidence that this instrument may effectively differentiate 'monitors' from 'distractors.' However, the outcomes were not conclusive. The results indicated that the distracting strategies contained in the scenario statements were not salient to monitoring subjects. Yet, these same subjects did not express a partiality for the monitoring strategies in the instrument. Miller (1979a) summarized her results by stating the following:

> "Thus, two distinct groups have been isolated: those who choose to monitor and show accompanying arousal, and those

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who choose to distract themselves and show less arousal. This seems to be a general trait since the real-life questionnaire predicted which strategy would be adopted in the laboratory" (p. 578).

While the empirical evidence for this psychological construct is preliminary in nature, Miller has attempted to further explicate the differential behaviors that are exhibited by individuals under the constraints of specific situational variables (e.g., predictability and controllability) by proffering the monitoring and blunting hypothesis (1979b, 1980, 1981, 1989, 1990; Miller & Grant, 1979)[1].

Miller and her colleagues (1979b, 1980, 1981, 1989, 1990; Miller & Grant, 1979) described two dimensions of coping style/cognitive information style that individuals often implement when confronted with a threatening situation[2]. Multiple forms of blunting strategies were identified by Miller (1980). These included such positive behaviors as "distraction, self-relaxation, and reinterpretation" (Miller, 1980, p. 147). In a like manner, negative blunting strategies included "denial, detachment, and intellectualization" (Miller, 1980, p. 147). This conduct was termed a blunting strategy because the implementation of such behaviors

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1 Blunting is the most recent term that Miller has adopted to identify the distracting/avoidance behavior that is exhibited by some individuals. Formerly, a person who subscribed to these behaviors was labelled as a 'distractor'. Miller formulated her hypothesis in a 1979 paper and from that point forward refers to the individual who exhibits such behaviors with the term 'blunter'.

2 Initial writings by Miller (e.g., 1979b, 1980, 1981; Miller & Grant, 1979) referred to the construct as coping style. Later publications (Miller, 1987, 1989, 1990) spoke of a cognitive information style. Henceforth, the term cognitive information style will be used in this paper.

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blunts the impact of the psychological threat to the individual. Thus, a person who cognitively and behaviorally engages in blunting strategies is identified as a blunter. At the opposite pole of the construct are monitoring actions. A monitor, one who engages in monitoring behaviors, is one who actively seeks out and/or is desirous for information about a physically and/or psychologically threatening situation.

The development of the Miller Behavioral Style Scale (MBSS) has greatly facilitated researchers' ability to classify individuals as either a monitor or a blunter (Miller, 1987; Miller & Mangan, 1983). Utilizing the MBSS, a behavioral measure, and subjective self-reports of tension/anxiety, Miller (1987) found that high monitoring/low blunting subjects, when threatened with the possiblity of electric shock, spent more time listening to a channel that provided a warning signal prior to the delivery of shock than did their low monitoring/high blunting counterparts. Additionally, a significant style-by-trial interaction on self-reports of tension was revealed (Miller, 1987). Specifically, high blunters/low monitors exhibited a rapid decrease in arousal across trials in comparison to low blunting/high monitoring subjects (Miller, 1987).

In the second part of the study subjects attended to a cognitive task. This task was deemed to be aversive because of the potential for the information about one's performance to be psychologically threatening to one's ego. Results from this phase indicated that there was a main effect for cognitive information style on the behavioral measure (Miller, 1987). High monitoring subjects sought more performance-related information, i.e.,

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knowledge of results - KR, than did low monitoring subjects (Miller, 1987). However, this effect was only true when subjects were divided into high and low monitor subgroups using the monitoring subscale. Although low blunters on the average exhibited more information-seeking behavior than did high blunters, no main effect for cognitive information style on information-seeking behavior was revealed when participants were split into subgroups using the blunter subscale. Miller (1987) suggests that "dispositional differences in coping styles predict opposing informational strategies under threat of an ego stressor" (p. 350).

Although the construct has not been studied in the motor domain, similar differential responses in individuals' information-seeking behavior would be expected. The sport setting, much like Miller's (1987) cognitive task, can be psychologically threatening to individuals. This may be due, in part, to the evaluative nature of the sport context. Thus, monitoring participants would seek-out performance-related information; whereas, blunters would avoid such information.

Similar results for the relationship between cognitive information style and anxiety/arousal were divulged in a study that examined the interactive effect of cognitive information style and information condition (Miller & Mangan, 1983). In this study (Miller & Mangan, 1983) forty gynecologic patients who were about to undergo a colposcopy exam completed the MBSS. A mean split was employed to divide the subjects into two groups - monitors and blunters. Subjects were then randomly assigned to either a high or low information condition. Thus, the effects of style-compatible

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and style-dissonant information conditions on behavioral and self-report measures could be examined.

The results revealed a significant interaction between cognitive information style by information condition on change scores of subjective tension/anxiety from initial reading to the pre-examination assessment (Miller & Mangan, 1983). Self-ratings of tension were lower for both monitors in the high information condition and blunters in the low information condition than for monitors in the low information condition and blunters in the high information condition. The magnitude of effect was particularly strong for blunters (Miller & Mangan, 1983).

Pulse rate measures provided additional evidence for the influence of an interactive effect. Pulse rate change scores from pre-info to post-exam for both monitors in the high information condition and blunters in the low information condition, i.e., style-compatible condition, were significantly lower than subjects in a style-dissonant information condition, i.e., blunters in the high information condition and monitors in the low information condition. Miller and Mangan (1983) summarized "that patients are generally less aroused when the amount of preparatory information is consistent with their coping styles" (p. 234).

Because of the physical nature of motor activities, elevated heart rates are usually exhibited by sport participants. Miller and Mangan's (1983) findings suggest that an individual's physiological arousal, as measured by heart rate, can be affected as a function of the individual's cognitive information style and the elements of the situation. Thus, similar levels of arousal would be noted when sport

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participants can elect to seek-out or avoid information relative to the performance of a motor task. However, differential heart rates should be noted when elements of the situation do not parallel the participant's cognitive information style.

The psychological construct of a cognitive information style appears to have great relevancy for the sport domain. Smoll et al. (1978) reported that some children appear to view feedback as being aversive. It may be that some children feel this way because their ego is threatened when they are in an evaluative situation where performance-related feedback is thrust upon them. This would appear to be a satisfactory explanation for blunters who would prefer to avoid situational information. But what explanation can be offered for monitors who are desiring performance-related information? It is possible that some coaches do not provide enough information to satisfy the needs of their athletes. Thus, an athlete who subscribes to a monitoring orientation could become quite anxious, i.e., physiologically aroused, when he/she perceives that he/she has not received adequate information about the situation from the coach.

Effect of Feedback on Self-Perceptions

Smoll et al. (1978) provide evidence that performance-related information, i.e., feedback, impacts the self-perceptions of the sport participant. However, the term feedback has a number of domain-specific interpretations which are often a function of the academic focus of the researcher (Lee, Keh, & Magill, 1993). Fortunately, experts in motor learning and sport pedagogy do seem to share a common perspective that feedback is information about an

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individual's performance that emanates from an external source such as a teacher, coach, videotape, or computer.

Feedback and its effect upon various psycho-social variables has been studied by several investigators (e.g., Anshel & Hoosima, 1989; Horn, 1985; Smoll, Smith, Curtis, & Hunt, 1978; Vallerand, 1983). These studies demonstrated that feedback can significantly impact an individual's causal attributions (e.g., Anshel & Hoosima, 1989), intrinsic motivation (e.g., Vallerand, 1983; Vallerand & Reid, 1984; Vallerand & Reid, 1988), perceptions of competence (e.g., Horn, 1985; Vallerand, 1983; Vallerand & Reid, 1984; Vallerand & Reid, 1988), and self-esteem (e.g., Smoll, Smith, Curtis, & Hunt, 1978). For the purposes of the present study only the effect of feedback on perceptions of competence and self-esteem will be discussed.

The Effect of Feedback on Perceptions of Competence. In the first investigation in a line of research, which explored the relationship between feedback and perceptions of competence, Vallerand (1983) sought to test the effect of varying amounts of positive feedback on the perceptions of competence of elite male hockey players. The participants' perceptions of competence were assessed via a single question. The participants were asked to respond to this single item on a 7-point Likert-type scale.

Each participant was randomly assigned to one of five experimental conditions - a no information control group and four positive feedback groups each of which received a different amount of feedback than the other groups. Subjects who received performance-related information were asked to analyze 24 pictures

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of a hockey player in possession of the puck in different situations and determine whether the individual in the picture should shoot, pass, or skate in each instance. The participants were given bogus positive feedback about the accuracy of their assessment and the speed with which they reached their decision. For example, subjects were told, "It's quite rare to see someone like you who is so quick and yet makes very few mistakes" (Vallerand, 1983, p. 104).

Statistical analyses revealed that subjects in all four feedback conditions reported greater perceptions of competence than did subjects in a no-feedback control group. However, no differences in perceived competence were found to exist between the four information conditions. Thus, the positive performance-related feedback appeared to act in an enhancing informative capacity relative to the individual's perceived competence at the task.

In two ensuing studies Vallerand and Reid (1984, 1988) examined the effect of positive and negative feedback as well as no feedback on subjects' perceptions of competence. In the first study (Vallerand & Reid, 1984) college-aged males, who demonstrated a moderate to high amount of intrinsic motivation as measured via the Mayo (1977) Task Reaction Questionnaire in the first phase of the study, were randomly assigned to one of three experimental conditions, i.e., positive feedback, negative feedback, or no feedback condition, for the second phase of the study. The subjects then completed 20 trials on the stabilometer, which is considered to be a novel motor skill task. Thus, subjects were not able to rely on their internal sensory feedback source. Individuals in the positive

feedback condition were told by the researcher, "It looks like you have a natural ability to balance and it shows in your performance" (Vallerand & Reid, 1984, p. 97). In contrast, participants in the negative feedback condition were informed, "This is an easy task but your improvement is quite slow. Try to perform as well as you can" (Vallerand & Reid, 1984, p. 97).

Results of the investigation (Vallerand & Reid, 1984) revealed that positive feedback appeared to have a significant enhancing effect on participants' perceptions of competence. Specifically, participants in the positive feedback condition reported higher levels of perceived competence in comparison to participants in the no-feedback and negative feedback conditions. In addition, the individuals in the negative feedback condition reported the lowest levels of feelings competence among the three experimental conditions.

In a succeeding study (Vallerand & Reid, 1988) male and female undergraduates were randomly assigned to either a positive or a negative feedback condition, thus creating a 2 x 2 (gender by feedback condition) research design. In this study each participant completed 20 trials on the stabilometer task. Performance-related feedback was given to each participant following every fourth trial beginning with the third trial. The form that the feedback took was the same as in the Vallerand and Reid (1984) study.

Following the completion of the stabilometer task, the participants completed a comprehensive measure of feelings of competence. Specifically, the subjects responded to a questionnaire which was comprised of seven items. The investigators utilized a

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9-point Likert-type scale for each item. An individual's responses to each of the seven items were then summed to yield a single perceived competence score.

Results of the investigation (Vallerand & Reid, 1988) revealed non-significant effects for the gender x feedback condition interaction and the main effect for gender. However, a significant main effect for feedback condition was divulged. Specifically, participants in the positive feedback condition reported higher levels of feelings of competence than did individuals in the negative feedback condition. Therefore, the valence of the feedback that is provided to participants has a significant effect on the individual's level of perceived competence and ultimately on the individual's level of intrinsic motivation.

In summary, the preceding three studies by Vallerand (Vallerand, 1983; Vallerand & Reid, 1984; Vallerand & Reid, 1988) provide strong evidence regarding the effect of performance-related feedback on an individual's self-perceptions of competence. Further, these findings would appear to offer corroborating evidence in support of theoretical suppositions of Deci and Ryan (1985)[3].

According to this theoretical perspective, positive performance-related feedback because of its informative nature would be expected to have an enhancing effect on the individual's perceptions of competence which would also translate into increased levels of intrinsic motivation. This effect would be particularly true when the controlling aspect of the feedback is

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[3] For a more complete discussion of Cognitive Evaluation Theory, see Deci and Ryan (1985).

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minimal. However, Vallerand (1983) and Vallerand and Reid (1984, 1988) did not concomitantly assess nor control for the controlling aspect of performance-related information. Still, the findings of Vallerand and his colleague (Vallerand, 1983; Vallerand & Reid, 1984, 1988) should be accepted albeit with some reservations.

In a study conducted by Horn (1985) the across-the-season changes in perceptions of competence exhibited by female, junior high school softball players were highly dependent on the particular type of coaching behavior that was prevalent during practice sessions. Increases in perceptions of competence were found to be positively associated with critical feedback (Horn, 1985). Whereas, reinforcement and nonreinforcement behaviors by the coach "were not facilitative of players' development of perceived competence" (Horn, 1985, p. 182).

Research on the effective use of feedback (e.g., Brophy, 1981) suggests that one explanation for Horn's finding may be grounded in the contingency of the feedback relative to the athlete's performance in the practice setting. Specifically, learning theorists suggest that any reinforcement or punishment must be applied contingent upon the presentation of the desired or undesirable behavior (Magill, 1989). However, research reveals that many times reinforcement is not provided in a performance-contingent manner (Brophy, 1981). Thus, the effectiveness of the teacher/coach's feedback can be greatly compromised by the contingency of the feedback.

In other instances reinforcement may take the form of

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non-specific verbal praise. This kind of feedback provides the individual with little or no specific information about his/her performance. As a result the individual cannot make any determination about his/her ability. Horn's (1985) finding appears to be consistent with the previously mentioned age-related developmental trend regarding sport participants' preferences for specific types of feedback that was revealed by Smith et al. (1978).

Evidence that an individual's perceptions of competence are influenced by the manner in which the individual interprets the feedback that is given relative to a task was offered by Nicholls and his colleague (Nicholls, 1978; Nicholls, 1984a; Nicholls, 1984b; and Nicholls & Miller, 1984). Specifically, Nicholl's contention is that young children do not clearly differentiate between effort and ability. Further, his research has suggested that a child above the age of twelve is able to make the distinction between effort and ability; and, thus, interprets the feedback relative to the perceived valence of the feedback as well as the difficulty of the task to arrive at a perception of one's competence.

Follow-up research along this line of thought has been conducted by Meyer (1982) and Meyer, Bachmann, Biermann, Hempelmann, Ploger, & Spiller (1979). Using an academic setting for their research, Meyer and his colleagues provided empirical evidence that suggested that at times praise actually led to the formation of a belief that one's ability was not as high as a peer's ability when in actuality both achieved at the same level on a task. Conversely, criticism of one's performance could be interpreted by the individual as being an indication that one possesses greater ability than was

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actually demonstrated (Meyer, 1983; Meyer et al., 1979).

Williamson (1987) extended this line of research into the domain of physical activity. Specifically, male subjects in the study listened to four scenarios that described two young athletes executing a gymnastics skill in a physical education setting. The individuals in the scenarios performed the skill with exactly the same level of competence. However, differential feedback, i.e., positive, negative, or neutral, was provided to the two students by the teacher. The subjects were then asked to indicate which student had more ability. Analysis of the data revealed a four-way interaction (outcome x task difficulty x feedback x age). However, because of technological limitations Williamson (1987) was unable to statistically examine the interaction. Williamson's (1987) results highlight the complexity of the cognitive processes relative to the interpretation of the delivery of feedback from an external source.

In summary, the results of several investigations (e.g., Horn, 1985; Vallerand, 1983) clearly suggest that an individual's perceptions of competence are influenced by the performance-related feedback that is delivered by a teacher or coach. Additionally, the effect of the feedback on an individual's perceptions of competence is suggested to be related to the contingency (e.g., Brophy, 1981) and the informative nature of feedback (e.g., Horn, 1985). Finally, evidence is available that suggests that the feedback is interpreted by the individual to arrive at a judgment of personal competence (e.g., Meyer et al., 1979; Williamson, 1987). When taken together these findings provide

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support for several of the hypothesized linkages between the core constructs in the Mediational Model of Coach-Player Relationships (Smoll et al., 1978). However, the effect of an individual's cognitive information style on the interpretive process may facilitate a more complete understanding of the effect of feedback on perceptions of competence.

The Effect of Feedback on Self-Esteem. Research on the effect of feedback on psycho-social variables has not been limited to perceptions of competence. Smith, Smoll, and Curtis (1979) in an investigation from a series of studies on coaching effectiveness found that coaching behaviors had an effect on the self-esteem of male, Little League baseball players. Specifically, they found that subjects who played for trained coaches, i.e., coaches who had participated in several educational sessions related to positive coaching behaviors and completed self-monitoring activities, experienced a significant, positive change in self-esteem when baseline measures were compared to post-season assessments of self-esteem as determined by a modified-version of Coopersmith's (1967) Self-Esteem Inventory.

Further, the trained coaches in this study were perceived by their players as being more technical in their instruction, provided more encouragement following errors in performance, were seen as being less punitive, and were generally more reinforcing of players' attempts at desired performance. The results suggested that athletes who were low in self-esteem appeared to be most sensitive to the leadership behaviors of coaches (Smith & Smoll, 1990; Smith, Smoll, & Curtis, 1978). Specifically, the coach's feedback

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dramatically influenced the attitude of an athlete with low self-esteem towards (1) his teammates, (2) the sport (baseball in this case), and (3) the coach (Smith, Smoll, & Curtis, 1978).

Additional evidence for the influencing effect of feedback on self-esteem was provided by Kamal, Blais, McCarrey, Laramee, and Ekstrand (1992). This team of researchers utilized a pre-posttest research design to examine the effect of positive or negative feedback on the self-esteem of fifty male and fifty female subjects. The results of the study were consistent with the notion that positive feedback has an enhancing effect on the individual's self-esteem. Whereas, a reduction in the subject's self-esteem was noted following exposure to negative feedback. The effect was particularly strong for females in the negative feedback condition (Kamal, Blais, McCarrey, Laramee, & Ekstrand, 1992).

In summary, the self-esteem of an individual can be affected by the feedback that is provided by a teacher or coach. Specifically, negative feedback appears to have a derogating effect on an individual's self-esteem (Kamal, Blais, McCarrey, Laramee, & Ekstrand, 1992). Further, athletes who played for coaches who utilized a positive approach to coaching, i.e., provided technical instruction along with reinforcement and encouragement, exhibited increases in self-esteem across the season. Based on the aforementioned results, self-esteem could be one player/individual difference variable that is affected by the individual's evaluative reaction to feedback from a coach.

Additionally, cognitive information style may be a cognitive mechanism which mediates an individual's evaluative response to

performance-related feedback. Specifically, self-esteem may be negatively impacted when the coaching behavior, i.e., the delivery of feedback, is not compatible with the individual's cognitive information style. In a contrasting manner, feedback from a coach that is consistent with the informational needs of an individual's cognitive information style could positively affect an individual's self-esteem. Therefore, an individual's cognitive information style must be entered into the equation when attempting to probe the effect of feedback on self-perceptions.

Relationship between Perceptions of Competence and Self-Esteem. Current thinking in the area of self-concept theory suggests that the self is best viewed from a multi-dimensional perspective (e.g., Harter, 1985; Shavelson, Hubner, & Stanton, 1976). According to this viewpoint an individual's global self-worth is influenced by domain specific perceptions of competence (e.g., Harter, 1988a). However, self-worth is not simply a summation of an individual's competence in the various domains. Several researchers have offered evidence to tease out the relationship between perceptions of competence and the individual's self-esteem (e.g., Ebbeck & Weiss, 1992; Iso-Ahola, LaVerde, & Graefe, 1988; Koocher, 1971).

The results of a study by Ebbeck and Weiss (1992) suggested that the individual's perceptions of competence were an antecedent to his/her self-esteem. In this investigation subjects who were attending a university-sponsored sports camp completed self-report measures that assessed perceptions of sport competence, self-esteem, and positive and negative affect that could be experienced

in sport. While the direct effect of perceptions of competence on self-esteem was found to be statistically non-significant, an indirect route via the positive or negative affect that the subject experienced in sport was found to be significant (Ebbeck & Weiss, 1992). Subjects who had higher levels of perceived competence tended to experience more positive affect and reported greater self-esteem than did the subjects who reported lower levels of perceived competence. This finding is consistent with the belief that affect is a central element in the development of self-esteem (Weiss, 1987).

In a like manner, the results of a study that was conducted by Iso-Ahola, LaVerde, and Graefe (1988) indicated that climb-specific perceived competence, i.e., a measure of the relative success for that day's climb, of rock climbers better predicted the individual's self-esteem than did a more global measure of perceived competence. The investigators deduced that self-esteem does fluctuate; and that any changes in self-esteem were dependent upon whether or not the individual experienced a successful or unsuccessful climb.

A final piece of evidence for the influence of competence on an individual's self-esteem was provided by Koocher (1971). In this study the subjects were boys who were attending a YMCA resident camp. A pre-posttest research design was utilized in this investigation. For the purposes of the study competence was operationally defined as whether or not the subject learned to swim while attending camp. Thus, the use of an objective assessment of competence caused this study to differ from the investigations cited previously which relied on more subjective self-report measures of

perceived competence.

Results of the research (Koocher, 1971) indicated that subjects who learned to swim during the camp session exhibited significantly lower discrepancy scores, i.e., the difference between measures of the ideal self and perceived self, on the self-esteem measure than did subjects who did not learn to swim. The lower discrepancy score reflected greater self-esteem. Therefore, becoming physically competent in a motor skill enhanced the individual's self-esteem.

Although self-esteem is conceptually distinct from competence (Harter, 1985), the evidence suggests that competence, both objective and subjective forms, affects and/or contributes to an individual's self-esteem. Specifically, increased competence results in a positive effect on the individual's self-esteem (Koocher, 1971). Additionally, situation-specific subjective feelings of competence significantly predict an individual's self-esteem (Iso-Ahola, LaVerde, & Graefe, 1988). Finally, individuals who reported higher levels of perceived competence also exhibited positive affect and higher levels of self-esteem in comparison to persons with lower levels of perceived competence (Ebbeck & Weiss, 1992).

The preceding empirical evidence serves to clarify the strong relationship between self-esteem and perceptions of competence. Therefore, research investigations which attempt to examine the effect of feedback on self-perceptions must consider both perceived competence and self-esteem. In light of the previously mentioned research and theoretical perspective, studies which focus only on perceived competence or self-esteem cannot provide a complete

understanding of the effects of feedback on self-concept.

The Mediational Model of Coach-Player Relationships (Smoll et al., 1978) provides an excellent theoretical framework for studying the interaction between the coach and the athlete. A study that is conceived around this framework offers the opportunity to further clarify the relationship between specific coaching behavior (e.g., providing performance-related feedback) and player evaluative responses (e.g., perceptions of competence and self-esteem). Finally, a specific cognitive-interpretive mechanism, i.e., cognitive information style (Miller, 1990), has been identified as a player individual difference that may affect the individual's interpretation of the coach's feedback. Because Miller and Mangan (1983) revealed differential arousal responses between persons in style-compatible and style-dissonant information conditions, another player evaluative response that should be examined is physiological arousal.

Motor Performance-Physiological Arousal Relationship

The sport science literature is replete with studies that describe the debilitating effect of anxiety/arousal on motor performance (e.g., Fenz, 1988; Weinberg, 1978). The existance of a curvilinear relationship between motor performance and physiological arousal was proposed in the Inverted-U Hypothesis (Yerkes & Dodson, 1908). Specifically, as a person's level of physiological arousal increases, so too does his/her motor performance. This continues until an 'optimal' level of arousal has been attained. Thus, maximum motor performance and optimal arousal coincide. Additional increases in physiological arousal

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beyond the 'optimal' level will result in a decrement in motor performance.

Soenstroem and Bernardo (1982) provided some of the most substantial evidence in support of the hypothesized effects of increased levels of physiological arousal on motor performance. Thirty female collegiate basketball players served as subjects in the study. The measure of basketball performance was an overall assessment that was a mixture of positive aspects of performance (e.g., scoring, passing, and defending) while deducting for negative aspects of performance (e.g., fouling or turning the ball over). The plotted data clearly revealed an inverted-U relationship between basketball performance and state arousal. Specifically, the participants realized higher levels of performance while moderately aroused. Meanwhile, lower levels of performance were revealed when the subjects were either underaroused, i.e., low level of state arousal, or overaroused i.e., high level of state arousal.

With this knowledge about the physiological arousal-motor performance relationship, coaches would desire to minimize or eliminate any possible causes of increased arousal. As previously described Miller and Mangan (1983) reported that subjects in cognitive information style-dissonant information conditions responded with increased levels of physiological arousal. Theoretically, elevated levels of physiological arousal should have a debilitating effect on the individual's subsequent motor performance. Thus, an individual's characteristic cognitive information style may be an important individual difference for coaches to know and understand.

The cognitive information style of the athlete is, perhaps, a critical variable that evinces a powerful mediating effect in the sport context. Specifically, coaches, because of a lack of knowledge about the cognitive information style of each athlete and without fully understanding the effect of their actions, may be providing inappropriate amounts of information to their athletes. Therefore, athletes who would be classified as monitors may not be receiving sufficient amounts of information from their coaches. Because the athlete is experiencing an information deficit, the sport activity may become an anxiety-provoking experience. After a period of time the athlete may opt to leave sport to avoid the anxiety of the event. Harter (1978) has suggested that persons who suffer anxiety would sustain a decrease in effectance motivation.

In a like manner, a blunter who is given more information than he/she seeks may also experience feelings of anxiety and choose to disengage from sport. These two scenarios would account for the effects of being in a style-dissonant condition as defined by Miller and Mangan (1983). On the other hand, individuals who are in style-compatible conditions, i.e., monitors who are provided with sufficient feedback and blunters who receive minimal feedback, may find participation in sports to be arousing but not anxiety-provoking and may choose to persist in sport.

Statement of the Problem

While research has provided much information about the reasons athletes give for participating in sport (e.g., Ewing & Seefeldt, 1987; Gill, Gross, & Huddleston, 1983; Gould, Feltz, & Weiss, 1985) as well as athletes' reasons for discontinuing in sport

(e.g., Ewing & Seefeldt, 1987; Gould, Feltz, Horn, & Weiss, 1982), no satisfactory explanation has been offered that fully or even partially explains the divergent behaviors that are exhibited by athletes who experience similar coaching behaviors. Studying the interaction between the presentation of performance-related feedback by a coach and an individual's cognitive information style may provide a partial explanation for the differential behaviors of athletes.

Hypotheses

A. Phase 1 - Identification

1. Subjects who are identified as blunters by the MBSS will demonstrate lower levels of information-seeking than monitors.
2. No differences will be found between the heart rates of monitors and blunters across trials.

B. Phase 2 - Experiment

1. Monitors in the low information condition and blunters in the high information condition will demonstrate increased levels of physiological arousal in comparison to monitors in the high information condition and blunters in the low information condition.
2. Monitors in the low information condition and blunters in the high information condition will exhibit decrements in performance across trial blocks in comparison to monitors in the high information condition and blunters in the low information condition.

3. Monitors in the low information feedback condition and blunters in the high information condition will manifest lower levels of pre- to post-test levels of global self-esteem, perceived general athletic competence, and perceptions of sport-specific ability in tennis in comparison to monitors in the high information condition and blunters in the low information condition.

Limitations

During the execution of the motor task in Phase 2, participants will be able to utilize their internal source of information. Thus, the participants may rely upon internal feedback rather than solely upon an external feedback source, i.e., information provided by the coach.

Delimitations

The following delimitations should be considered when reading the results of this study. The study is delimited to male college students who have volunteered to participate in the study. Secondly, it is assumed that all participants will be honest in their responses to the questionnaires.

CHAPTER 2

Methods

Participants

Male students (n=63) at a moderately-sized university located in the Midwest volunteered to serve as participants. The participants were recruited from undergraduate classes in physical education and interpersonal communication. Of the 63 individuals who began the study only 60 participants participated fully in both data collection phases of the study. Two persons were not able to complete both phases of data collection because of injuries that were incurred outside the research setting. The other individual chose to withdraw from the study prior to the start of Phase 2 of the study. Additionally, another four individuals were dropped from the analyses of the data because the persons' cognitive information styles were not clearly identifiable using a modified-version of the Miller Behavioral Style Scale (MBSS), i.e., the participant's scores on the monitor and blunter subscales did not meet criterion levels. Thus, all descriptions of the data will be based on the final sample size of 56 participants.

The participants' ages ranged from 18 to 35 years of age (M=21.39, SD=3.06). The sample represented the full spectrum of academic standings (see Table 1 for the frequency distribution of the sample). Further, ninety-three percent of the participants were

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Caucasian (N=52). Four other ethnic groups, African-American, Hispanic, Asian-Pacific Islander, and Native American were represented in the study by a single participant.

Table 1

Distribution of Participants by Academic Status

Academic Status	N	Percent
Freshman	15	26.8
Sophomore	5	8.9
Junior	13	23.2
Senior	20	35.7
Graduate Student	3	5.4
Total	56	100.0

Sport Participation. Information about the participants' history of sport experiences was collected via a demographic questionnaire. All fifty-six participants reported that they had participated in organized sport. For the purposes of this investigation organized sport was described for the participants by the following definition:

> "...an institutionalized competitive activity. Most often sport teams are directed by adult coaches and compete in formal leagues" (Coakley, 1986).

The participants reported that they had participated in two or more of 21 organized sport activities. Sixteen participants played soccer for the greatest length of time. This was followed by 12 participants who identified baseball as the sport in which they had invested the most time. Football was the sport of longest duration for 6 participants. Hockey (N=4), basketball (N=4), softball (N=3), cross-country (N=2), and wrestling (N=2) were cited as having been sports in which the participants participated extensively. Golf, marching band, martial arts, soft tennis, swimming, track, and two sports were each identified as the primary sport interest of one participant. On average, each individual had participated in his primary organized sport for an average of 8.39 years (SD=3.75).

As before, a broad array of sports characterized the participant's secondary sport interest. Baseball (N=10), football (N=10), and basketball (N=9) were the three sports that were most frequently identified by the participants as having been a secondary interest. Other secondary sport interests of the participants were soccer (N=6), track (N=5), tennis (N=3), and wrestling (N=3). Cross-country, hockey, rugby, and softball were each reported as the secondary sport interests of two participants. While martial arts and power lifting were identified as the second sport interest by one participant, respectively.

Additonally, a substantial number (N = 48) of participants reported having played a third sport. This finding was followed by 26 participants who indicated that they had played four sports. Finally, 13 individuals stated that they had played five sports during their organized sport career. Frequency tables for the

participants' third, fourth, and fifth sport interests can be found in Appendix A.

The data indicated that the vast majority of participants ceased their participation in organized sport at an age of 18.25 years (SD=1.496). Seventy-five percent of the sample (N=40) indicated that they had stopped participating in organized sport by age 19. This result suggested that most participants concluded their organized sport career upon completion of their high school education. However, nine participants in the study reported that they were still participating in organized sport.

Sport experience was not a requirement for participation in the study. However, the data provided clear evidence that the participants have had substantive experiences in the organized sport setting. Also, the participants had varied experiences in organized sport. Thus, the participants demonstrated diversity in their experiences and invested a substantial amount of time in organized sport activities. Finally, only six individuals had any organized sport experience in tennis.

Tennis Ability. Forty-four of the fifty-six participants in the sample indicated they had prior experience playing tennis. To determine the ability of the participants to play tennis, the participants were asked to self-rate their tennis ability using a modified-version of the National Tennis Rating Program (NTRP; USTA, 1991) (see Appendix B).

The original version of the NTRP was jointly developed in 1978 by the United States Tennis Association (USTA), the United States Professional Tennis Association (USPTA), and the International

Racquet Sports Association (IRSA). Qualified tennis verifiers use the instrument to rate the tennis ability of individuals.

A person's rating can range from 1.0 to 7.0 which encompasses 13 levels of play. Each level features a brief description of tennis play which is characteristic of a player at that particular level of play. For example, a player with a 1.5 rating is described as follows: "this player has limited experience and is still working primarily on getting the ball into play" (USTA, 1991, p. 28). Individuals can also use the measure to self-rate their own ability in tennis.

The NTRP instrument was modified in two ways for this study. First, the levels were assigned a whole integer beginning with 1 and concluding with 13. Next, each statement was stated in the first person, e.g., I am just starting to play tennis (level 1). The participants were asked to match their perceived competency in tennis to one of thirteen descriptions of skill in tennis.

The results of this aspect of the study suggested that the individuals who participated in the project were best characterized as novice tennis players ($\underline{M}$=3.39, $\underline{SD}$=2.81). Seventy-seven percent of participants in the sample rated their tennis ability as 5 or lower out of 13 possible levels. A player with this rating can rally at a slow pace but is not comfortable with all strokes.

Further evidence of the novice tennis ability of the sample was noted by the frequency of responses to other statements on the modified-version of the NTRP which was a part of the demographic questionnaire. Eighteen-percent of the participants (N=10) had limited playing experience and were still working primarily to get the ball over the net. These individuals were characterized as a

level 2 player. An additional twenty-one percent of the sample rated themselves as either a level 1 (just starting to play tennis), level 3 (some instruction, but obvious stroke weaknesses), or level 4 player (working just to keep the ball in play with others of the same ability). Thus, it can be said with reasonable confidence that the vast majority of the participants in the study were, at best, novice tennis players. This statement was especially true when the lack of any experiences in tennis for 12 participants is taken into account (see Table 2 for a summary of the frequency distribution of self-ratings of tennis ability).

Although no psychometric properties of the instrument are available, the instrument is widely used by verifiers across the United States and is accepted as being a valid measure of tennis ability. Graham (cited in USTA, 1991) found a strong relationship between self-ratings from the instrument and actual levels of play. This research was supported by the USTA and involved 75 players of various ages.

Research Design. The study incorporated two phases of data collection. The purpose of Phase 1 was to identify the participants' cognitive informational style and to test for differences in information-seeking behaviors and heart rate data. For the purposes of this study a cognitive informational style was determined by an analysis of the participant's self-report on the Miller Behavioral Style Scale (MBSS; Miller, 1987). Based on the results from the MBSS from Phase 1, participants were characterized as either monitors or blunters and were then randomly assigned to either a

Table 2

Distribution of Self-Rating of Tennis Ability on NTRP

Rating	N	Percent
0	12	21.4
1	4	7.1
2	10	17.9
3	3	5.4
4	5	8.9
5	12	21.4
6	4	7.1
7	2	3.6
8	1	1.8
9	0	0.0
10	2	3.6
11	1	1.8
12	0	0.0
13	0	0.0
Total	56	100.0

high or a low information feedback condition. Thus, the Phase 2 study employed a 2 x 2 (cognitive information style by information condition) factorial design.

Instrumentation - Phase 1

Anticipation Timer

The motor task for Phase 1 was the anticipation timing task. A Bassin Anticipation Timer (Lafayette Instruments Model 50-575) was used to assess each participant's anticipation timing

performance. The timer consisted of four 16-lamp modular runways which were attached end to end (304.8 x 8.89 x 6.99 cm). The runway was placed on a table that was 74.93 cm above the ground.

The objective of the timing task for each participant was to anticipate the lighting of the target lamp at the proximal end of the runway. Following the lighting of a signal lamp at the distal end of the runway, the remaining lamps on the runway began lighting up in a sequential, consecutive manner. At the estimated moment of arrival, the participant squeezed a handheld trigger device. After each trial, a light on the timing control unit indicated whether a participant's response was "early" or "late", and a digital clock with a range of .001 - 9.999 seconds indicated the degree of discrepancy. The speed at which the light sequence traveled down the runway was set at 5 miles per hour (223.52 cm/s). This speed was selected to allow the participants a 50/50 chance for successful performance on the task.

Rating of Tennis Ability

At the outset of Phase 1, the participants were asked to self-rate their tennis ability using a modified form of the National Tennis Rating Program (USTA, 1991). The modified version of the NTRP was included as a part of the demographic questionnaire (see Appendix C).

Miller Behavioral Style Scale (MBSS)

Description of the MBSS. In Phase I the participants completed a modified version of the Miller Behavioral Style Scale (MBSS; Miller, 1987). The original version of this self-report instrument is comprised of four aversive scenarios (see Appendix D). Each

scenario is followed by eight statements. Four of the statements are characteristic of monitoring behaviors while the other four are characteristic of blunting actions. Participants mark the statements that are most pertinent to themselves. A score for the monitor subscale is obtained by summing the number of monitor items that were marked for each scenario. Similarly, a score for the blunter subscale is obtained by summing the number of blunter items that were checked for each scenario. Most often a mean split has been employed by researchers (e.g., Efran, Chorney, Ascher, & Lukens, 1989; Miller & Mangan, 1983) to divide a sample into two groups.

Validity of the MBSS. The MBSS has been utilized in several investigations (Efran, Chorney, Ascher, & Lukens, 1989; Miller, 1979a; Miller, 1987; Miller & Mangan, 1983; Miller, Brody, & Summerton, 1988). Discriminant validity of the MBSS was demonstrated via statistical analyses with other psychological measures. Specifically, the correlations between the two MBSS subscales and the Endler Trait Anxiety Scale (Endler, & Okada, 1975) were .00 for the monitor subscale and -.11 for the blunting subscale, respectively (Miller, 1987). Additionally, analyses of variance revealed that state anxiety, as measured by Spielberger's State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, & Lushene, 1969), was significantly related only to the monitoring scale (Miller, 1979a). Further, Miller (1979a) found a nonsignificant relationship between the MBSS and Eysenck's Personality Questionnaire (Eysenck & Eysenck, 1969).

Similar results were uncovered by Efran et al. (1989). Efran et al. (1989) found no evidence of a relationship between the Marlowe-

Crowne Social Desirability Scale (Crowne & Marlowe, 1964) and the MBSS. Additionally, the Absorption subscale of Tellegen and Atkinson's (1974) Differential Personality Questionnaire was not significantly related to either subscale of the MBSS (Efran et al., 1989). Thus, the MBSS appears to stand apart from other personality measures.

Reliability of the MBSS. Reliability of the MBSS was assessed via test-retest analyses with a sample of 110 participants (Miller & Mischel, 1986). This analysis revealed that the MBSS subscales were quite constant over a four-month period. Examination of the monitor subscale yielded a reliability coefficient of .72, while the reliability coefficient for the blunting subscale was just slightly higher at .75 (Miller & Mischel, 1986).

Further, acceptable levels of Cronbach's alpha have been reported by Miller (1987). Alpha coefficients ranged between .67 and .79 (Miller, 1987) and suggested that the internal consistency of the subscales were modest but, nonetheless, acceptable for work with "hypothesized measures of a construct" (Nunnally, 1978, p. 248). Stronger estimates of reliability, i.e., internal consistency, were reported for the monitoring subscale than for the blunting subscale (Miller, 1987). Specifically, Miller's (1987) analyses revealed alphas of .79 and .75 for the monitoring subscale; whereas, alphas of .69 and .65 were divulged for the blunting subscale. Correlational analyses between the MBSS subscales and other psychological measures have been nonsignificant.

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Description of a modified-version of the MBSS. Vealey (1992) asserts that there is a need to develop sport-specific personality measures which capture the uniqueness of the sport context. Therefore, a fifth sport-specific scenario was developed for this investigation and data from this subscale included in subsequent data analyses. This scenario presented an aversive tennis situation. Following the scenario were eight statements. Four of the statements were characteristic of monitoring behaviors and four were representative of blunting actions.

Validity of modified-version of the MBSS. Face validity for the scenario was determined via an examination by an expert who was familiar with the original version of the MBSS (M. M. Spirek, personal communication, April 14,1994). The expert rated the face validity of the sport-specific monitoring and blunting items to be very consistent with the basic tenets of the construct.

Convergent validity for the fifth subscale was examined through correlational analyses with the other MBSS subscales. The monitor aspect of the fifth subscale was significantly correlated with each of the four subscales that were a part of the original MBSS instrument (see Table 3 for the correlation coefficients for the Monitor subscale). The strength of the resultant correlation coefficients suggested that this dimension of the sport-specific MBSS subscale demonstrated excellent convergent validity. However, the results of the correlational analysis for the blunting data of the expanded MBSS blunter scale were not as encouraging. Only one of the original MBSS blunter subscales was significantly correlated with the sport-specific MBSS subscale (see Table 4 for

Tab

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Mon 3

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Table 3

Correlation Coefficients for the Monitor Subscale from the Five MBSS Scenarios

Subscale	Mon 1	Mon 2	Mon 3	Mon 4
Mon 2	.25*			
Mon 3	.11	.37**		
Mon 4	.33**	.27*	.29*	
Mon 5	.27*	.42**	.29*	.27*

* significant at the $p<.05$ level
* * significant at the $p<.01$ level

Table 4

Correlation Coefficients for the Blunter Subscale from the Five MBSS Scenarios

Subscale	Blun 1	Blun 2	Blun 3	Blun 4
Blun 2	-.04			
Blun 3	-.04	-.03		
Blun 4	.22	.18	.43**	
Blun 5	.11	.07	.09	.30*

* significant at the $p<.05$ level
* * significant at the $p<.01$ level

the correlation coefficients for the Blunter subscale). Thus, the lack of convergent validity by the blunting subscale revealed an apparent weakness in the psychometric properties of this dimension of the instrument for this population sample.

Reliability of modified-version of the MBSS. The MBSS data from the present investigation were submitted to a reliability analysis. The reliability coefficients for both the monitor subscale and the blunter subscale from the original MBSS instrument were below the recommended criterion level of alpha=.70 (cited in Borg & Gall, 1983). The original monitor subscale demonstrated greater internal consistency than did the blunter subscale, alpha=.53 versus alpha =.27 respectively. Because of this apparent weakness in the instrument, the monitoring and blunting data from the sport-specific MBSS subscale that was developed for the present investigation were included in the reliability analysis. The results from this analysis were encouraging, although not wholly satisfactory. The alpha for the monitor subscale increased to .68. A similar effect was realized for the blunter subscale as alpha improved to .38, which is still well below the recommended level. The previously mentioned finding was consistent with previous research (Muris, van Zuuren, de Jong, de Beurs, & Hanewald, 1994). Muris et al. (1994) reported that the dichotomous format of the instrument leads to lower levels of internal consistency for both the monitor subscale and the blunter subscale.

Further, Muris et al. (1994) have suggested that a 5-point Likert-type scale results in better internal consistency for both dimensions of the instrument. Unfortunately, this information was

not available to the investigator at the time the study was conceptualized. Therefore, because of the exploratory nature of the investigation and due to the fact that the MBSS is the only instrument that has been designed to tap the monitoring and blunting predispositions of individuals, data collected with the instrument were included in the analyses, albeit with a measure of concern.

Physiological Arousal

The final assessment in Phase I was a physiological measure. The participant's heart rate was monitored throughout the testing session. Heart rate has proved to be an excellent measure of physiological arousal in several related studies (e.g., Averill & Rosenn, 1972; Miller & Mangan, 1983). A Uniq™ Pro Trainer (Computer Instruments Corporation Model #61144) was used to collect data on heart rate. The instrument consisted of a transmitter which was attached to an elastic belt that fastened around the individual's chest just below the pectoralis muscles. The transmitter sensed electrical signals that were produced by the beating of the individual's heart. These signals were transmitted to a receiver/monitor that was worn on the participant's wrist. The information that was transmitted is very similar to the information that a physician would receive from an electrocardiogram (ECG). Heart rate (beats per minute) was constantly displayed in a digital format. Thus, seven individual heart rate readings were determined by the digital readout at a given point in time.

Instrumentation - Phase 2

Pre-test self-perception measures

During the development of the Self-Perception Profile for College Students, the results from factor analyses revealed twelve distinct domains of competence (Neeman & Harter, 1986). The Self-Perception Profile for College Students consists of thirteen subscales: (1) job competence, (2) scholastic competence, (3) social acceptance, (4) appearance, (5) parent relationships, (6) close friendships, (7) intellectual ability, (8) morality, (9) romantic relationships, (10) humor, (11) creativity (12) athletic competence, and (13) global self-worth. In Phase 2 participants completed modified versions of the Athletic Competence Subscale and the Global Self-Worth Subscale (see Appendix E). Additionally, the participants filled-out a modified-for-tennis version of an instrument that was developed by Feltz and Brown (1984) to assess an individual's perceptions of his/her sport-specific ability (see Appendix F).

Description of athletic competence subscale. The Athletic Competence Subscale (Neeman & Harter, 1986) is a five-item measure that "like the child, adolescent, and adult measures, ... assesses whether one feels he or she is good at physical activities and sports" (Neeman & Harter, 1988, p. 2). The instrument utilizes a "structured alternative format" (Harter, 1982, p. 89). The utility of this format is that it seeks to minimize socially desirable responses. Each item is rated on a four-point Likert-type scale. A score of 'one' on an item indicates low perceived athletic competence; whereas, a response of 'four' is indicative of high

perceived athletic competence.

Validity of the Athletic Competence Subscale. Validity for this version of the instrument was grounded in the previous versions of the instrument (e.g., Perceived Competence Scale for Children, Harter, 1978, 1982; Adult Self-Perception Profile, Messer & Harter, 1986). In one of the validating studies conducted by Harter (1982), a correlation coefficient of .62 was attained between the physical education teacher's evaluation of the student on the Perceived Physical Competence Subscale and the student's self-rating on the same instrument.

Additionally, t-tests of mean ratings offered evidence that the Perceived Physical Competence Subscale has discriminant validity. Specifically, a sample of sixth-grade students who were selected to participate on an athletic team from a school that placed a high value on athletic accomplishment reported a higher level of perceived physical competence than did their classmates (Harter, 1982). The validity of the subscale is widely accepted by researchers and has been used in numerous investigations (e.g., Feltz & Petlichkoff, 1983).

Reliability of the Athletic Competence Subscale. Estimates of reliability have been calculated for the instrument (Neeman & Harter, 1986). A coefficient alpha, a measure of internal consistency, of .92 was obtained for the athletic competence subscale from the final sample. In the present study, the alpha for the Athletic Competence Subscale was .84. Thus, the reliability for the athletic competence subscale was acceptable for the purposes of this study.

Description of the Global Self-Worth Subscale. The Global Self Worth Subscale from the Self-Perception Profile for College Students (Neeman & Harter, 1986) was also used in the investigation. This measure is comprised of five items. The Global Self-Worth Subscale utilizes a structured-alternative format. As previously mentioned, each item is rated on a four-point Likert-type scale. A score of 'one' on an item indicates low perceived self-worth; whereas, a response of 'four' is indicative of high perceived self-worth. Neeman and Harter (1986) suggest that the Global Self-Worth Subscale "taps one's general feeling about the self, assessed with items such as liking the kind of person one is, and liking the way one is leading one's life" (p. 3).

Validity of the Global Self-Worth Subscale. Harter (1986) suggested that self-worth is unique and distinct from the other competence domains that were revealed through factor analytic procedures. Validity for the Global Self-Worth Subscale was inferred from the factor pattern for the original version of the Perceived Competence Scale (Harter, 1982). Further, the intercorrelations between the Global Self-Worth Subscale and the other eight subscales from the Self-Perception Profile for College Students are modest (Neeman & Harter, 1986). The finding suggests divergent validity. That is, the other domains make a modest contribution to an individual's self-worth, but each domain is clearly not identical to self-worth.

Reliability of the Global Self-Worth Subscale. Neeman and Harter (1986) do not report a coefficient alpha for the Global Self-Worth Subscale. However, previous studies (e.g., Harter, 1982) for

other age groups have yielded alpha coefficients that ranged from .80 to .89. In the present study the alpha for the self-worth subscale was .80. Thus, the reliability of the subscale was acceptable.

Description of the Perceptions of Sport-Specific Ability in Tennis Subscale. Weiss, Bredemeier, and Shewchuk (1984) reported that competence measures that were sport-specific were better indicators of achievement in a specific sport than a general measure of perceived athletic competence. Therefore, a tennis-specific measure of physical competence, which was a modification of an instrument used by Feltz and Brown (1984), was utilized in the investigation (see Appendix F). The Perceptions of Sport-Specific Ability in Tennis Subscale also used the structured-alternative format that was devised by Harter (1982). The scale consisted of seven items that specifically address the individual's perceptions of his/her ability in the sport of tennis. Several of the questions specifically addressed the skill of hitting a tennis ball.

Validity of the Perceptions of Sport-Specific Ability in Tennis Subscale. In a previous investigation Feltz and Brown (1984) used two subscales from the Perceived Competence Scale for Children (Harter, 1982): Perceived Physical Competence Subscale and General Self-Esteem Subscale, along with a modified-version of Harter's (1982) instrument to assess young soccer players' self-perceptions of their ability at soccer. The correlations between the three scales ranged from $r=.45$ to $r=.66$. Although these correlations were modest, the resultant correlation coefficients were similar to those found by Harter (1982). Based on these findings Feltz and Brown

(1984) concluded that this modified-version truly assessed a separate sport-specific domain and thus exhibited concurrent validity.

Reliability of the Perceptions of Sport-Specific Ability in Tennis Subscale. The alpha for the modified-for-tennis version of Feltz and Brown's (1984) perceptions of sport-specific ability subscale was .75. The coefficient alpha for the modified-for-tennis subscale was .86. The reliability coefficients for the three pre-test self-perception measures of global self-worth, perceived general athletic competence, and perceptions of sport-specific ability in tennis exceeded the recommended alpha level of .70 for acceptable instrument reliability.

Sport Competence Information Scale

Because monitors are characterized as information-seekers and blunters are described as information-avoiders, a measure of the sources from which an individual can draw performance-related information was included in the study. The Sport Competence Information Scale (SCIS) (Horn & Hasbrook, 1986) (see Appendix G) was utilized to assess the strength of the participants' preferences for internal and external sources of competence information. The original form of this measure consisted of 48 items, four items per information source (Horn & Hasbrook, 1986). The present investigation utilized a revised version of the instrument that has been administered to adolescents (Horn, 1991). This form is comprised of 39 items. Participants were asked to respond on a 5-point Likert-type scale (5=extremely important; 1=not at all important).

Validity of the Sport Competence Information Scale (SCIS). The SCIS is an adaptation of Minton's (1979) Competence Information Scale. Minton (1979) formulated her instrument based on the responses of children during interview sessions. Horn and Hasbrook (1986) developed the SCIS based on sources of competence information that were identified by Minton (1979) for the physical domain. Thus, the validity of the instrument was established by the nature of its development from interviews with children. No additional assessments of validity have been conducted.

Reliability of the Sport Competence Information Scale (SCIS). The internal consistency of the various dimensions of sources of information of the original instrument was assessed using Cronbach's alpha (Horn & Hasbrook, 1986). The results of this analysis indicated that the subscales were quite stable as the alpha coefficients ranged from .71 to .88 (Horn & Hasbrook, 1986). Similarly, Ebbeck (1990) using the SCIS with university students reported alpha coefficients which ranged from .53 to .88. In the present study the reliability of eight of the ten subscales (factors) was above the .70 level (see Table 5 for a summary of the reliability coefficients for the SCIS instrument). The alphas for the two subscales that were not above the recommended criterion level for reliability coefficients were just beneath this preferred level. Thus, the reliability of the measure is acceptable (Nunnally, 1978).

Procedures

Prior to recruiting participants for the study, the necessary forms were submitted to the university committee which oversees research involving human subjects. After the project was approved

Table 5

Reliability Coefficients for Sport Competence Information Scale (SCIS) Subscales

Subscale	Items in Subscale	Alpha
Self-Comparison/ Internal Information	9	.79
Competitive Outcomes	4	.67
Parental Evaluation/ Feedback	3	.93
Peer Comparison	4	.72
Spectator Evaluation	3	.84
Coach Evaluation/ Feedback	3	.84
Speed/Ease of Learning	3	.74
Peer Evaluation	3	.67
Goal Achievement	2	.80
Sport Attraction/ Enjoyment	2	.74

by the committee (see Appendix H), permission to recruit participants enrolled in university classes was obtained from the Executive Committee of the School of HPER and from the chairperson of the Department of Interpersonal Communication. Arrangements to speak to students who were enrolled in classes under the auspices of these two areas of study were made with the respective course instructors. At the informational meeting with the students, the nature of the study was explained to the male students who were also informed of their rights as participants in a research study and subsequently asked to volunteer their time for the study.

Individuals who indicated a willingness to participate in the study were scheduled to report to the testing site on an individual basis. These persons were given a written reminder and later contacted via the telephone to remind them of their appointment for testing.

Data Collection Procedures for Phase 1

Upon reporting to the lab (see Figure 2 for a diagram of the testing setting), procedures for the experiment were reviewed with the prospective participant. Following this action the participant was asked to give his written consent (see Appendix I) to continue in the investigation and was assigned a participant identification number. Upon the receipt of his assent, the participant was fitted with the heart rate monitor and an explanation of the purpose and mechanics of the monitor were furnished. The individual was then asked to sit at a desk and complete the modified-version of the Miller Behavioral Style Scale (MBSS) and a brief demographic questionnaire. This latter questionnaire asked for some information

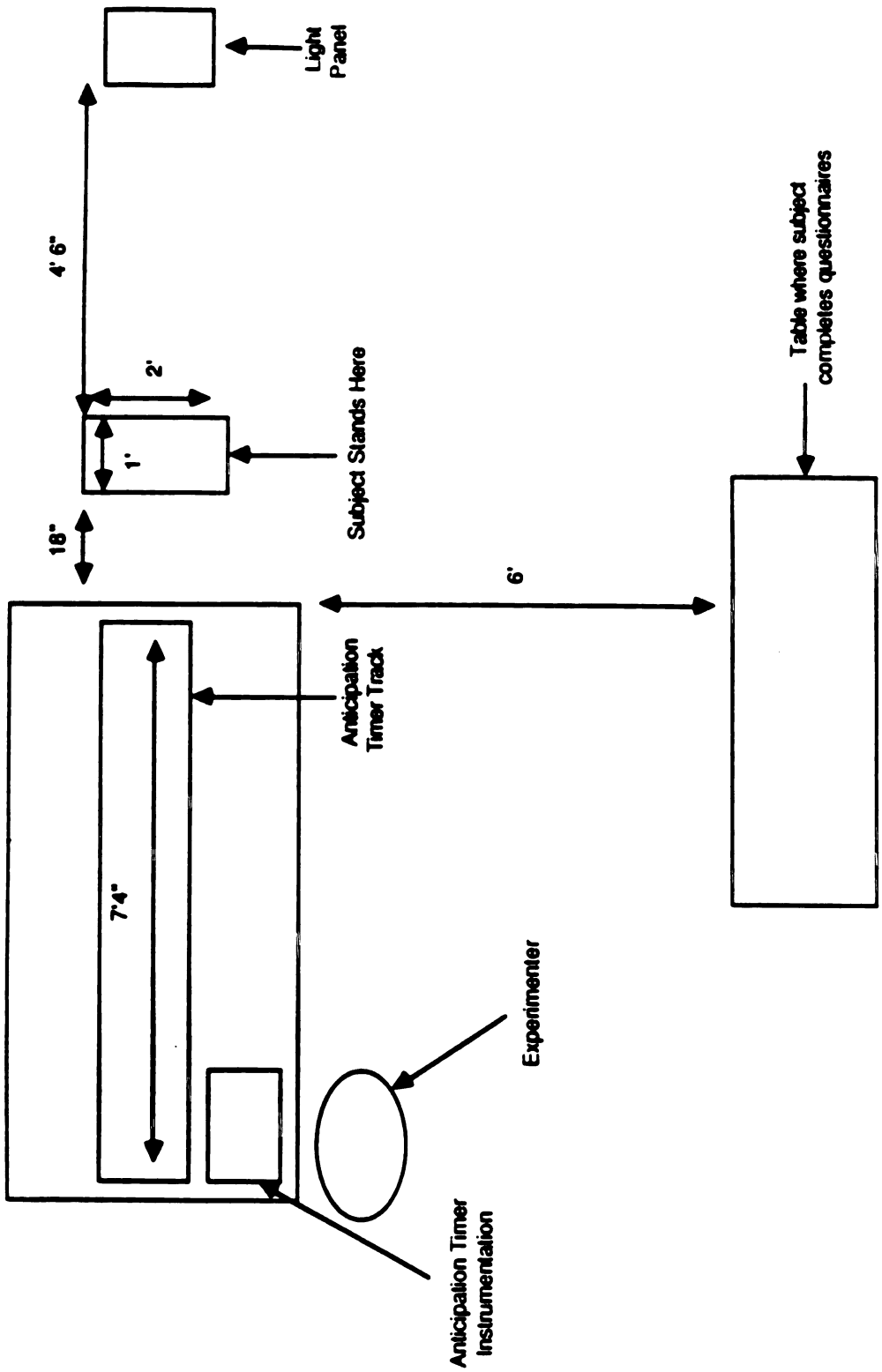

Figure 2. Diagram of test site for Phase 1

regarding the participant's perceptions of the sport experience as well as the individual's sport history. Also, the participant was asked to provide a self-rating of his tennis ability. Following the completion of these questionnaires, the participant's heart rate was recorded. Next, the anticipation timing task was introduced to the participant. The individual was told that performance on the anticipation timer was a strong indicator of an individual's potential for successful performance in tennis, in particular, hitting a tennis ball. Thus, purportedly the purpose of this phase of the experiment was to see how well participants could anticipate exactly when an object would arrive at a certain point. The mechanics of the anticipation timing task were then described in detail to each participant as follows:

> "The yellow warning signal lamp at the far end of the runway will go on, and remain lit for 1.0 to 2.5 seconds. This is your cue to get ready, because when the warning light goes off, the red lights on the track will start to light up - one by one- all the way down the track. The light will be traveling at a speed of 5 miles per hour. Your job is to try to "time" exactly when the last light - the target light - will light up. You are to push this button (participant is given the hand switch) with the thumb of your dominant hand <u>exactly</u> when you think the target light will light up. You will be given a total of 25 trials" (Albrecht, 1988).

Following the explanation of the task, the participant's heart rate was recorded. Then the individual participated in five practice trials. The practice trials allowed for habituation of heart rate.

After completing the practice trial block, the participant's heart rate was recorded. At the conclusion of the practice trials, the participant was informed about a light panel that was located on a shelf with a height of 105 cm and at a distance of approximately 140 cm behind the participant. The panel had a red light and a green light. The lighting of the green light signified that the participant's performance on the anticipation timer was within the predetermined acceptable range for performance on the task (-25 msec to +25 msec). Whereas, the lighting of the red light indicated that the participant's performance was outside the desirable range of scores (performance - 25 msec to +25 msec). The criteria were established based on a conversation with a motor learning expert who uses the anticipation timing task in her research (P. Shewokis, personal communication, April 15, 1994). The light panel was the only source of information about one's performance on the anticipation timer task. The following scripted information was provided:

> "If you look behind you, you will see a box with two lights mounted on top. These lights will give an indication of how well you are doing on the task. Because a large number of students have taken this test we can accurately predict the pattern of your own performance under these conditions. If you are interested, you can follow how well you are doing by looking at the lights. If the light is green it means that your performance is equal to or exceeds the criterion level of performance on the task. If the light is red, however, it means that you have fallen below the standard of performance. If you want to know how you did on each trial, you will have time to

turn and look at the lights. Shortly thereafter the warning light at the far end of the track will light and the next trial will begin."

The participant stood approximately 45 cm behind the target lamp in such a manner that the runway light sequence was coming directly toward them in the sagittal plane. The hand switch was held in the dominant hand. The length of time between the presentation of the warning signal and the start of each trial remained constant throughout at 1.0 seconds.

Although actual performance on the task was not a variable of direct interest, performance on each trial was recorded by the investigator. Each participant experienced a total of twenty-five trials (5 practice trials and 20 trials for which performance was recorded). The trials were administered in two blocks consisting of ten trials each. The individual's heart rate was recorded prior to the start of each trial block and at the conclusion of the trial block. Thus, the participant's heart rate was measured on seven occasions during the testing session. A 7-second interval between trials was provided in order to allow the person adequate time to seek-out information from the light panel. Additionally, a brief 30 second-long rest period was provided between the conclusion of the first trial block and the start of the second trial block.

The investigator observed and recorded the participant's information-seeking behavior following each trial. Specifically, the observer looked for information-seeking behavior in the form of the individual turning to look at the light panel. At the end of the testing session the heart monitor was removed and the participant

completed a post-test instrument and was debriefed.

Specifically, the person's perceptions of the experience were addressed during this session. Following the completion of this brief interview, the participants were thanked for their participation in Phase 1 and a day and time for Phase 2 testing was scheduled. A general description of the tennis task in Phase 2 was provided so as to encourage the participant to continue in the experiment. The participant was given a written reminder and asked for permission to be reminded of their appointment by a telephone call from the researcher. The individual was then excused from the lab.

Data reduction procedures to determine the participants' cognitive information style

The cognitive information style of each participant was determined via the analysis of MBSS data acquired during Phase 1 testing. This task was accomplished utilizing a three-step procedure. In the first step, participants whose scores on the monitor subscale were equal to or greater than the mean for the subscale (M=13.00, SD=3.56) and whose scores on the blunter subscale were below the mean for that subscale (M=4.89, SD=2.41) were classified as monitors. In like manner, participants whose scores on the monitor subscale were less than the mean for the subscale and whose scores on the blunter subscale were equal to or greater than the mean for the subscale were classified as blunters. Using this procedure, 17 participants were characterized as monitors and 18 as blunters.

Because the study utilized a mean split for the cognitive

information style variable, all data for Phase 1 were collected prior to the initiation of data collection procedures for Phase 2. Inasmuch as the first procedure was not able to categorize the cognitive information style of all the participants, a second step was necessary. The next action in the procedure classified an additional 4 participants as blunters and 14 as monitors. This was accomplished using the following procedure, participants whose score on the monitor subscale was above the mean for the subscale and whose score was above the mean for the difference score between the two subscales ($\underline{M}$=8.11, $\underline{SD}$=4.32) were identified as monitors. Participants whose score on the blunter subscale was above the mean for the subscale and whose score was above the mean for the difference score between the two subscales were identified as blunters.

Ten participants were not classified using either of the two procedures previously mentioned. Thus, a third step was implemented. The raw scores from the two MBSS subscales for the remaining 10 participants were examined to see if a characteristic cognitive information style could be ascertained (see Table 6). Six of these individuals appeared to possess a strong tendency towards a monitoring disposition, i.e., scores very close to the mean for the monitor subscale and difference scores at or above the mean difference score for the two subscales. These individuals were included in the analyses of the data as monitors. However, no clearcut determination of cognitive information style could be made for four of the participants. Therefore, the data for the four participants whose characteristic cognitive information style could

Table 6

MBSS Raw Scores for Monitor Subscale and Blunter Subscale for Unclassified Participants

Subject No.	Monitor Score	Blunter Score	Difference Score	Group Assigned
002	11	3	8	Monitor
009	12	1	11	Monitor
013	12	3	9	Monitor
100	7	4	3	Dropped
107	12	3	9	Monitor
108	5	0	5	Dropped
114	10	2	8	Monitor
119	8	3	5	Dropped
124	10	3	7	Monitor
125	8	2	6	Dropped

not be clearly identified were not included in any subsequent analyses. Thus, 37 participants were clearly determined to be monitors and 22 participants were established as blunters. However, as previously mentioned, three participants (all monitors) did not complete both phases of data collection. Therefore, the data for these three individuals were eliminated from the study. Thus, the final sample included 34 monitors and 22 blunters.

Following assignment to the monitor or blunter group, one-half of the members in each group was randomly assigned to a high information condition. While the other half of each group was assigned to a low information condition.

Data Collection Procedures for Phase 2

The data collection for Phase 2 was done individually at an outdoor test site. Upon reporting to the test site, the general procedures for this phase of the investigation were explained to the participant following which the individual was asked for his consent to continue. Upon the receipt of positive assent from the participant, the heart monitor was put in place. The participant then completed the Sport Competence Information Scale (SCIS) (Horn & Hasbrook, 1986) and three pre-test self-perception instruments which measured perceived general athletic competence, sport-specific perceived ability, and global self-worth. Harter (1988b) provided the following set of directions for completing the self-perception questionnaires:

> "We have some sentences here and, as you can see from the top of your sheet where it says "What I am like," we are interested in what each of you is like, what kind of a person you are like. This is a survey, not a test. There are no right or wrong answers. Since college students are very different from one another, each person will be putting down something different. First, let me explain how these questions work. There is a sample question at the top, marked (a). I'll read it aloud and you will follow along with me. (Examiner reads sample question.) This question talks about two kinds of people, and we want to know which person you are most like. (1) So, what I want you to decide first is whether you are more like the person on the left side who would rather go to the movies or whether you are more like the person on the

right side who would rather go to a sports event. Don't mark anything yet, but first decide which kind of person is most like you, and go to that side of the sentence.

(2) Now, the second thing I want you to think about, now that you have decided which kind of person you are most like, is to decide whether that is only sort of true for you, or really true for you. If it's only sort of true, then put an X in the box under sort of true; if it's really true for you, then put an X in that box, under really true.

(3) For each sentence you only check one box. Sometimes it will be on one side of the page, another time it will be on the other side of the page, but you can only check one box for each sentence. You don't check both sides, just the one side most like you.

(4) OK, that one was just for practice. Continue with these sentences on your own. For each one, just check one box, the one that is most true for you, what you are most like. (p. 10)

Following the completion of the pre-test questionnaires, the participant's heart rate was recorded. Next, the participant received instructions regarding the task of hitting a tennis ball that is projected at a moderate speed from the ball machine, a Prince® Professional II with VSP®. The participant was given five practice trials to adjust to hitting the tennis ball that was projected from the ball machine. At the conclusion of the practice trial block, the individual's heart rate was registered.

The participant was then provided with more specific information about the experiment. Specifically, the person was told

that the experiment involved the evaluation of the participant's anticipatory skill in the context of a tennis task as well as an assessment of the objective outcome of each groundstroke, i.e., where the ball landed relative to the court. Further, the individual was informed that qualitative aspects of the forehand groundstroke would be assessed. The heart rate of participants in the low information condition was recorded.

At this point in time, however, the participants in the high information condition were told that at the end of each trial block they would receive performance-related information relative to their anticipatory skill at the task, their objective outcome on the task, and the qualitative aspects of the forehand groundstroke. At the conclusion of this task-related piece of information, the heart rate of the participants in the high information condition was recorded.

The participants then proceeded to begin the first of three trial blocks of the tennis task. The tennis task consisted of three trial blocks with each block consisting of five trials. At the end of each trial block the participants in the high information condition were given performance-related information. Specifically, following the first trial block high information condition participants received feedback relative to the preparatory phase of the forehand groundstroke. At the conclusion of the second trial block the performance-related information focused on the force production phase of the groundstroke; this was followed at the conclusion of the third trial block with information relative to the recovery phase of the movement. All feedback that was given was

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accurate, i.e., no false feedback was given to the participants.

In contrast, participants in the low information condition were first engaged in a conversation about their experiences with tennis as a part of the high school curriculum. This was followed by a brief discussion of the individual's television viewing of sporting events with particular interest in the participant's watching of tennis events on television. The collection of Phase 2 data took place shortly after the conclusion of the French Open and just prior to the start of Wimbledon. Both of these events were broadcast across commercial airways by one of the three major television networks. Thus, all persons who own a television could have free access to view some or all of the tennis action that was selected by television executives for broadcast.

Heart rate data were collected from each participant immediately following the fifth trial of each trial block, at a point 30 seconds after the initial heart rate reading, and again following the presentation of the experimental treatment which lasted 30 seconds. This pattern was followed for each of the three trial blocks. Thus, during the execution of the tennis task, each participant's heart rate was measured on nine separate occasions.

Following the completion of the three trial blocks the participant completed the three post-test self-perception measures, which were identical to those that were responded to during the pre-test phase of the experiment, and a brief post-test questionnaire. After the participant completed the post-experiment measures, the individual's heart rate was recorded. The participant then removed the heart monitor and was debriefed. The participant was thanked

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for his participation and cooperation in the research endeavor and then excused from the test site. The testing session for each phase lasted approximately 30 minutes.

Treatment of the Data

Phase 1 Data Analysis

Information-seeking behavior. Because the information-seeking data were gathered across two trial blocks, the data were submitted to a 2 x 2 (cognitive information style x trials) repeated measures multivariate analysis of variance (RM MANOVA) to test for differences in information-seeking behaviors between the monitor and blunter groups.

Physiological arousal. The heart rate data for this phase was analyzed using a 2 x 7 (cognitive information style x trials) repeated measures multivariate analysis of variance (RM MANOVA).

Perceptions of the sport experience. The items which assessed the participants' perceptions of the sport experience were moderately correlated (see Table 7 for a summary of the correlation coefficients for this measure). Therefore, the perceptions of the sport experience data were analyzed via a one-way (cognitive information style) multivariate analysis of variance (MANOVA).

Post-test questions. Because of a modest correlation between several items on the Phase 1 post-test questionnaire (see Table 8 for a summary of the correlation coefficients for this measure), participants' responses were analyzed via a one-way (cognitive information style) multivariate analysis of variance (MANOVA).

Table 7

Correlation Matrix of Perceptions of Sport Experiences

	CO2	CO3	CO4	CO5	CO6
EVALCO1 - Coach understood players	.65**	.36**	.42**	.56**	.49**
EVALCO2 - Coach was good teacher		.39**	.61**	.54**	.52**
EVALCO3 - Coach spoke calmly when I made a mistake			.04	.25	.42**
EVALCO4 - Coach understood the sport				.50**	.34*
EVALCO5 - Coach provided sufficient performance feedback					.58**
EVALCO6 - Coach exhibited high levels of social support					

* significant at the .05 level
** significant at the .01 level

Table 8

Correlation Matrix of Post-Test Engagement in Task Variables

	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
PostQ1 - Lights provided necessary info about performance	.57*	.27	-.02	-.05	.21	.30*	-.20	-.06
PostQ2 - Information was sufficient		.16	.02	-.04	-.07	.29*	-.32	.08
PostQ3 - Task was interesting			.02	.19	.37**	.21	.03	.19
PostQ4 - Nervous when performing the task				-.16	.20	.29*	.08	-.17
PostQ5 - I was successful at the task					.17	-.01	.05	.32*
PostQ6 - Sound of the switch caused me to look at light panel						-.03	.14	-.04
PostQ7 - Wanted to do well on the task							.22	-.05
PostQ8 - Wanted more information								-.04
PostQ9 - Knew how well I did without looking								

* significant at the .05 level
* * significant at the .01 level

Phase 2 Data Analysis

Pre-treatment physiological arousal. The heart rate data that was collected prior to the participant's exposure to the experimental treatment were submitted to 2 x 3 (cognitive information style x trials) repeated measures multivariate analysis of variance (RM MANOVA).

Pre-test self-perception measures. The data from the pre-test self-perception measures, i.e., perceptions of general athletic competence, perceptions of sport-specific ability in tennis, and global self-worth were analyzed using a one-way (cognitive information style) MANOVA.

SCIS data. Scores for each of the ten SCIS subscales were calculated. This was done by summing the item scores for each statement that was a part of a particular SCIS subscale. Next, the scores for the internal dimension of the instrument were determined by summing the subscale scores for items that reflected internal sources of information. A score for the external dimension was calculated by summing the subscale scores for items that reflected external sources of information. Finally, the internal and external data were submitted to a one-way (cognitive information style) MANOVA.

Post-test self-perception data. In order to control for pre-test levels of self-perceptions on the global self-worth, perceived general athletic competence, and sport-specific perceived ability in tennis subscales, the post-test self-perception data were submitted to a 2 x 2 (cognitive informational style by information condition) multivariate analysis of covariance (MANCOVA).

Physiological response to information condition. The heart rate data that were collected following exposure to the experimental treatment and after performing the tennis task were analyzed via a 2 x 2 x 3 (cognitive informational style by information condition by trials) RM MANOVA.

Effect of information condition on motor performance. The motor performance data were analyzed via a 2 x 2 x 3 (cognitive informational style by information condition by trials) RM MANOVA.

Post-test questions. The data that were collected in order to examine the participant's perception of the testing session were submitted to a 2 x 2 (cognitive information style by information condition) MANOVA.

CHAPTER 3

Results

Phase 1

The context for the present study was quite different from previous research involving the use of the MBSS. Previously described investigations have been conducted in a medical setting (e.g., Miller & Mangan, 1983), a situation with the threat of electric shock (e.g., Averill & Rosenn, 1972; Miller, 1979a), and in the context of viewing a scary movie (e.g., Sparks & Spirek, 1988). Clearly an objective physical threat was present in both the medical situation and the electric shock study. In the mass media context the physical threat was replaced with a stressful psychological threat.

The evaluative situations in the present study were designed to be ego-threatening. However, the evaluative situations in the motor domain would appear to be less stressful than the objective physical threat of undergoing a medical procedure or receiving an electric shock. Further, the media situation would seem to be more stress-filled than the present evaluative situation as the visual images in the film along with the accompanying sound track would, in all likelihood, heighten the stressfulness of the experience. Thus, the contexts of the previously-mentioned investigations were quite different from that of this study.

Because of the contextual differences and the exploratory

that the cognitive information style construct was utilized in research in the psychomotor domain, a more liberal estimate of statistical significance was employed. Specifically, the necessary p value was set at .10. This action increased the likelihood of making a Type-I error while at the same time reducing the probability of making a Type-II error. Thomas and Nelson (1990) indicated that in research investigations which employ the commonly-accepted $p<.05$ the region between .051 and .10 is borderline. The present investigation did not want to employ a too conservative estimate of statistical significance and run the risk of 'overlooking' a practically significant finding. Additionally, because of the exploratory nature of the study, effect sizes (Rosenthal, 1984) were calculated along with the appropriate inferential statistics to further aid in the analysis and subsequent interpretation of the data.

Information-Seeking Behavior. Miller (1987) reported that participants who were classified as monitors by the MBSS exhibited significantly more information-seeking behavior than did participants who were identified as blunters. Therefore, it was hypothesized that participants in the present study would exhibit a similar pattern of information-seeking behavior based on the individuals' cognitive information style. Specifically, participants who were characterized as monitors, based on data derived from the MBSS, would demonstrate higher levels of information-seeking behavior than blunters.

The information-seeking behavior of the participants was observed and recorded by the experimenter while the participants were performing the anticipation timing task. Specifically, the

experimenter noted whether or not each subject sought information, i.e., turned to look at the light panel located behind them, following each trial. A cursory examination of the means and standard deviations for the two cognitive information style groups suggested that participants who were identified as blunters by the MBSS exhibited lower levels of information-seeking during each trial block as well as across all 20 anticipation timing trials than did monitors (see Table 9 for a summary of the means and standard deviations for the participants' information-seeking behavior).

Table 9

Mean Number of Information Seeking Behaviors Exhibited During Each Trial Block and Summed Across All Trials

	Monitors (n=34)		Blunters (n=22)	
	M	SD	M	SD
Trial block 1	7.47	3.59	5.50	4.64
Trial block 2	7.74	3.70	5.59	4.60
All trials	15.21	7.04	11.09	9.21

Because the anticipation timing task was conducted in two trial blocks, a 2 x 2 (cognitive information style by trials) repeated measures multivariate analysis of variance (RM MANOVA) was executed for the information-seeking behaviors exhibited by the

participants in each trial block. A significant between-group effect was revealed, $F(1,54)=3.58$, $p<.064$; ES=.52. The within-subjects effect for trials was non-significant, $F(1,54)=.69$, $p<.41$. However, the effect size for Trial block 1 and Trial block 2 were ES=.48 and ES=.52, respectively. Additionally, the interaction effect (cognitive information style x trials) did not approach statistical significance, $F(1,54)=.16$, $p<.69$. Thus, monitors demonstrated more information-seeking behaviors than blunters. Blunters looked for performance-related information on approximately one out of every two trials while monitors looked after almost every trial.

Physiological Measures (Heart Rate). The research efforts of Miller (1979a; 1987; Miller & Mangan, 1983) have suggested a strong relationship between an individual's cognitive information style and the person's physiological responses (e.g., heart rate, palmar sweat prints, and muscular tension) when in a stressful environment. In one study (Miller, 1987), when participants could choose to seek or avoid information (i.e., satisfy their theorized predisposition), the groups did not differ in their levels of tension or rates of anxiety abatement. Because of this evidence it was hypothesized that the heart rates of monitors and blunters would not differ at any point in time during the testing session.

Each participant's heart rate (HR) was recorded at seven points in time during the data collection session: (1) after the completion of the demographic questionnaires, (2) after the explanation of the anticipation timing task, (3) immediately following the practice trial block, (4) at the conclusion of the explanation of the lights, (5) immediately after Trial block 1, (6) at the end of a 30 second rest

between the trial blocks, and (7) at the conclusion of Trial block 2. The HR measurement following the participant's completion of the demographic questionnaire was recorded while the participant was seated; whereas, the individual was in a standing position for the other six heart rate measures. A t-test for the HR measurement following the participant's completion of the demographic questionnaire was non-significant, $t(54)=.05$, $p>.10$. Thus, monitors and blunters did not exhibit different arousal levels following the completion of the demographic questionnaire.

The results of the 2 x 6 (cognitive information style by trials) RM MANOVA for the other six heart rate measurements revealed a significant within-subject effect for trials, $F(5,50)=7.48$, $p<.001$. However, the between-participants effect for cognitive information style was not significant, $F(1,54)=.04$, $p> .10$. Further, the interactive effect (cognitive information style x trials) was also non-significant, $F(5,50)=.58$, $p >.10$.

The significance of the within-subject effect for trials was examined further using the Tukey post-hoc method of multiple comparisons (Glass & Hopkins, 1984). The critical q-value necessary to reach statistical significance at the $p<.10$ level was 3.76. (The means and standard deviations for the six trials plus the baseline HR measure are presented in Table 10.)

Based on the results of the Tukey tests, the following differences in HR were found. First, the HR measurement that was taken following the explanation of the anticipation timing task was significantly greater than the last three HR measurements, i.e., HR following Trial block 1, $q=4.82$; HR following a 30-second rest

Table 10

Means and Standard Deviations for Heart Rate Measurements (in bpm) during Phase 1

Time of measurement	M	SD
While seated after completion of demographic questionnaires	80.38	11.70
After anticipation timer task explained	90.54	12.86
Following practice trial	87.82	12.97
After light panel explained	89.63	13.03
Following Trial block 1	86.36	13.25
After 30-second rest period	86.77	12.23
Following Trial block 2	86.71	16.96

period between trial blocks, q=4.35; and HR following Trial block 2, q=4.41. No other statistical differences (critical-q=3.76) were revealed between the HR measurement that was taken following the explanation of the anticipation timing task and HR following the practice trial block, q=3.13 ; and HR following the explanation of the light panel, q=1.05 .

The post-hoc Tukey follow-up revealed only one other significant difference in participants' HR. The HR measurement following the explanation of the light panel was significantly greater than the HR measurement following Trial block 1, q=3.76. A plot of the participants' HR data suggested that the participants' HRs appeared to habituate across trials, but remained elevated above baseline or seated HR (see Figure 3).

The results of the analysis of the heart rate data provided the necessary evidence in support of the second hypothesis that the participants' heart rates would not differ throughout the testing session as a function of the individual's cognitive information style. All participants experienced changes in HR as a function of hearing about the task, practicing the task, and learning about the lights. In addition, participants responded similarly during the performance trials and the rest period.

Anticipation timing performance. The motor task that was utilized in this part of the study was the anticipation timing task. Participants in the study completed 20 trials on the Bassin anticipation timer. These 20 trials were accomplished in two trial blocks of 10 trials per block. Results of a 2 x 20 (cognitive information style by trials) RM MANOVA revealed no significant

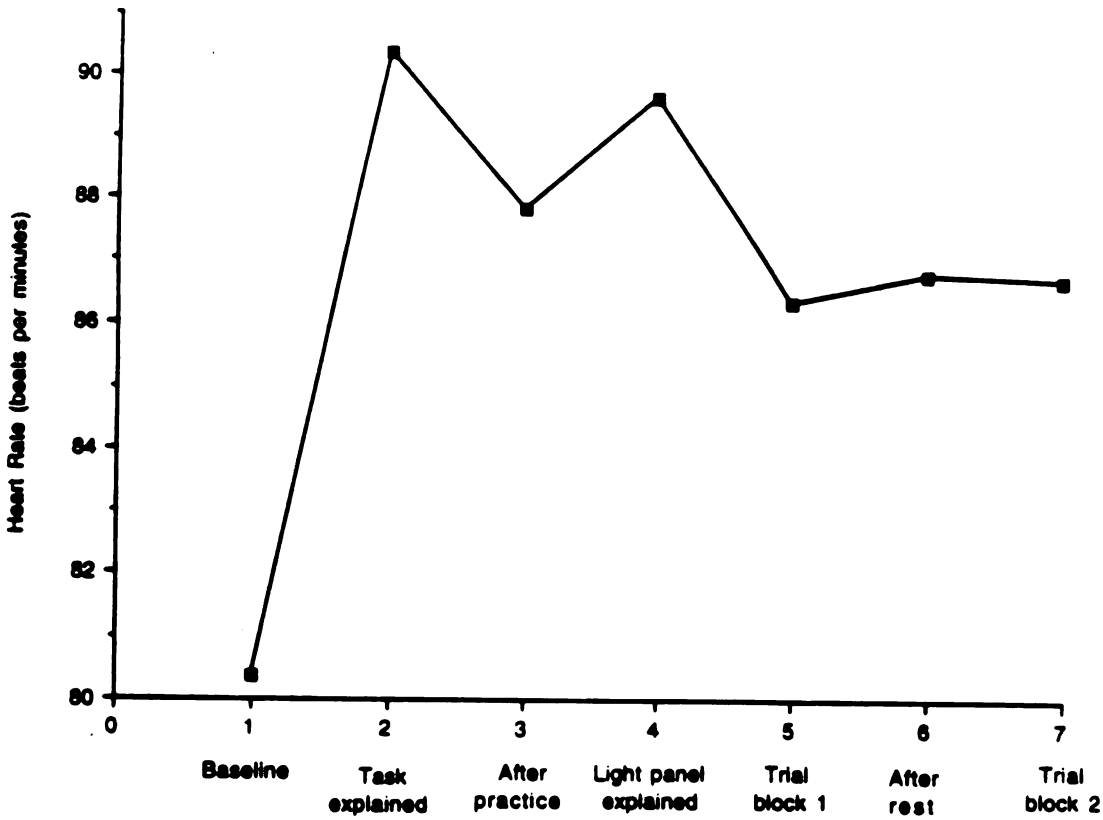

Figure 3. Heart rates of participants during the Phase 1 testing session

effect between groups for cognitive information style. In a like manner, the within-subject effects did not reveal any statistical differences in performance across trials by the entire group, nor was the interaction effect (cognitive information style x trials) statistically significant (see Table 11 for a summary of the MANOVA effects). The means and standard deviations for each of the 20 trials are located in Appendix J.

Subject Engagement in the Task. In order to assess the degree to which the participants were engaged in the motor task as well as to assess their perceptions of the experience, participants completed a post-test questionnaire which was comprised of nine questions (see Appendix K). The participants responded to each question by marking their response on a 5 point Likert-type scale (5=Completely True; 1=Not True).

Overall, the participants indicated that they found the task interesting (M=4.08, SD=.85); and that they wanted to do well on the task (M=4.46, SD=.61). Also, the participants believed that they were moderately successful at the task (M=3.04, SD=1.05). Further, the participants acknowledged that they were a little nervous when performing the anticipation timing task (M=2.42, SD=1.11).

The adequacy of information that was made available to the participants during the testing session was assessed via 3 questions. Interestingly enough, the participants were relatively strong in their response to the statement "I wanted more information about my performance" (M=3.64, SD=1.14), while at the same time indicating only modest support for the expression "The information about my performance was sufficient" (M=3.14,

Table 11

Analysis of Variance Summary Table for Performance on the Anticipation Timing Task

Source	df	MS	F	*p*
Between-subjects effect				
Cognitive style	1	6045.07	.36	.55
Error	54	16659.36		
Within-subject effect				
Trials	19	452.40	.45	.97
Cognitive style x Trials	19	1276.72	.93	.56
Error	36	1129.54		

SD=1.11). Further, a moderate level of support was provided for the statement "The lights provided necessary information about my performance" (M=3.18, SD=1.16).

Because of the modest correlation between the post-test items (see Table 8 for a summary of the correlation coefficients for this measure), the data were submitted to a one-way (cognitive information style) MANOVA. The results of this analysis revealed no differences between the responses of monitors and blunters, $F(9,40)=.36$, $p>.10$. Thus, it could be said that monitors and blunters experienced the testing session in similar ways.

Summary of Phase 1 Results. The statistical findings from the analyses of the data that were collected during Phase 1 supported both research hypotheses. Specifically, more information-seeking behavior was exhibited by monitors in the ego-threatening evaluative situation than by blunters. This result was consistent with previous research (Miller, 1987). Additionally, because the participants had the choice to engage their preferred cognitive information style, i.e., monitoring or blunting, physiological arousal, which was operationally defined for this study as heart rate, was not impacted. This finding was also consistent with previous research (Miller & Mangan, 1983). Additional support for the congruency between the testing experience and the participants' cognitive information style was revealed by the data that were collected at the conclusion of the testing session. Because of these findings, each participant's cognitive information style was accepted and Phase 2 of the study was conducted.

Phase 2

During Phase 2 of the project, participants were randomly assigned to either a high information condition or a low information condition. Physiological arousal, motor performance on a tennis task, and self-perceptions, i.e., general athletic competence, global self-worth, and sport-specific ability in tennis, were the dependent variables for the experimental phase which was conducted in a controlled field setting.

Physiological response to feedback. Because of Miller and Mangan's (1983) findings relative to the interactive effect of cognitive information style and information on physiological arousal, heart rate (HR) data were collected from the participants on 14 separate occasions during the testing session. Four of the HR measurements were taken prior to the introduction of feedback on performing a tennis groundstroke, i.e., the forehand drive; while the remaining ten HR measurements were recorded after the participants had been exposed to the experimental treatment.

A measure of the participant's baseline HR was taken while the individual was seated following the completion of the pre-test instruments. A t-test revealed no differences in baseline HR between monitors and blunters, $t(54)=1.58$, $p>.10$. The three assessments of HR, i.e., HR after the tennis task was explained, HR after the practice trial block, and HR after evaluative aspects explained, that followed the baseline measurement but were recorded prior to the experimental treatment were submitted to a 2 x 3 (cognitive information style by trials) RM MANOVA to test for group differences in heart rate as a function of the subject's

cognitive information style.

The results of the between-subjects analysis indicated that there were no differences in heart rate between the monitors and blunters before exposure to the information condition, $F(1,54)=.06$, $p>.10$. The interaction term (cognitive information style by trials) was significant, $F(2,53)=3.35$, $p<.043$, as was the within-subject effect for trials, $F(3,52)=119.16$, $p<.000$ (see Table 12 for the means and standard deviations for the participants' HR).

Table 12

Pre-Treatment Mean Heart Rates of Participants by Cognitive Information Style

	Monitors (n=34)		Blunters (n=22)		Sample (n=56)	
	M	SD	M	SD	M	SD
Baseline (while seated)	79.94	11.06	75.27	10.33	78.11	10.93
Tennis Task Explained	82.35	13.13	81.64	9.87	82.07	11.86
Practice Trial Block	108.29	15.62	111.27	19.04	109.46	16.94
Evaluative Features Explained	89.91	12.59	85.14	9.59	88.04	11.65

The plot of the means (see Figure 4) for this set of three measures of HR, i.e., HR after the tennis task was explained, HR after the practice trial block, and HR after evaluative aspects explained,

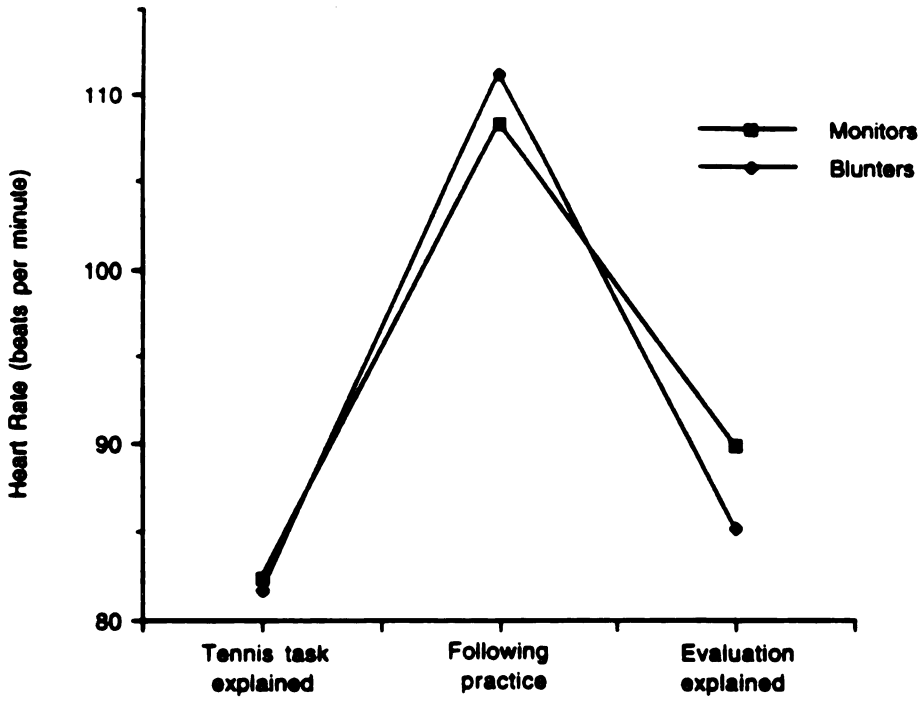

Figure 4. Heart rates of monitors and blunters prior to experimental treatment during Phase 2

revealed elevated heart rates for both monitors and blunters following the practice trial block. The data were subjected to a post-hoc analysis using the Tukey method for multiple comparisons. Because the groups were of unequal size, an estimate of the standard error of the mean was employed (Glass & Hopkins, 1984, p. 371). The critical-q value necessary to reach statistical significance at the $p<.10$ level was 3.76.

The HR measurement of monitors that was taken immediately following the practice trial block was significantly greater than the HR measure for both monitors and blunters following explanation of the tennis task, $q=16.63$ and $q=17.08$, respectively. Additionally, monitors' HRs immediately following the practice trial block were significantly greater than the HR measures for both monitors and blunters following the explanation of the evaluative aspects of the testing session, $q=11.78$ and $q=14.84$, respectively.

Further, the HR measurement of blunters that was taken immediately following the practice trial block was significantly greater than the HR measure for both monitors and blunters following explanation of the tennis task, $q=18.54$ and $q=18.99$, respectively. Also, blunters' HRs immediately following the practice trial block were significantly greater than the HR measures for both monitors and blunters following an explanation of the evaluative aspects of the testing session, $q=13.69$ and $q=16.67$, respectively. Again, the Tukey post-hoc method for multiple comparisons using an estimate of the standard error of the mean for groups of unequal size (Glass & Hopkins, 1984, p. 371) was employed.

One additional statistically significant difference in

participants' heart rates was revealed using the Tukey post-hoc method for multiple comparisons with an estimate of the standard error of the mean for groups of unequal size (Glass & Hopkins, 1984, p. 371). Monitors' HRs following the explanation of the evaluative aspects of the testing session were substantially greater than the HRs of both monitors and blunters following explanation of the tennis task, q=4.85 and q=5.30, respectively.

However, monitors and blunters' HRs following the completion of the practice trial block were not significantly different, q=1.90. Additionally, the HRs of monitors and blunters following an explanation of the evaluative aspects of the testing session were not different, q=3.24. Finally, monitors and blunters' HRs were not significantly different following a description of the tennis task, q=.46. Thus, the two groups exhibited similar heart rates at each point of measurement prior to the introduction of the experimental treatment.

The HR data for the total sample was plotted to ascertain the nature of the statistically significant within-subjects effect for trials (see Figure 5). As previously mentioned, the heart rates of the participants immediately following the practice trial block appeared to be greatly elevated in comparison to the other two heart rate measurements. The HR data was examined using the Tukey post-hoc method for multiple comparisons. The critical-q value necessary to confirm statistical significance at the $p<.10$ level was 2.96.

Results of this analysis revealed that participants' HRs following the practice trial block (M=109.46, SD=16.94) were higher

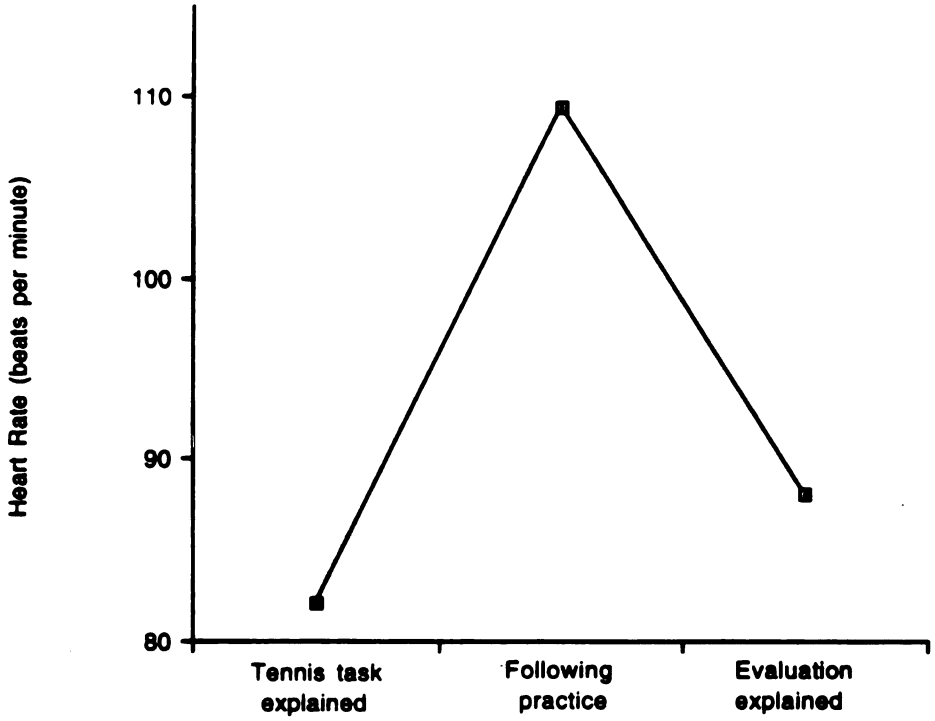

Figure 5. Heart rates of sample prior to experimental treatment during Phase 2

than participants' HRs following a description of the tennis task (M=82.71, SD=11.83) as well as following an explanation of the evaluative nature of the situation (M=88.04, SD=11.65), q=25.36 and q=19.83, respectively. Additionally, participants' HRs following a description of the tennis task were lower than participants' HRs following an explanation of the evaluative nature of the situation, q=5.53. Thus, the HRs of the total group were different at each of the three measurement points.

Although the HRs of the group were significantly different at every measurement point prior to the introduction of the experimental treatment, HRs of monitors and blunters were not different at each point of assessment. Thus, the two groups exhibited similar heart rates prior to exposure to experimental treatment.

An additional concern was the influence of the participants' level of fitness as measured by heart rate on performance of 15 trials of hitting the tennis ball. Participants with low levels of fitness might find it difficult to focus on the task as well as the performance-related information during the task. Inferences regarding the fitness levels of the participants were made based on two sets of heart rate data.

First, heart rate data collected immediately following the physical activity during each of the three trial blocks were analyzed using RM MANOVA techniques. The results of this 2 x 2 x 3 (cognitive information style by information condition by trials) RM MANOVA analysis indicated that there were no between-subject differences. This was true for both main effects, i.e., cognitive

information style and information condition, and the interactive effects, i.e., cognitive information style by information condition (see Table 13 for a summary of the MANOVA effects). Similar results were revealed for the within-subject effects. Thus, all participants exhibited similar heart rates immediately following each trial block of the tennis task. (The means and standard deviations for HR immediately following physical activity are presented in Appendix L.)

Next, recovery heart rates were analyzed using heart rate data that were collected at the conclusion of a 30-second rest period following the finish of each trial block of the tennis task. The results of this 2 x 2 x 3 (cognitive information style by information condition by trials) RM MANOVA on recovery heart rates indicated that there were no statistically significant between-subject effects for cognitive information style and information condition (see Table 14 for a summary of the MANOVA effects). In like manner, the three within-subject interaction effects did not reveal any significant findings. The only significant finding was for the trials main effect, $F(2,51)=9.19$, $p<.001$.

A second post-hoc comparison using Tukey's method of multiple comparisons was made between recovery HR following Trial block 1 and recovery HR after Trial block 3. A significant difference was revealed, $q=5.00$. Thus, the sample's recovery HR following Trial block 1 was significantly lower than the recovery HR of the sample following Trial block 3 ($M=92.13$, $SD=14.19$ and $M=96.13$, $SD=15.74$, respectively).

The final post-hoc comparison using Tukey's method of

Table 13

Analysis of Variance Summary Table of Participants' Heart Rates Immediately Following Physical Activity

Source	df	MS	F	*p*
Between-subjects effect				
Cognitive style	1	.18	.00	.99
Information condition	1	973.70	1.47	.23
Cognitive style x Information condition	1	652.15	.99	.33
Error	52	660.37		
Within-subject effect				
Trials	2	2.13	.05	.95
Cognitive style x Trials	2	22.89	.50	.61
Information condition x Trials	2	96.23	1.44	.25
Cognitive style x Information condition x Trials	2	3.29	.07	.93
Error	51	55.38		

Table 14

Analysis of Variance Summary Table of Participants' Recovery Heart Rates Following a 30-Second Rest Period

Source	df	MS	F	*p*
Between-subjects effect				
Cognitive style	1	192.98	.34	.56
Information condition	1	101.40	.18	.67
Cognitive style x Information condition	1	393.87	.70	.41
Error	52	564.07		
Within-subject effect				
Trials	2	341.77	9.19	.001
Cognitive style x Trials	2	27.06	.77	.47
Information condition x Trials	2	65.29	1.73	.19
Cognitive style x Information condition x Trials	2	4.07	.11	.90
Error	51	35.91		

multiple comparisons involved recovery HR following Trial block 2 and recovery HR after Trial block 3. No significant difference was revealed, $p=.25$. Thus, recovery HRs did not differ between Trial blocks 2 and 3 ($M=96.32$, $SD=13.08$ and $M=96.13$, $SD=15.74$, respectively). Thus, the participants' recovery HRs appeared to remain at a higher level following Trial blocks 2 and 3 in comparison to recovery HR following Trial block 1.

Because no between group differences were realized in the participants' heart rate following the 30-second rest period, the data suggested that all participants experienced similar patterns of recovery. Further, based on the results of these two analyses of heart rate data, HR immediately following physical activity and recovery HR following a brief rest, the fitness levels of the participants appeared to be quite similar. Therefore, any differences in heart rate data that might appear in future analyses would be attributable to the experimental treatment and were not simply a spurious finding that was confounded by the participants' level of physical fitness.

The heart rate data that were collected immediately following exposure to the experimental treatment were subjected to a 2 x 2 x 3 (cognitive information style by information condition by trials) RM MANOVA. The results for all between-subjects analyses were non-significant (see Table 15 for a summary of the MANOVA effects). An examination of the within-subject analyses revealed similar findings except for the interaction of information condition x trials effect which was statistically significant, $F(2,51)=2.60$, $p<.084$. An examination of the plotted data (see Figure 6) suggested that

Table 15

Analysis of Variance Summary Table for Participants' Heart Rates Following Exposure to Experimental Treatment

Source	df	MS	F	*p*
Between-subjects effect				
Cognitive style	1	233.36	.47	.50
Information condition	1	738.38	1.48	.23
Cognitive style x Information condition	1	403.23	.81	.37
Error	52	497.84		
Within-subject effect				
Trials	2	22.96	1.14	.33
Cognitive style x Trials	2	7.96	.35	.71
Information condition x Trials	2	74.96	2.60	.08
Cognitive style x Information condition x Trials	2	1.96	.07	.94
Error	51	24.44		

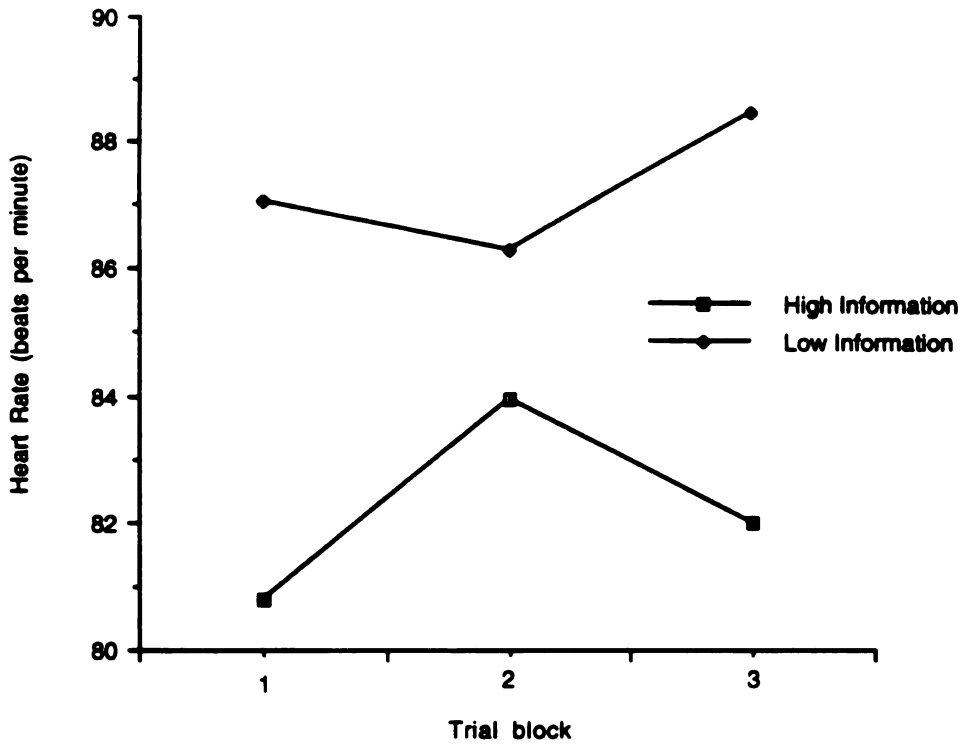

Figure 6. Heart rates of participants immediately following exposure to the experimental treatment by information condition

participants in the low information condition exhibited higher heart rates immediately following the presentation of performance-related feedback for each of the three trial blocks than did participants in the high information condition.

The data for participants' HRs following feedback were examined using Tukey's post-hoc method of multiple comparisons. Because the groups were not equal in size, an estimate of the standard error of the mean was employed (Glass & Hopkins, 1984, p. 371). The critical-q value for significant statistical differences was 3.76.

The results of this analysis revealed that HRs of participants in the high information condition for Trial blocks 1 and 3 were significantly lower than HRs of participants in the low information condition for all three trial blocks, $q>3.76$ (see Table 16 for a summary of the means and standard deviations for the participants' HR). Further, HRs of participants in the high information condition for Trial block 2 were significantly lower than HRs of participants in the low information condition for Trial block 3, $q>3.76$. According to the post-hoc analysis, no other pair of means were statistically different.

Statistical procedures which calculated the effect size were also conducted in order to better understand the magnitude of the effect of information condition on participants' heart rate. A modest effect size was revealed for HR following feedback for Trial blocks 1 and 3, $ES=.50$ and .48, respectively. However, a very weak effect was revealed for Trial block 2, $ES=.17$. Thus, the HRs of participants in the low information condition remained elevated

Table 16

Means and Standard Deviations for Participants' Heart Rates Immediately Following Exposure to the Experimental Treatment by information Condition

	High (n=27)		Low (n=29)	
	M	SD	M	SD
Trial Block 1	80.81	13.67	87.07	11.57
Trial Block 2	83.93	12.68	86.31	15.34
Trial Block 3	82.00	15.08	88.48	11.66

following exposure to the experimental treatment in comparison to HRs of participants in the high information condition.

Although the three-way interaction effect for cognitive information style by information condition by trials was non-significant, the data for this interaction effect were plotted (see Figure 7). This action was taken because physiological responses predicted by the 'Monitoring and Blunting Hypothesis' (Miller, 1990) are predicated on an interactive effect between cognitive information style and information condition. In this particular instance, monitors in the low information condition appeared to respond to the absence of performance-related information in a negative way, i.e., heart rate remains elevated. Whereas, HRs for blunters and monitors in the high information condition as well as blunters in the low information condition appeared to be lower than heart rates of monitors in the low information condition.

Additionally, effect sizes were calculated for the purpose of

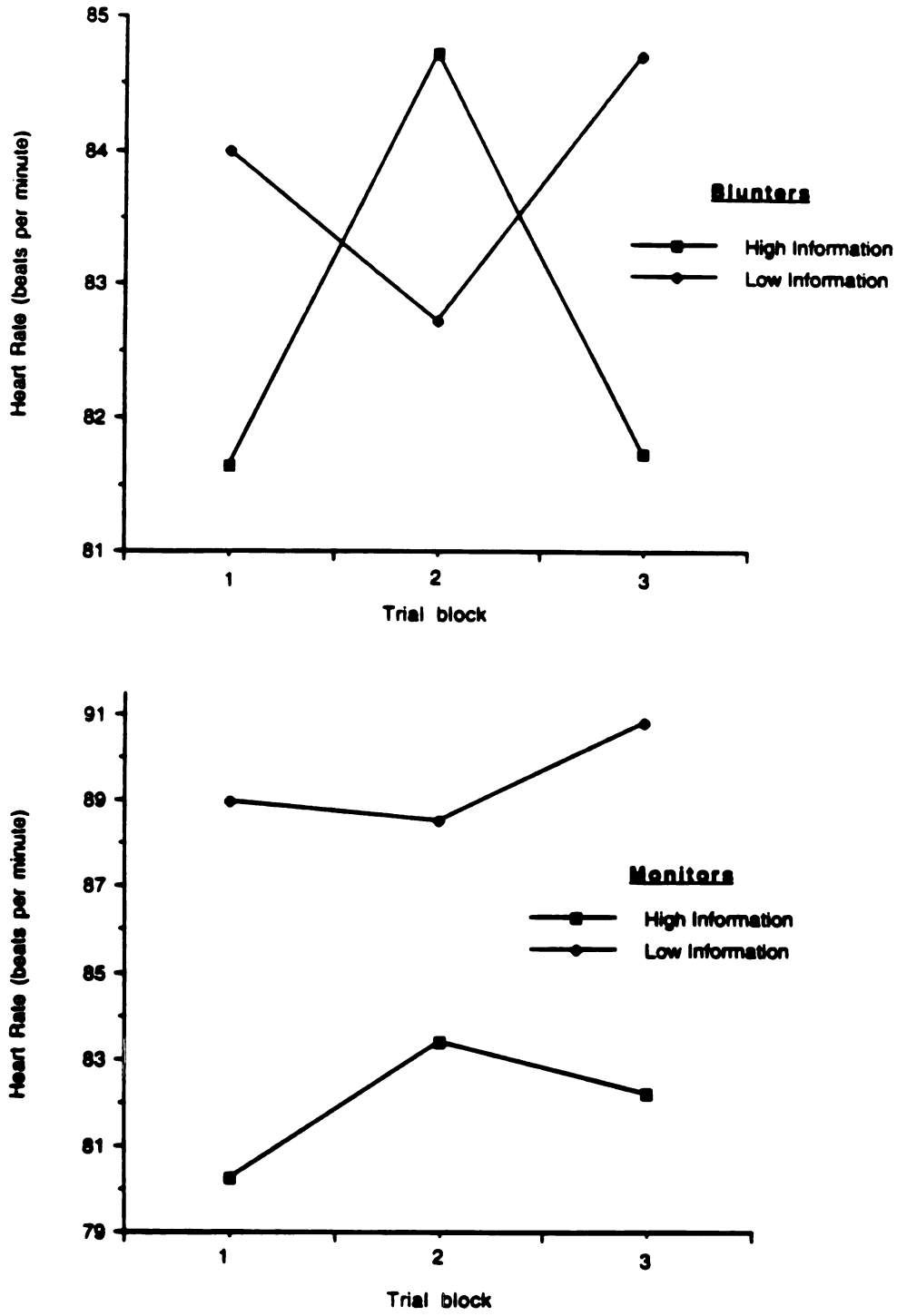

Figure 7. Heart rates of monitors and blunters following exposure to the experimental treatment by information condition

studying the magnitude of the effect of the experimental treatment on the HRs of the participants. This line of inquiry provided some interesting statistical evidence which suggested that the HRs of monitors in the low information condition were higher than the HRs of all the other participants. Specifically, in almost every instance the resultant effect sizes would best be described as moderate with several of the effect sizes approaching the upper boundary of the moderate range.

For example, a modest effect size of .67 was divulged for Trial block 1 when the HRs of monitors in the high information condition were compared to the HRs of monitors in the low information condition. A smaller, yet moderate, effect size was disclosed for Trial block 2, (ES=.34). Finally, another moderate effect size was revealed for Trial block 3, (ES=.62). Thus, the evidence here suggested that the effect of the experimental treatment on participants' HRs was modest. Further, monitors in the low information condition exhibited higher HRs across the three trial blocks than their monitoring counterparts in the high information condition.

Another analysis of effect sizes was conducted which compared HRs of monitors in the low information condition following exposure to the experimental treatment with HRs of blunters in the low information condition. The effect sizes across the three trial blocks ranged from .38 to .53. Effect sizes of this magnitude are considered to be moderate. In simplest terms, exposure to the experimental treatment had a modest effect on the HRs of blunters in the low information condition in comparison to

the HRs of monitors in the low information condition. Specifically, blunters in the low information condition exhibited lower HRs than monitors in the low information condition following exposure to the experimental treatment.

The effect size across trial blocks for monitors in the high information condition and blunters in the high information condition were small, (ES=.01, ES=.11, and ES=.03). Additionally, weak effect sizes across trial blocks were divulged for blunters in the high information condition and blunters in the low information condition, (ES=.19, ES=.15, and ES=.23).

The analyses of the heart rate data did not provide the necessary statistical support in favor of the first hypothesis for Phase 2 which stated that monitors in a high information condition and blunters in the low information condition would exhibit lower heart rates than monitors in a low information condition and blunters in a high information condition. However, the trends that appeared in the data indicated that participants in the low information condition exhibited higher levels of physiological arousal than their counterparts in the high information condition. This result suggested that performance-related information perhaps reduced the stressfulness of the situation.

Further, the effect sizes for the interaction effect between cognitive information style and information condition revealed that HRs of monitors in the low information condition were elevated above HRs for monitors in the low information condition and blunters in both information conditions. Thus, the data provided partial support for Miller and Mangan's (1983) premise that

physiological arousal is influenced by the compatibility of the situation, i.e., information resources relative to a stressful situation, with the individual's cognitive information style. However, it is important to keep in mind the fact that the interaction was not statistically significant according to the multivariate analysis. Thus, the data provided some evidence in partial support of the first research hypothesis for Phase 2.

Performance (outcome) on the tennis task. Because of the extant literature regarding the physiological arousal-motor performance relationship, the participants' performance at the tennis task was examined. Each participant in the study completed 15 trials at the tennis task. These fifteen trials were accomplished in three trial blocks of five trials per trial block. Performance was examined in two ways: (a) performance summed across the three trial blocks or total performance, and (b) comparisons between performance during each trial block. This was done to test for differences for total performance on the task, and to examine any differences that might arise during any or all of the trial blocks.

The data for each participant's total performance during the experiment were submitted to a 2 x 2 (cognitive information style by information condition) analysis of variance (ANOVA). The results of this analysis indicated that there were no significant main effects for the individual's cognitive information style as well as the information condition to which the subject had been randomly assigned. Further, the interaction effect (cognitive information style x information condition) was also non-significant (see Table 17 for a summary of the ANOVA effects).

Table 17

Analysis of Variance Summary Table for Participants' Motor Performance Data Summed Across the Three Trial Blocks

Source	df	MS	F	*p*
Cognitive style	1	7.71	.06	.94
Information condition	1	9.86	.06	.81
Cognitive style x Information condition	1	77.92	.56	.46
Error	52	138.42		

Because performance on the tennis task was measured for each of the three trial blocks, the data were next submitted to a 2 x 2 x 3 (cognitive information style by information condition by trials) RM MANOVA. The results of this analysis were similar to the previous ANOVA finding. Specifically, none of the F-statistics was of sufficient magnitude to indicate any statistical differences between groups as a function of the individual's cognitive information style, the information condition to which the participant was randomly assigned, or interactive effect (cognitive information style x information condition). An examination of the results for the within subject effects were quite similar to those for the between-subjects effects (see Table 18 for a summary of the RM MANOVA effects). However, the three-way interaction term (cognitive

Table 18

Repeated Measures Multivariate Analysis of Variance Summary Table for Motor Performance

Source	df	MS	F	*p*
Between-subjects effect				
Cognitive style	1	2.96	.06	.80
Information condition	1	.47	.01	.92
Cognitive style x Information condition	1	25.97	.56	.46
Error	52	46.14		
Within-subject effect				
Trials	2	6.35	.33	.72
Cognitive style x Trials	2	36.87	1.68	.20
Information condition x Trials	2	2.14	.10	.90
Cognitive style x Information condition x Trials	2	61.73	2.78	.07
Error	51	20.29		

information style by information condition by trials) was statistically significant, $F(2,51)=2.78$, $p<.07$.

The plotted means for this statistically significant finding revealed an interesting trend in the data (see Figure 8). Specifically, during the first and third trial blocks the means for each of the four groups were consistent with the hypothesized direction for motor performance. However, during the second trial block, the means for the four groups were reversed in their positions. The means and standard deviations for motor performance across trial blocks as a function of cognitive information style and information condition are presented in Table 19.

The motor performance data were submitted to follow-up procedures using the Tukey method of multiple comparisons. Because the groups were not equal in size, an estimate of the standard error of the mean was employed (Glass & Hopkins, 1984, p. 371). This post-hoc technique failed to support the significant multivariate finding. Because of the use of a rather conservative post-hoc test, none of the comparisons produced a q-value that approached the critical-q value of 4.42.

In an attempt to clarify the exact nature of the interaction, effect sizes were calculated. Modest to large effect sizes for all three trial blocks were revealed for motor performance scores of monitors and blunters in the high information condition. A robust effect size was divulged for Trial block 1, $ES=.84$. Whereas, moderate effect sizes were discovered for the two succeeding trial blocks, Trial block 2 $ES=-.54$ and Trial block 3 $ES=.43$.

Effect sizes which were near the lower boundary of the range

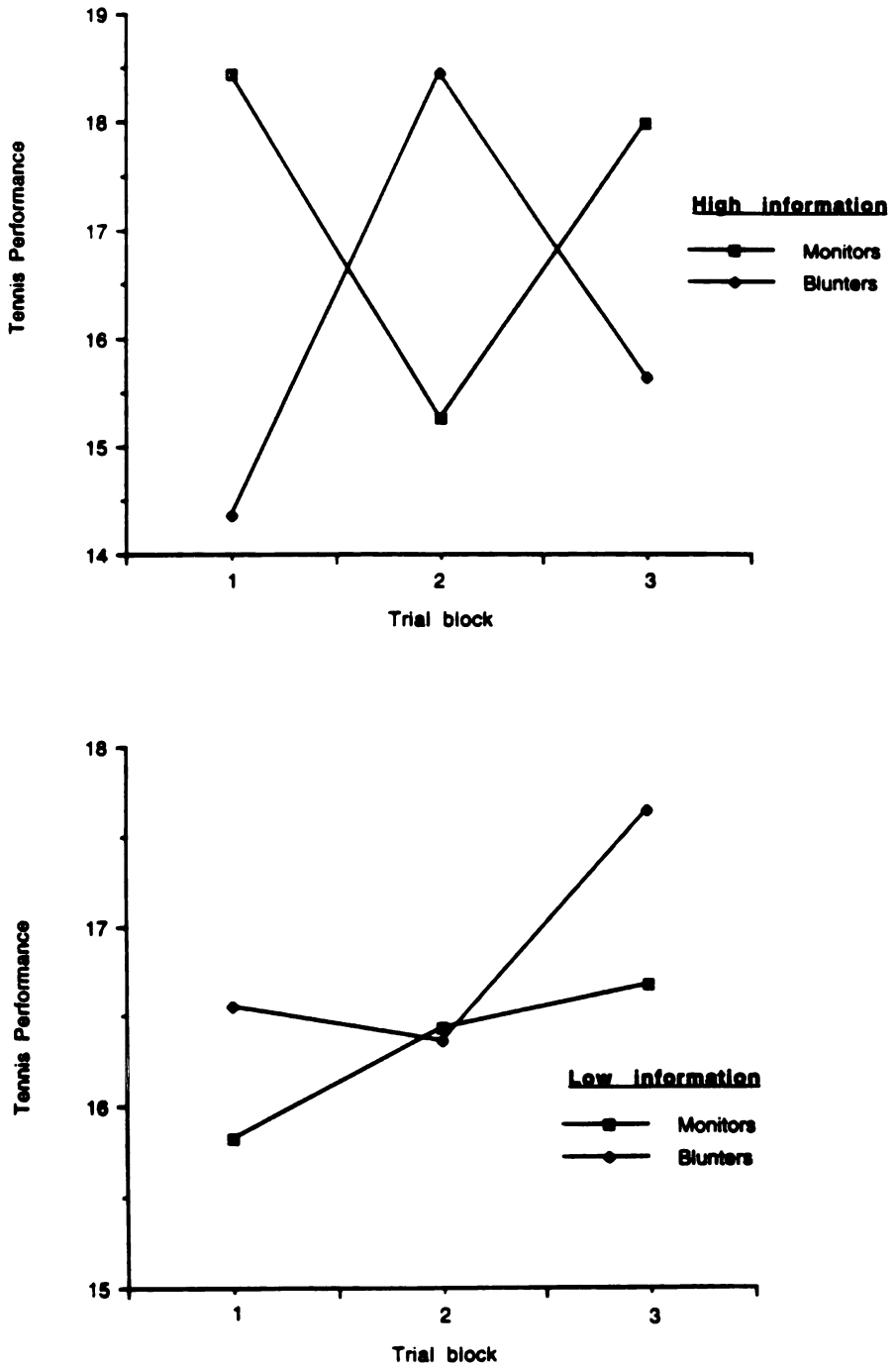

Figure 8. Performance scores on the tennis task by monitors and blunters by information condition.

Table 19

Means and Standard Deviations for the Three-Way Interaction (Information Condition by Cognitive Information Style by Trials) on Motor Performance

	Monitors				Blunters			
	High (n=16)		Low (n=18)		High (n=11)		Low (n=11)	
	M	SD	M	SD	M	SD	M	SD
Trial Block 1	18.44	4.95	15.83	5.49	14.36	4.72	16.55	6.17
Trial Block 2	15.25	5.91	16.44	5.51	18.46	6.07	16.36	4.91
Trial Block 3	18.00	4.55	16.67	5.08	15.64	6.55	17.64	4.55

for modest effect sizes, i.e., .3 to .8, were discovered for blunters in the high and low information conditions. The effect size for Trial block 1 was .40; followed by -.38 for Trial block 2; and, finally, .36 for Trial Block 3.

The only other effect size that was modest in its magnitude was disclosed for monitors in the high information condition and monitors in the low information condition. During Trial block 1, an effect size of .50 was uncovered. All other effect sizes that were calculated were weak, i.e., ES <.30.

The largest difference in performance between monitors and blunters in the high information condition occurred during Trial block 1. Monitors in the high information condition performed at a higher level on the tennis task than blunters in the high information

condition during Trial block 1. As previously mentioned, the effect size for the comparison of performance on the tennis task of monitors in the high information condition and blunters in the high information condition during Trial block 1 was robust, (ES= .84).

However, monitors in the high information condition followed their high performance on Trial block 1 with a noticeable drop in motor performance during Trial block 2. Perhaps monitors in the high information condition were attempting to assimilate the performance-related information into subsequent motor performance which because the participants were novices at tennis resulted in errors in performance. Once sufficient time had elapsed, monitors in the high information condition were able to utilize the performance-related information and modify their performance on the tennis task in a positive direction during Trial block 3.

Blunters in the high information condition performed poorly on the motor task during Trial block 1, but were able to improve their performance during Trial block 2. Although blunters do not characteristically seek-out performance-related information, blunters in the high information condition may have been able to utilize the feedback and improve their performance during Trial block 2.

The drop-off in performance by blunters in the high information condition during Trial block 3 can best be explained by the precepts of the Inverted-U Hypothesis (Yerkes & Dodson, 1908). Blunters in the high information condition exhibited an increase in physiological arousal immediately before starting Trial block 3 (see Figure 7). The increase in physiological arousal by blunters in the

high information condition was a manifestation of being in a style-dissonant information condition. This effect would be consistent with previous findings (e.g., Miller & Mangan, 1983). The consequence of the increased physiological arousal that was experienced by blunters in the high information condition was a decrement in performance which is consistent with predictions from the Inverted-U Hypothesis (Yerkes & Dodson, 1908).

The plotted data for monitors and blunters in the low information condition group revealed an apparent learning effect for both groups (see Figure 8). No statistical differences in performance on the tennis task occurred between monitors and blunters in the low information condition. The effect sizes for Trial block 1 was .13 in favor of blunters in the low information condition. A similar finding was revealed for Trial block 3, ES=.20. However, in Trial block 2 the effect size favored the monitors in the low information condition, ES=.02. All three effects are considered to be small (Rosenthal, 1984).

In summary, no statistical differences were evident in the objective measure of the participants' performance at the tennis task. However, modest effect sizes suggested that better motor performances on the tennis task was exhibited by participants in style-compatible information conditions. Specifically, monitors in the high information condition performed better than blunters in the high information condition during Trial blocks 1 and 3. Further, blunters in the low information condition performed better than blunters in the high information condition during Trial blocks 1 and 3. In both of the previously mentioned comparisons, during Trial

block 2 , the style-dissonant group performed better, as reflected by the negative sign for the effect size. Thus, the research hypothesis for motor performance was only partially supported by the data.

Self-perception variables (global self-worth, general athletic competence, and sport-specific ability). Smith and Smoll (1990) demonstrated that the self-perceptions of youth can be impacted in either a positive or a negative direction based on the leader's approach to the communication of information. Therefore, each participant completed a pre- and a post-test battery of self-perception questions. The questionnaire consisted of three subscales, the Global Self-Worth and General Athletic Competence subscales which were developed by Harter (1988b) and a modified-for-tennis version of a sport-specific perceived competence scale that was developed by Feltz and Brown (1984). The data were summed for each subscale. Thus, each participant had a pre- and a post-test score for each of the three subscales.

As expected, the participants' scores on the pre-test measures were moderately, yet significantly, correlated (see Table 20 for a summary of the correlation coefficients). Because of this finding the self-perception data were analyzed using multivariate procedures.

The pre-test self-perception data were examined for group differences prior to exposure to the experimental treatment based on the cognitive information style of the participant. Results of this one-way (cognitive information style) MANOVA indicated that monitors and blunters did not significantly differ in their responses during the pre-test on perceived tennis ability, general athletic

Table 20

Correlation Matrix for Pre-Test Self-Perception Measures

	General Athletic Competence	Sport-Specific Ability in Tennis
Global Self-Worth	.28*	.31*
Sport-Specific Ability in Tennis	.39**	

* significant at the .05 level
** significant at the .01 level

competence, or self-worth, $F(3,52)=2.14$, $p>.10$.

Although the results of the one-way MANOVA suggested that monitors and blunters were not different in their pre-test self-perceptions of general athletic competence, sport-specific ability in tennis, and global self-worth, an examination of effect sizes provided evidence that blunters had higher pre-test levels of global self-worth and perceived ability in tennis, $ES=.64$ and $ES=.45$, respectively. Both of these effects are considered to be modest in magnitude. Additionally, the effect size for general athletic competence was .29, which is considered a weak effect. (Means and standard deviations for the three pre-test self-perception measures as a function of cognitive information style can be found in Appendix M.)

Even though the results of the one-way MANOVA suggested that

the participants did not differ in their responses on the pre-test self-perceptions, in light of the findings relative to effect size, the post-test data were analyzed using a covariate procedure. Additionally, this was done because of the hypothesized change in self-perceptions pre- to post-test.

The results of the 2 x 2 (cognitive information style by information condition) MANCOVA revealed a non-significant main effect for cognitive information style, $F(3,46)=.75$, $p>.10$. In a like manner, a non-significant multivariate main effect was discovered for the information condition to which the participants had been randomly assigned, $F(3,46)=.97$, $p>.10$. The interaction effect (cognitive information style by information condition), however, was statistically significant, $F(3,46)=2.60$, $p<.063$. An examination of the univariate F-tests revealed that the source of the group differences appeared to emanate from the sport-specific ability in tennis measure (see Table 21 for a summary of the univariate analyses).

Because of the statistical result for the interaction effect (cognitive information style by information condition), the data for the post-test measure of sport-specific ability in tennis were submitted to a post-hoc evaluation for statistical significance. The data were analyzed using the Tukey method of multiple comparisons. An estimate of the standard error of the mean for groups of unequal size was employed (Glass & Hopkins, 1984, p. 371).

This procedure revealed that perceived ability in tennis post-test scores for monitors in the low information condition were significantly lower than the post-test scores for monitors in the

Table 21

Summary Table of Univariate F-Statistics for the Interaction Effect (Cognitive Information Style by Information Condition) on Post-Test Self-Perception Measures

Self-Perception Measure	df	F	p
General Athletic Competence	1,48	2.44	.125
Global Self-Worth	1,48	1.01	.320
Sport-Specific Ability in Tennis	1,48	7.33	.009

high information condition, q= 9.02, ES=1.38; blunters in the high information condition, q= 6.31, ES=1.26; and blunters in the low information condition, q= 5.25, ES=1.04. (The means and standard deviations for the three post-test self-perception measures can be found in Table 22.) The resultant q-values for the comparison of means between monitors in the high information condition, blunters in the high information condition, and blunters in the low information condition did not approach the critical-q value of 3.31.

Based on the plotted data (see Figure 9) along with the available statistical evidence, the post-test self-perceptions of monitors in the low information condition regarding their ability in tennis were significantly impacted in a negative direction as a result of being in a style-dissonant information condition. However, the univariate statistics did not reveal any additional significant statistical differences in participants' self-perceptions. Thus, only

Table 22

Means and Standard Deviations for Post-Test Self-Perception Measures by Cognitive Information Style and Information Condition

	Monitors				Blunters			
	High (n=16)		Low (n=18)		High (n=11)		Low (n=11)	
Subscale	M	SD	M	SD	M	SD	M	SD
Global Self-Worth	16.94	2.57	15.29	2.31	18.46	1.86	17.18	2.48
General Athletic Competence	15.81	3.08	13.65	1.99	15.27	3.13	15.18	2.68
Perceived Ability in Tennis	19.06	4.43	13.47	3.71	17.82	2.96	17.09	3.02

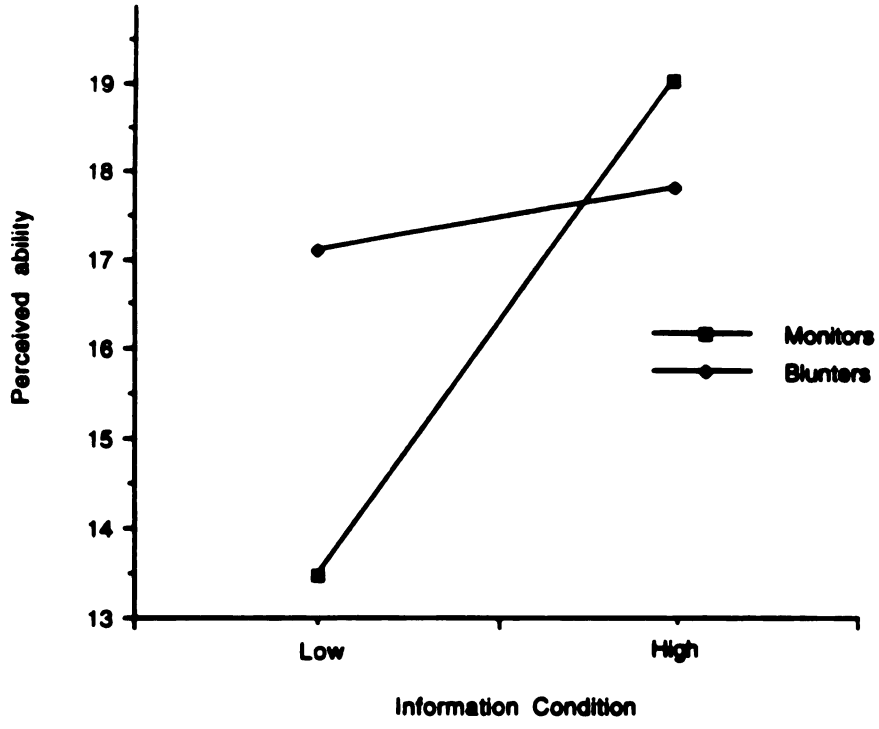

Figure 9. Interaction effect (information condition by cognitive information style) for post-test perceptions of sport-specific ability in tennis

partial support was provided for the third research hypothesis which stated that monitors in the high information condition and blunters in the low information condition would manifest higher levels of pre to post-test levels of global self-esteem, perceived general athletic competence, and perceptions of sport-specific ability in tennis in comparison to monitors in the low information condition and blunters in the high information condition.

Because the p-value for the univariate F-statistic for the general athletic competence subscale was only slightly greater, $p=.125$, than the criterion level of $p<.10$, effect sizes were calculated for the two remaining self-perception subscales. A substantial effect size in favor of monitors in the high information condition in comparison to monitors in the low information condition was divulged for post-test general athletic competence, ES=.84. Additionally, a moderate effect size was revealed between blunters in the low information condition and monitors in the low information condition, ES=.67. However, weak effect sizes for post-test levels of general athletic competence were discovered when comparing scores of blunters in the high information condition to both monitors in the high information condition and blunters in the low information condition, ES=.17 and ES=-.03, respectively. Thus, the post-test perceptions of general athletic competence of monitors in the low information condition appeared to be negatively impacted by the experimental treatment, i.e., the effect of membership in a style-dissonant information condition.

Although the univariate F-statistic for post-test global self-worth was non-significant, $F(1,48)=1.01$, $p<.32$, the effect sizes that

were calculated for the data from this subscale yielded some interesting findings. Once again, moderate to large effect sizes were revealed when comparing the scores of monitors in the low information condition, which is a style-dissonant information condition, with scores of both monitors in the high information condition and blunters in the low information condition, which are both style-compatible information conditions, ES=.68 and ES=.80, respectively. A similar result, i.e., a higher level of global self-worth for the style-compatible group in comparison to the style-dissonant group, was obtained when examining the scores of blunters in the low information condition and blunters in the high information condition, ES=.58. However, a reversal of this trend in the data was divulged when comparing the post-test global self-worth scores of monitors in the high information condition with post-test global self-worth scores of blunters in the high information condition, ES=-.66.

In summary, the data suggested that performance-related information appeared to have a positive effect on the participants' self-perceptions of global self-worth, perceived athletic competence, and sport-specific ability in tennis. While at the same time, the self-perceptions of the participants' in the low information condition were negatively affected. However, multivariate analyses indicated that the only statistically significant differences were realized in post-test levels of sport-specific ability in tennis. Specifically, monitors in the low information condition expressed lower post-test levels of perceived ability in tennis in comparison to monitors and blunters in the high

information condition and blunters in the low information condition. In several instances effect sizes suggested that the post-test self-perceptions of participants in a style-compatible information condition, i.e., monitors in a high information condition and blunters in a low information condition, far exceeded the post-test self-perceptions of participants in a style-dissonant information condition, i.e., monitors in a low information condition and blunters in a high information condition. However, the data were not consistent with the research hypothesis for the self-perception variables in all instances. Thus, only partial support for the hypothesized effects was provided.

Sport Competence Information Scale. Although no research hypothesis was proposed relative to sources of competence information, Miller's previous work (1987) has suggested that monitors were predisposed to seek-out information regarding a stressful situation and blunters were inclined to avoid or block this type of information. Therefore, the subject's reliance on both internal and external sources of information was measured. The Sport Competence Information in Scale (SCIS) was specifically designed for the purpose of delineating a person's preferences for internal or external sources of information (Horn & Hasbrook, 1986). The data that were collected from this instrument were submitted to a one-way (cognitive information style) MANOVA. The result of the one-way (cognitive information style) MANOVA was statistically significant, $F(2,50)=2.77$, $p<.072$. An examination of the univariate F statistics indicated that monitors and blunters differed in the strength of their preferences for internal sources of information,

$F(1,51)=5.63$, $p<.02$. However, monitors and blunters did not exhibit any differences in their preferences for external sources of information, $F(1,51)=1.12$, $p<.30$.

Specifically, blunters revealed a greater reliance on internal sources of information than did monitors (see Table 23 for a summary of the means and standard deviations for the two SCIS subscales). The effect size in favor of blunters for internal sources of competence information was moderate, ES=.67. However, monitors and blunters did not appear to differ in their preference for external sources of information as only a relatively weak effect size was divulged, ES=.30. Based on these findings, perhaps blunters would best be characterized as information-seekers from internal sources of information; whereas, monitors are less internal in their quest for information. However, when internal sources fail to meet the demands of the situation, i.e., do not provide adequate information, then blunters might seek information from other sources.

In summary, blunters, in comparison to monitors, reported a significantly stronger preference for internal sources of competence information. Additionally, monitors and blunters did not appear to differ in their preferences for external sources of competence information.

Perceptions of the Sport Experience. The previously mentioned differences between monitors and blunters in their reliance on and/or preference for internal versus external sources of competence information may help to explain differences that were found in monitors and blunters reflective perceptions of their sport

Table 23

Means and Standard Deviations on Internal and External Subscales of the Sport Competence Information Scale (SCIS) by Cognitive Information Style

	Monitors (n=34)		Blunters (n=22)	
SCIS Subscale	M	SD	M	SD
External	28.63	6.31	30.57	6.93
Internal	45.97	7.62	51.52	9.34

experiences. The participants were asked six questions which attempted to establish a profile of the athlete's perceptions of attributes of the coach of the sport in which the subject had participated the longest. The participants responded to each question by marking their response on a 5-point Likert-type scale (1= Completely True; 5= Not True).

In general, the participants were very positive in their belief that coaches understood the sport (M=1.52, SD=.81). The participants' responses to four of the other questions indicated that, overall, the athletes believed that their coaches understood the players, were good teachers, provided sufficient feedback, and were socially supportive. However, the mean for the statement "The coach spoke calmly when I made a mistake" received only modest support (M=3.14, SD=1.12). (The means and standard deviations for

the sample can be found in Appendix N.)

Because monitors and blunters exhibit differential information seeking behaviors in stressful situations (Miller, 1987) and because the items were moderately correlated, the data were submitted to a one-way (cognitive information style) multivariate analysis of variance (MANOVA). The results of this analysis revealed a significant difference in response pattern based on the cognitive information style of the subject, $F(6,49)=2.66$, $p<.026$.

An examination of the univariate F-tests (see Table 24 for a summary of the ANOVA effects) indicated monitors differed significantly from blunters in the way that monitors recalled the manner in which their coaches spoke to them following a mistake, $F(1,54)=5.40$, $p<.024$. Monitors were less supportive of the statement "The coach spoke calmly when I made a mistake" than blunters, ES=.63. Thus, monitors appear to be more sensitive to the emotion of coaches' verbalizations; whereas, blunters were able to distract or avoid the affective part of the coaches' message. (The means and standard deviations for all six statements (by cognitive information style) are presented in Table 25.)

Further, monitors' belief about their coaches' understanding of the players was significantly different from the blunters' view, $F(1,54)=3.36$, $p<.073$. Monitors reported modest support for the statement "The coach understood the players" in comparison to blunters, ES=.50. Based on these results, monitors reflectively interpreted some of the actions of their coaches in a less positive manner than individuals who have a blunting predisposition. No other items approached statistical significance at the univariate

Table 24

One-way Analysis of Variance Summary Table for Aspects of the Sport Experience Questions for Monitors and Blunters

Statement	F	p
The coach understood the players	3.36	.073
The coach was a good teacher	.02	.876
The coach spoke calmly when I made a mistake	5.40	.024
The coach understood the sport	.04	.839
The coach provided sufficient performance feedback	.32	.576
The coach exhibited high levels of social support	1.97	.167

Note: The degrees of freedom for all ANOVAS were equal (df=1,54).

Table 25

Means and Standard Deviations for Perceptions of Sport Experience Questions by Cognitive Information Style

	Monitors (n=34)		Blunters (n=22)	
Statement	M	SD	M	SD
Coach understood the players	2.59	.93	2.18	.59
Coach was a good teacher	2.09	1.03	2.05	.95
Coach spoke calmly when I made a mistake	3.41	1.16	2.73	.94
Coach understood the sport	1.50	.83	1.55	.80
Coach provided sufficient performance feedback	2.18	.97	2.32	.84
Coach exhibited high levels of social support	2.62	1.16	2.23	.75

(1 = completely true; 5 = not true)

level.

Monitors may believe that their coaches did not understand the players because the coaches did not respond to the athlete in a manner that was compatible with the individual's monitoring predisposition. The athlete who is a monitor is an information-seeker. The emotion of the coach's verbalization in response to an error in performance by the monitor exceeds the monitor's 'desired' level of information-seeking, or perhaps the coach expresses his/her emotion without including any performance-related content in the message. Further, monitors may cue into the emotion of the message faster than the verbal content that is being transmitted.

Blunters, on the other hand, exhibit a stronger reliance on internal sources of competence information. Thus, blunters can block-out the emotion-laden vocalization of the coach. Further, because of blunters' more internal focus, blunters are less dependent on whether or not the coach understands the blunter's individual differences which is in contrast to monitors' predisposition.

Post-test perceptions of the testing session. Following the completion of the post-test self-perception questionnaire, the participants' level of involvement in the testing session along with their perception of several other aspects of the testing experience were assessed. Each participant filled out a brief post-test questionnaire which was appended to the bottom of the self-perception questionnaire. The participants answered seven questions by marking their response to each question on a five-point Likert-type scale (1 = not true; 5 = completely true).

Overall, the participants reported a moderate level of success

(M=3.13, SD=1.11). Additionally, the participants wanted to do well on the task (M=4.53, SD=.74), and found the task interesting (M=4.40, SD=.78). (Sample means and standard deviations are reported in Appendix O).

Because the items on the Phase 2 post-test questionnaire were similar to the Phase 1 post-test items, which were moderately correlated, the data were submitted to a 2 x 2 (cognitive information style by information condition) MANOVA. A significant interaction effect (cognitive information style by information condition) was divulged, $F(7,45) = 3.22$, $p<.007$, along with a significant main effect for information condition, $F(7,45) = 3.22$, $p<.007$. The main effect for cognitive information style, however, was non-significant, $F(7,45) = .90$, $p>.10$.

An examination of the univariate F-statistics for the statistically significant interaction effect (cognitive information style by information condition) indicated that participants differed in their ratings of success at the tennis task and perceptions of how well they wanted to perform on the task, $F(1,51) = 13.25$, $p<.001$ and $F(1.51) = 8.88$, $p<.004$, respectively. None of the remaining univariate F-statistics was statistically significant (see Table 26 for a summary of the ANOVA effects).

The data were further analyzed using the Tukey post-hoc method of multiple comparisons. An estimate of the standard error term for groups of unequal size was employed (Glass & Hopkins, 1984, p. 371). This line of inquiry confirmed the statistical significance of the differences in ratings of success between monitors in the high information condition and monitors in the low

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Table 26

Summary Table of Univariate F-Statistics for Interaction Effect (Cognitive Information Style by Information Condition) for Perceptions of the Phase 2 Testing Experience

Statement	df	F	p
The information about my performance was sufficient	1	2.12	.151
The task was interesting	1	1.33	.255
I was nervous when performing the task	1	.49	.488
I was successful at the task	1	13.25	.001
I wanted to do well on the task	1	8.88	.004
I wanted more information about my performance	1	1.02	.317
I knew how well I did on each trial	1	.45	.505
Error	51		

information condition, q=6.93. Further, significant differences were substantiated between monitors in the low information condition and blunters in the low information condition, q=4.09. None of the other mean comparisons for this item approached the critical-q value of 3.31.

An examination of the group means (see Table 27 for a summary of the means and standard deviations for the post-test perceptions of the testing session) for the two significant univariate interaction effects indicated that monitors in the high information condition in comparison to monitors in the low information condition perceived themselves to be substantially more successful. Further, a large effect size confirmed the magnitude of the difference, ES=1.72. Blunters in the low information condition reported only slightly higher levels of perceived success on the tennis task than blunters in the high information condition, as indicated by a weak effect size, ES=.29. Additionally, a large effect size was revealed in favor of blunters in the low information condition in comparison to monitors in the low information condition, ES=1.18. Finally, another robust effect size was divulged for monitors in the high information condition in comparison to blunters in the high information condition, ES=.85.

Blunters in both information conditions reported modest success at the tennis task. Quite interestingly, blunters in the high information condition rated their success on the tennis task lower than blunters in the low information condition. This lower rating of success at the tennis task by blunters in the high information condition may help to explain why these same individuals did not

Table 27

Means and Standard Deviations for Perceptions of Testing Experience During Phase 2 by Cognitive Information Style and Information Condition

	Monitors				Blunters			
	High (n=16)		Low (n=18)		High (n=11)		Low (n=11)	
Statement	M	SD	M	SD	M	SD	M	SD
The information about my performance was sufficient	4.47	.64	3.44	1.25	4.00	1.27	3.82	.87
The task was interesting	4.60	.74	4.28	.75	4.27	1.01	4.46	.69
I was nervous when performing the task	1.87	1.25	2.56	1.38	2.18	1.40	2.36	1.21
I was successful at the task	3.93	.96	2.33	.91	3.09	1.04	3.36	.81
I wanted to do well on the task	4.93	.26	4.44	.71	4.00	1.09	4.64	.51
I wanted more information about my performance	2.47	1.41	3.28	1.02	2.73	1.42	2.82	1.40
I knew how well I did on each trial	4.53	.74	3.67	.97	4.00	.78	3.46	.93

(1 = not true; 5= completely true)

exhibit the same increase in perceived sport-specific ability in tennis as monitors in the high information condition.

The means for ratings of reflective perceptions of how well the participants wanted to do on the task revealed that monitors in the high information condition desired to do very well on the tennis task. The next highest mean rating was exhibited by blunters in the low information condition, followed in descending order of means by monitors in the low information condition and blunters in the high information condition, respectively.

The Tukey post-hoc follow-up procedure using an estimate of the standard error of the means for groups of unequal size (Glass & Hopkins, 1984, p. 371) revealed that the only statistically significant difference in ratings of desire to do well on the tennis task was between monitors in the high information condition and blunters in the high information condition, q=4.86. Additionally, a large effect size (ES=1.27) in favor of monitors in the high information condition was obtained. Robust effect sizes were divulged for monitors in the high information condition in comparison to monitors in the low information condition (ES=.89); and for blunters in the low information condition in comparison to blunters in the high information condition (ES=.75).

Although the difference in ratings between monitors and blunters in the high information condition was significant and substantial effect sizes were divulged, the absolute values for all four experimental conditions were well above the midpoint of the scale and were very favorable towards wanting to do well at the task. The rating by blunters in the high information condition may

have been a reflection of the dissonance between their cognitive information style and the information condition to which they had been randomly assigned. Additionally, the high mean ratings by monitors in the high information condition may have been a manifestation of the compatibility between their information-seeking needs and the information condition to which they had been randomly assigned.

The univariate F-statistics for the significant main effect for information condition revealed that participants differed in their perceptions of the adequacy of performance-related information, $F(1,51)=4.36$, $p<.042$. Additionally, participants differed in their perceptions of success at the tennis task, $F(1,51)=6.66$, $p<.013$. Finally, the participants differed significantly in their responses to the statement "I knew how well I did on each trial", $F(1,51)=8.70$, $p<.005$. None of the other univariate F-statistics approached statistical significance (see Table 28 for a summary of the ANOVA effects).

Participants in the high information condition indicated that they perceived the performance-related information to have been sufficient when compared to participants in the low information condition, $ES=.61$ (see Table 29 for a summary of means, standard deviations, and effect size for post-test perceptions of the testing session). Further, individuals in the high information condition rated themselves as more successful at the tennis task in comparison to participants in the low information condition, $ES=.85$. Finally, participants in the high information reported a higher level of knowing how well they did on each trial in comparison to

Table 28

Analysis of Variance Summary Table for Perceptions of the Testing Experience During Phase 2 by Information Condition

Statement	df	F	p
The information about my performance was sufficient	1	4.36	.042
The task was interesting	1	.10	.750
I was nervous when performing the task	1	1.44	.236
I was successful at the task	1	6.66	.013
I wanted to do well on the task	1	.15	.698
I wanted more information about my performance	1	1.60	.211
I knew how well I did on each trial	1	8.70	.005
Error	51		

Table 29

Means and Standard Deviations for Perceptions of Testing Experience During Phase 2 by Information Condition

	High (n=27)		Low (n=29)		
Statement	M	SD	M	SD	ES
The information about my performance was sufficient	4.29	.95	3.59	1.12	.61
The task was interesting	4.44	.85	4.34	.72	.13
I was nervous when performing the task	2.04	1.29	2.48	1.29	-.34
I was successful at the task	3.59	1.05	2.72	.99	.85
I wanted to do well on the task	4.54	.86	4.52	.63	.03
I wanted more information about my performance	2.59	1.37	3.10	1.18	-.40
I knew how well I did on each trial	4.33	.78	3.59	.95.	.97

(1 = not true; 5= completely true)

participants in the low information condition, ES=.97. These large effect sizes reveal how performance-related information significantly influenced the manner in which individuals interpreted their experience as a participant in the study.

Modest effect sizes were revealed in favor of participants in the low information condition. Specifically, individuals in the low information condition reported higher levels of feeling nervous while performing the tennis task than did their counterparts in the high information condition, ES=-.34. Further, participants in the low information condition reflectively indicated a greater desire for performance-related information than participants in the high information condition, ES=-.40. Thus, additional evidence was provided for the manner in which the participants' interpretation of the testing session was affected by the information condition to which they were randomly assigned.

Summary of Results for Phase 2: The analyses of the data for Phase 2 provided only partial support for the three research hypotheses. Specifically, the heart rates of monitors and blunters immediately following exposure to the experimental treatment did not differ as a result of the individual experiencing either a style-compatible or a style-dissonant information condition. Further, monitors and blunters' performance on the tennis task was not influenced by their exposure to the experimental treatment, i.e., high information or low information conditions. At the same time, monitors and blunters' perceptions of sport-specific ability in tennis were significantly different as a function of the subject encountering either a high or a low information condition.

Specifically, perceptions of sport-specific ability in tennis for monitors in the low information condition were significantly lower than the perceptions of sport-specific ability in tennis for participants who were members of the other three experimental conditions.

Additionally, the analyses of the data revealed that blunters have a stronger preference for internal sources of competence information in comparison to monitors. Finally, because monitors are not as reliant on internal feedback, monitors in the low information condition felt less successful at the tennis task in comparison to monitors in the high information condition and blunters in the low information condition (both style-compatible information conditions). Also, in comparison to their counterparts in the low information condition, participants in the high information condition knew how well they did on each trial, believed the performance-related information was sufficient, and rated themselves as being successful at the tennis task.

CHAPTER 4

Discussion

Previous research involving the monitoring and blunting constructs has been conducted in medical settings (e.g., Miller & Mangan, 1983; Miller Brody, & Summerton, 1988), in situations with the threat of electric shock (e.g., Averill & Rosenn, 1972; Miller, 1987), and also in the context of viewing a frightening movie (Sparks & Spirek, 1988). The present study, however, marks the first time for the utilization/application of the psychological construct of cognitive information style in the psychomotor domain. Therefore, because of the exploratory nature of the study, a more liberal estimate for statistical significance, rather than the commonly-accepted level of $p<.05$, was applied to the testing of the research hypotheses. The usage of $p<.10$ as the necessary level for significance yielded several statistically significant results. The significant findings along with the numerous trends in the data that appeared in plots of the data clearly intimated practical significance. These trends should be viewed as being meaningful and the practical implications of the investigation should be considered with a degree of caution as strong confirmation was not presented. The practical applications of the study should be strongly considered for inclusion in current coaching and teaching behavior.

Information-Seeking Behavior

Consistent with research findings on monitors and blunters, the majority of participants were desirous of information about their performance. During Phase 1 of the present study, only eight individuals elected not to seek-out any performance-related information that was available from the light panel. Miller (1979a) reported that some threat-related information was desired by a majority of subjects in a health-threatening situation. Further, Miller suggested that this occurred because some individuals were predisposed to seek-out information relative to a 'stressful situation'; whereas, other people were inclined to ignore or block-out the threat-related information. Thus, each person has a distinctive pattern of coping in stressful situations. The present study confirmed this pattern in a non-physical threatening but potentially ego-threatening situation.

True to Miller's (1979a) initial premise and subsequent 'Monitoring and Blunting Hypothesis' (Miller, 1990), monitoring subjects in the investigation demonstrated greater information-seeking behavior within each anticipation timing trial block and thus across all trials than did blunting subjects. In both trial blocks, monitors sought information from the light on the average of 75% of the time; whereas, blunters looked approximately half the time. This finding was consistent with previous research (e. g., Miller, 1987).

Further support for the existence of the two distinct tendencies regarding an individual's preference to seek or avoid stress-related information was provided during the debriefing

session that was held following the collection of data for Phase 2. In one instance, a monitor voluntarily indicated that he desired the performance-related information that was provided at the conclusion of the second trial block. The individual stated, "My performance told me that I was not hitting the ball very well. I really needed the cue, to transfer my weight forward, in order to improve my performance."

In addition to the previously mentioned affirmation, several other individuals offered confirmatory experiential evidence following an explanation of the psychological constructs of monitoring and blunting along with hypothetical style-compatible and style-dissonant situations based on the individual's cognitive information style. As the practical significance of the construct was being described by the investigator, several of the participants nodded in agreement. Many individuals then testified that they had indeed had interactions with their coaches which had closely paralleled the hypothetical situation. Both monitors and blunters identified instances when coaches had responded in a manner that was dissonant with the individual's cognitive information style. Other monitors and blunters, however, recalled personal feelings associated with style-compatible interactions.

Additional confirmation of the importance of understanding the information-seeking preference of an individual appeared in a recent article in Sports Illustrated. John Smith, the UCLA track coach for sprinters, stated, "You make your point and back off. You have to know how each athlete processes information" (Moore, 1993, p. 43). Based on the trend in the information-seeking data and the

experiential confirmation, two divergent cognitive information styles do appear to exist.

Physiological Arousal

The practical importance of this individual difference has even greater relevancy for teachers and coaches when the theoretical stipulations spell out the circumstances under which an individual's level of physiological arousal is impacted by performance-related information from a teacher or coach. The literature relative to the relationship between dispositional coping style and physiological arousal has largely been equivocal (Miller, 1987). Generally, though, in aversive situations a monitoring disposition is associated with increased physiological arousal; contrastingly, lower levels of arousal are evinced by blunters in the same situation (Miller, 1979a). However, Miller (1990) has suggested that insight into all the aspects of the coping process can only be gained when the individual's predisposition is simultaneously considered with factors related to the situation.

In Phase 1 of the present study, a psychological threat to the individual's ego was devised as the context. Specifically, the lights on the light panel indicated how successful or unsuccessful the individual was at meeting the performance criterion for the anticipation timing task. Thus, the aversiveness of the situation was, in part, relative to the degree of importance the individual attached to performing well on the task. All the participants reported that they were only moderately successful at the task; thus, some failure at the task was a part of the experience. Further, the participants indicated that they found the task

interesting and wanted to do well at the task. Thus, some degree of aversiveness was present. The slight jump in heart rate following the explanation of the purpose of the lights also suggests that some stress was present in the situation. Yet, monitors and blunters did not exhibit any statistical differences in heart rate at any point in time during the testing session.

The 'Monitoring and Blunting Hypothesis' (Miller, 1990) suggests that for some individuals, whose predisposition is to seek-out stress-related information from a situation, the information has a stress-reducing effect particularly when uncertainty is reduced and controllability is increased. In the present situation looking at the lights helped reduce the uncertainty of the situation for monitors. Further, the information from the lights could be used by monitors on the next trial and subsequent trials to either sustain successful performance or modify their performance in an attempt to meet the criterion. The controllability of the aversive situation was, thus, increased for monitoring subjects. As a result the monitor's level of physiological arousal was similar to that of the blunters who avoided the performance-related information by not looking at the lights and relied instead on their internal source of information about their performance on the task.

Clearly the free choice to engage one's characteristic cognitive information style was a prominent feature of the situation during Phase 1. In Phase 2 of the study, the choice to seek or avoid performance-related information was eliminated. One-half of the monitoring subjects were randomly assigned to either a high information condition or a low information condition. This same

process was instituted for the blunting subjects. When individuals are forced to a nonpreferred information condition, higher levels of arousal should be manifested (Miller, 1990).

The analysis of heart rate data following implementation of the experimental treatment revealed that participants in the high information condition exhibited lower heart rates immediately following the presentation of performance-related information for each of the three trial blocks than did participants in the low information condition. Because the high information group consisted of both monitors and blunters, a clear explanation of this result is difficult to provide using the 'Monitoring and Blunting Hypothesis' (Miller, 1990).

Because of the interactional nature of the research hypothesis and the results of previous investigations (e.g., Miller & Mangan, 1983), the graph of the heart rate data as a function of the interaction between the subject's cognitive information style and information condition was examined. Particularly noteworthy about these data was the manner in which the heart rate data for monitors in the low information condition stood apart from the plotted data for the other three experimental conditions. As a result of being in a style-dissonant information condition, monitors in the low information condition appeared to experience greater physiological arousal, i.e., more stress, than did the other three groups.

Because performance-related information was not made available to monitors in the low information condition whose cognitive predisposition was towards a preference for information, the dissonance between the situation and the cognitive information

style of the individual appeared to cause an increase in the physiological response. From an interactional perspective, this occurred because the necessary conditions related to the individual's predisposition to prefer and/or to seek-out information in a stressful situation were not met by the information condition of the situation. Students and athletes who are predisposed to seek-out information or prefer information about a stressful situation, i.e., a monitor, must be given sufficient performance-related information. Otherwise, these individuals will exhibit increased physiological arousal when the necessary information conditions associated with their characteristic cognitive information style are not met. Clearly coaches and teachers would not desire to contribute to the 'anxiousness' that might already be felt by students or athletes in an evaluative situation. Therefore, the data, particularly for monitors, suggest the importance of matching information conditions, i.e., the coaching behavior, with the cognitive information style of the individual particularly when the individual's physiological responses were considered.

This finding is consistent with the hypothesized relationships proposed in the Mediational Model of Coach-Player Relationships (Smoll, Smith, Curtis, & Hunt, 1978). Specifically, the coaching behavior, i.e., providing performance-related information or the absence of such action, appeared to be interpreted by the athlete with the individual's cognitive information style acting in a mediating role. The evaluative reaction of individuals in the low information condition was elevated physiological arousal with the most dramatic physiological response being observed in monitors in

the low information condition whose heart rates stood above the heart rates of the other three experimental conditions. The heart rates of blunters were observed at lower levels because the coaching behavior was blunted, i.e., cognitively mediated. Similarly, monitors in the high information condition demonstrated lower levels of physiological arousal because the coaching behavior was perceived to be compatible with the participant's cognitive information style. Finally, the importance of managing physiological arousal is well understood by sport scientists (e.g., Fenz, 1988).

Physiological Arousal and Motor Performance

The relationship between physiological arousal and motor performance has been well documented in the sport anxiety literature (e.g., Soenstroem & Bernardo, 1982). In the present study, the arousal-performance relationship was examined by looking at two sets of data: (a) heart rate data following the feedback session for the first trial block and subsequent motor performance during trial block two, and (b) heart rate data following feedback for the second trial block and motor performance during trial block number three.

In previous studies (e.g., Miller & Mangan, 1983) individuals in style-compatible information conditions, i.e., monitors in high information conditions and blunters in low information conditions, exhibited lower levels of physiological arousal than did subjects in style-dissonant information conditions. When this line of thought is extended to include motor performance, based on the specifications of the Inverted-U Hypothesis (Yerkes & Dodson, 1908) one would

postulate that participants who experience style-dissonant information conditions and who demonstrate higher levels of arousal would evince lower levels of performance on a motor task. In contrast to the former group would be persons who encounter style-compatible information conditions and manifest lower levels of arousal. Performance at motor tasks for individuals in a style-compatible information condition would be expected to be greater when compared to that of participants in a style-dissonant information condition.

As previously mentioned, monitors in the low information condition exhibited elevated levels of physiological arousal in comparison to the heart rate data of participants in the other three experimental conditions. The heart rate data for monitors in the high information condition and blunters in both information conditions were quite similar. An examination of the heart rate data following feedback at the end of Trial Block 1 and performance on the tennis task during Trial Block 2 revealed that there was some congruence between the data and the hypothesized relationships between physiological arousal, motor performance, and style-compatible and style-dissonant information conditions. Specifically, monitors in the low information condition, i.e., a style dissonant information condition, evinced a higher level of physiological arousal and demonstrated a modest level of performance on the tennis task. According to the Inverted-U Hypothesis (Yerkes & Dodson, 1908), the participants' performance on the tennis task was impaired by the elevated level of arousal which was caused, in this case, by being in a style-dissonant

information condition.

Additionally, blunters in a low information condition manifested a moderate level of physiological arousal and a modest level of performance on the tennis task. This group's motor performance was not hindered because physiological arousal was not elevated as a result of assignment to a style-compatible information condition. Thus, the first set of motor performance and heart rate data for monitors and blunters in the low information condition were towards the hypothesized directions.

However, the first set of heart rate and motor performance data for both monitors and blunters in the high information condition were not consistent with the hypothesized directions. Monitors in the high information condition exhibited a low level of physiological arousal. According to the Inverted-U Hypothesis (Yerkes & Dodson, 1908), monitors in the high information condition should have exhibited better performance on the tennis task. However, the participants in this experimental condition performed poorly. Possibly, monitors in the high information condition were not sufficiently aroused which would also cause poor performance. This explanation does not seem likely because heart rates following feedback for monitors in the high information condition were greater than the group's baseline levels of physiological arousal. Thus, the participants do not appear to be underaroused.

Another explanation for the poor performance by monitors in the high information condition is that because of their predisposition to seek information these individuals were attempting to assimilate the performance-related information into

subsequent performance attempts. However, because participants were novices in tennis, performance was impaired. Monitors in the high information condition who were at the cognitive level of learning had to think too much, which may have caused errors in performance.

The other discrepancy in the hypothesized motor performance-physiological arousal relationship as a function of assignment to a style-compatible or style-dissonant information condition was noted in the first set of heart rate and motor performance data for blunters in the high information condition. According to the 'Monitoring and Blunting Hypothesis' (Miller, 1990), participants in this experimental condition should have exhibited elevated levels of physiological arousal. However, blunters in the high information condition displayed low levels of physiological arousal. Thus, the first set of heart rate and motor performance data provided equivocal support for the research hypothesis.

An examination of the heart rate data following feedback at the end of Trial Block 2 and performance on the tennis task during Trial Block 3 nearly aligned with the hypothesized effects. Participants in style-compatible conditions, i.e., monitors in the high information condition and blunters in the low information condition, exhibited slightly lower heart rates than did individuals in the style-dissonant conditions, i.e., monitors in the low information condition and blunters in the high information condition. Further, monitors in the high information condition and blunters in the low information condition demonstrated greater proficiency at the tennis task than did participants in style-dissonant information

conditions, i.e., monitors in the low information condition and blunters in the high information condition. Thus, the second set of data provided stronger, yet perhaps only modest, evidence for the effect of being in a style-compatible or style-dissonant information condition and the resultant effect on physiological arousal and motor performance.

Unfortunately, additional confirmatory evidence was not available. Because the participants did not have an opportunity to perform the tennis task for a fourth time following the presentation of performance-related information for Trial Block 3, a third set of motor performance and heart rate data could not be examined. This would appear to be a shortcoming of the study. Clearly, another set of motor performance and heart rate data was needed to facilitate an understanding of the exact nature of being in style-compatible and style-dissonant information conditions and the subsequent effect on physiological arousal and motor performance.

Self-Perceptions of Global Self-Worth, General Athletic Competence and Sport Specific Ability in Tennis

The scope of the investigation was not limited to examining the physiological arousal-motor performance relationship as a function of random assignment to style-compatible or style-dissonant information conditions. The investigation also considered the effect of participation in a style-compatible or style-dissonant information condition on participants' self-perceptions. Specifically, participants' perceptions of global self-worth, perceived general athletic competence, and perceptions of sport-specific ability in tennis were the variables of interest.

Results of the multivariate analysis of the pre-test self-perception data revealed that monitors and blunters did not statistically differ in their responses on the three measures. However, an examination of effect sizes divulged that blunters expressed substantially higher pre-test levels of global self-worth and perceived ability in tennis in comparison to monitors' pre-test scores on the two self-perception measures. A weak effect size in favor of blunters was revealed for data from the general athletic competence subscale.

This result suggests that blunters may be better 'prepared' or 'equipped' than monitors for situations in which differential levels of performance-related information are provided by coaches. Further, analyses of the data derived from the Sources of Competence Information Scale (Horn & Hasbrook, 1987) confirmed blunters' apparent stronger reliance on internal sources of competence information. Contrastingly, monitors by the very nature of their cognitive information style do not have a strong internal sense of competence and, thus, seek confirming information from the situation (e.g., feedback from coaches and teachers).

The results of the multivariate analysis of the post-test self-perception data provided additional evidence in support of blunters' apparent trust in their internal sensory feedback system. Weak effect sizes were revealed for blunters' responses on the post-test measures of perceived ability in tennis and general athletic competence. The similarity in responses by blunters in both the high and low information conditions suggests that blunters utilized their internal sensory feedback system. Thus, the post-test perceptions

of ability in tennis and general athletic competence of blunters were apparently unaffected by the experimental treatment.

However, a large effect size in favor of blunters in the high information condition was disclosed on the post-test Global Self-worth Subscale (Neeman & Harter, 1986). This finding is quite interesting in light of the previously mentioned results for blunters' responses on the General Athletic Competence and Sport-specific Perceptions of Ability in Tennis subscales. The apparent post-test difference in global self-worth between blunters in the high and low information conditions would be expected had there also been differences noted in blunters' perceptions of general athletic competence and ability in tennis. According to a hierarchical perspective of self-esteem (e.g., Fox & Corbin, 1989), global self-esteem is located at the pinnacle of the model. Subdomains such as academic, social, and physical self-esteem are subordinately positioned in the model. The inference is that an individual's global self-esteem/self-worth can be modified by changes at the domain-specific level. Thus, the large effect size for global self-worth in favor of blunters in the high information condition without concurrent changes in perceptions of sport-specific ability in tennis and/or general athletic competence does not appear to be consistent with the theoretical suppositions of the hierarchical perspective of self-esteem.

At the same time the data suggested that monitors were quite dependent on external feedback. Specifically, the self-perceptions of monitors in the low information condition appeared to be negatively impacted when performance-related information from an

external source was not provided; whereas, the self-perceptions of monitors in the high information condition were enhanced by the performance-related information.

The results of the multivariate analyses of the post-test self-perception data disclosed statistical differences for the perceived ability in tennis subscale. Specifically, monitors in the low information condition exhibited significantly lower levels of perceptions of sport-specific ability in tennis in comparison to the responses of participants in the other three experimental conditions. An examination of effect sizes confirmed the magnitude of the effect of the experimental treatment on the self-perceptions of monitors in the low information condition. The apparent positive effect of performance-related information on monitors' self-perceptions was consistent with previous research regarding feedback and perceptions of competence (e.g., Vallerand & Reid, 1984). Clearly, the perceptions of ability in tennis of monitors, who were relative novices at tennis, were highly dependent on an external feedback source.

Statistically significant differences were not discovered for the participants' post-test perceptions of global self-worth and general athletic competence. However, modest-to-large effect sizes, generally in favor of the style-compatible information conditions, were revealed. Blunters' stronger reliance on internal sources of competence apparently mediated the effect of experiencing a low information condition. Whereas, monitors whose reliance on internal sources of competence was not as great as blunters were not as capable as blunters of coping with the low

information condition, which for monitors was a style-dissonant condition.

Thus, because of the nature of their dispositional coping style, monitors in the low information condition appear to be the group that is most 'at-risk' to exhibit decrements in self-perceptions and, perhaps, ultimately disengage from sport. Monitors who are information-seekers and do not have a strong reliance on internal sources of information are highly dependent on information from external sources about a stressful situation.

When the necessary conditions of their cognitive information style were met, monitors in a high information condition exhibited high levels on the self-perception measures of global self-worth, perceived general athletic competence, and perceptions of sport-specific ability in tennis. However, when the necessary conditions of their cognitive information style were not met, monitors in a low information condition exhibited decrements in self-perception measures of global self-worth, perceived general athletic competence, and perceptions of sport-specific ability in tennis.

Although the analyses of the self-perception data did not provide the necessary statistical evidence to support the research hypothesis, the practical relevance and the graphical evidence clearly highlight the importance of being in a style-compatible information condition for individuals who have a monitoring cognitive information style. Further, the data suggest that performance-related information had a positive effect on post-test self-perceptions of all subjects, except for perceived general athletic competence for blunters in the high information condition.

These results are consistent with the social reinforcement literature (e.g., Smoll & Smith, 1989). Sport participants who played for coaches who provided technical instruction and reinforcement exhibited increased self-esteem pre- to post-season. Further, the self-perception data provided additional evidence in support of the mediating effect of cognitive information style on coaching behavior as proposed by Smoll et al. (1978) in the Mediational Model of Coach-Player Relationships.

Practical Implications of the Study

The participants in the study exhibited two distinctive patterns of coping in stressful situations which is consistent with previous research (e.g., Miller, 1979). Further, Miller and Mangan (1983) suggest that some individuals may benefit by information relative to a stressful or aversive situation; whereas, other persons may not reap the same benefits. The available evidence from the present study clearly suggests that coaches and teachers must know and understand the cognitive information style of the students and athletes. A teacher or coach whose behavior does not appropriately match the student or athlete's cognitive information style may cause the student or athlete's level of physiological arousal to elevate. Coaches and teachers would not intentionally desire to increase students and athletes' physiological arousal, particularly when there could be a concomitant decrease in motor performance. If teachers and coaches want to help students and athletes maximize performance, performance-related information must be appropriately matched to the student's and athlete's cognitive information style. Otherwise, increases in levels of physiological

arousal may be manifested by students and athletes which could ultimately debilitate motor performance.

Additionally, the self-perceptions of the participants in the high information condition were impacted, for the most part, in a positive direction; while a negative effect on self-perceptions was revealed for participants in the low information condition. The valence of the feedback that is provided to participants has been shown to have an impact on perceptions of competence (e.g., Vallerand & Reid, 1988), intrinsic motivation (e.g., Vallerand, 1983), and self-esteem (e.g., Smith, Smoll, & Curtis, 1978). Specifically, negative feedback had a negative impact on the previously mentioned psycho-social variables; whereas, positive feedback had an enhancing effect.

All the participants in the present study had a rich history of sport experiences over a substantial period of time. Therefore, the participants had developed some type of internal feedback system. At the same time, the participants in the present study were novices at tennis and were generally lacking in tennis experiences. Participants in the low information condition were forced to rely on their sensory feedback system; whereas, participants in the high information condition had access to both internal and external feedback systems (Magill, 1989). Monitors, who have less of a reliance on internal sources of competence information in comparison to blunters, may not have been able to derive sufficient useful performance-related information from their internal sensory feedback system or they did not trust the information. Thus, in the absence of external sources of performance-related information,

participants in the low information condition exhibited a decrease from pre- to post-test in self-perceptions of global self-worth, perceived general athletic competence, and perceptions of sport-specific ability in tennis. The decremental effect was particularly dramatic for monitors, especially for perceived ability in tennis. Clearly, a style-dissonant information condition had a negative effect on monitors' psycho-social development. In order to facilitate the psycho-social development of students and athletes, coaches and teachers must provide performance-related information. This finding is consistent with Smith, Smoll, and Curtis (1978).

In summary, individual differences are an important consideration for coaches and teachers. If coaches and teachers know and understand the cognitive information style of athletes and students, coaches and teachers can respond in a more appropriate manner. Lower levels of physiological arousal and improved motor performance should be noted when there is a positive match between the cognitive information style of athletes and students and feedback behaviors of teachers and coaches. Additionally, performance-related information from teachers and coaches can enhance athlete and student's self-perceptions and, perhaps, reduce the number of youth who drop out of a program because "coaches don't understand kids."

MBSS Measurement Issues

One of the concerns with this study was the failure to replicate the reliability of the MBSS. This finding was unexpected although the psychometric properties have been challenged in some

recent research studies (e.g., van Zuuren & Wolfs, 1991). Muris, van Zuuren, de Jong, de Beurs, and Hanewald (1994) indicate that the monitoring subscale of the MBSS is positively related to trait anxiety, depression, and worry. Also, the dichotomous version of the MBSS blunting subscale has not always exhibited acceptable reliability (e.g., van Zuuren, 1993). Therefore, the original version of the MBSS would appear to have several psychometric shortcomings.

In the present study the reliability of the two original monitor and blunter subscales were both below the recommended alpha level of .70. The reliability of both the monitor and blunter subscales was improved by the inclusion of monitoring and blunting data from a sport-specific scenario that was developed for the investigation. However, Cronbach's alpha coefficient for the modified-blunter subscale was still low for acceptable reliability. Muris, van Zuuren, de Jong, de Beurs, and Hanewald (1994) suggest that the reliability of the MBSS can be dramatically improved by using a 5-point response format.

Further, the predictive capability of the two MBSS subscales has varied from study to study. In a study of health-seeking behavior (Miller, Brody, & Summerton, 1988) the monitor subscale demonstrated better predictive validity than the blunter subscale. However, the blunter subscale exhibited greater predictive validity in a study that involved the threat of electric shock (Miller, 1987). Because of this variability in the predictive capability of the monitor and blunter subscales in past studies, the two subscales were utilized in a joint manner to classify the participants as

either monitors or blunters. This was done to facilitate a parsimonious interpretation of the data.

Additionally, Muris, van Zuuren, and de Vries (1994) suggest "that dispositional monitoring and blunting may be domain dependent" (p. 371). In a laboratory study that involved a medical stressor, the Threatening Medical Situations Inventory (TMSI; van Zuuren & Hanewald, 1993) was the best predictor of situational coping. The positive effect of the sport-specific measure of dispositional coping style for use in the present study would seem to corroborate this finding.

In summary, the psychometric properties of the original version of the MBSS must be called into question. For studies in the psychomotor domain a more encouraging route would seem to be the development of a sport-specific measure of dispositional coping style which uses a 5-point response format.

Summary and Conclusion

The data in the present study were consistent with the results from previous studies (e.g., Miller, 1987), which were conducted outside the psychomotor domain, which suggested that individuals exhibit a predisposition to respond to a stressful situation with one of two distinctive styles of coping. Further, the results provided compelling evidence for the cognitive-interpretive function of an individual's cognitive information style on coaching behaviors. Also, the data confirmed the mediating effect of cognitive information style on subsequent evaluative responses (e.g., physiological arousal and self-perceptions) to the situation. Thus, the study provided compelling evidence for the importance of knowing and

understanding an individual's cognitive information style. Additionally, the data supported several of the hypothesized linkages in the Mediational Model of Coach-Player Relationships (Smoll et al., 1978).

Future Research

The sport arena has been dominated by males for a long period of time. However, sport and sport experiences are not under the exclusive dominion of males (Coakley, 1986). For the purpose of simplifying the analyses of data, the present research was delimited to male college students. Although no gender distinctions have been revealed between males and females in their response patterns on the MBSS, females must have the opportunity to serve as participants in a similar study in the sport context.

As a result of socialization into gender roles, females, in general, do not report high levels of perceived athletic competence (Neeman & Harter, 1986) in comparison to their male counterparts. Dramatic effects might be seen from females who are in a low information condition and/or who have male coaches. Specifically, the self-perceptions of females in the low information condition could plummet further than their male counterparts in the present study. Additionally, females in the low information condition may exhibit higher levels of physiological arousal following exposure to the experimental treatment.

Based on the findings of Muris et al. (1994), an instrument which is psychometrically sound must be developed for use in future investigations. This measurement tool should utilize a 5-point response format and be designed specifically for use in the

psychomotor domain.

Along with the development of a sport-specific instrument that assesses cognitive information style, a form that can be used with children is essential. The research to date has been conducted with samples of adults. Thus, individuals at or near the endpoint of the development of this predisposition to seek out or avoid information about a stressful situation has been studied. However, no clear understanding of the developmental pathway has been attained. Therefore, research into the nature of the development of either a monitoring perspective or a propensity for blunting must be conducted. This line of inquiry may also include the development of assessment tools that are appropriate for the participant's level of cognitive development.

In summary, cognitive information style may be the psychological construct which allows sport psychologists to explain the divergent behaviors that are exhibited by athletes who experience similar coaching behaviors. Additionally, the present study points towards the importance of adopting an interactive perspective when conducting research in the sport context. The true benefit of an interactive perspective will be manifested in educational programs that should subsequently be developed based on the results of future research.

APPENDICES

APPENDIX A

FREQUENCY TABLES - SPORT PARTICIPATION

Frequency Table - Third Sport Participated In

Sport	n	Percent
Softball	7	12.5
Baseball	6	10.7
Basketball	6	10.7
Football	6	10.7
Track	5	8.9
Cross-country	4	7.1
Wrestling	3	5.4
Soccer	2	3.6
Swimming	2	3.6
Golf	1	1.8
Intramurals	1	1.8
Roller hockey	1	1.8
Tennis	1	1.8
No third sport listed	8	14.3
Total	56	100.0

Frequency Table - Fourth Sport Participated In

Sport	n	Percent
Baseball	3	5.4
Basketball	3	5.4
Golf	3	5.4
Track	3	5.4
Cross-country	2	3.6
Football	2	3.6
Hockey	2	3.6
Softball	2	3.6
Martial arts	1	1.8
Soccer	1	1.8
Swimming	1	1.8
Tennis	1	1.8
Water polo	1	1.8
No fourth sport listed	30	53.6
Total	56	100.0

Frequency Table - Fifth Sport Participated In

Sport	n	Percent
Track	4	7.1
Baseball	2	3.6
Basketball	2	3.6
Cross-country	1	1.8
Diving	1	1.8
Soccer	1	1.8
Swimming	1	1.8
Tennis	1	1.8
No fifth sport listed	43	76.8
Total	56	100.0

APPENDIX B

MODIFIED-VERSION OF THE NATIONAL TENNIS RATING PROGRAM

MODIFIED-VERSION OF THE NATIONAL TENNIS RATING PROGRAM

12. Have you ever played tennis? _____ Yes (1) _____ No (2)

If you answered NO to Question 12, please STOP here. If your answer to Question 12 was yes, please continue.

13. Please check the one statement that best describes your ability to play tennis.

_____ I am just starting to play tennis (1).

_____ I have played a limited amount but am still working primarily on getting the ball over the net; have some knowledge of scoring but am not familiar with the basic positions and procedures for singles and doubles play (2).

_____ I have had some lessons but need on-court experience; have obvious stroke weaknesses but am beginning to feel comfortable with singles and doubles play (3).

_____ I have more dependable strokes but am still unable to judge where the ball is going; have weak court coverage; am still working just to keep the ball in play with others of the same ability level (4).

_____ I can place shots with moderate success; can sustain a rally of slow pace but am still not comfortable with all strokes; I lack consistency in serving (5).

_____ I still lack stroke dependability (depth and variety) but have improved my ability to direct shots away from my opponent; I rarely double fault but do not usually force errors on my serve; I hit forehand and backhand volleys with consistency if the ball is within my reach (6).

_____ I have dependable strokes on both forehand and backhand sides; have the ability to use a variety of shots including lobs, overheads, approach shots and volleys; can place my first serve and force some errors; am rarely out of position in a doubles game (7).

_____ I have begun to master the use of power and spins; have sound footwork; can control depth of my shots and am able to move opponent up and back; can hit my first serves with above average power and accuracy and place my second serve; am able to rush net with some success on serve against players of similar ability (8).

_____ I have good shot anticipation; am able to overcome some stroke deficiencies with outstanding shots or exceptional consistency; I will approach the net at opportune times and am often able to force an error or make a winning placement; can execute lobs, drop shots, half-volleys and overhead smashes with above average success; am able to vary the spin on my serve (9).

_____ I am able to execute all strokes offensively and defensively; can hit my first serve for winners and second serve to set up an offensive situation; I maintain a winning level of play in social tennis and can reach at least the quarter-finals or semi-finals of the highest level club or park championship (10).

_____ I have mastered all of the above skills; am able to hit both slice and topspin serves; can vary my strategies and styles of play in a competitive situation; am capable of being ranked in a major city or USTA district (11).

_____ I have developed power and/or consistency as my major weapon; have all of the above skills as well as the concentration necessary for successful tournament play; am capable of earning a USTA sectional ranking (12).

_____ I am highly skilled in all of the above categories; am a polished tournament player who has travelled extensively for sanctioned competitions; have been ranked nationally by the USTA (13)

APPENDIX C

DEMOGRAPHIC QUESTIONNAIRE

DEMOGRAPHIC QUESTIONNAIRE

Personal Information Questionnaire

1. What is your present age? _____ years

2. Please check the space that best describes your ethnicity.
   _____ African-American (1) _____ Hispanic (2)
   _____ Caucasian (3) _____ Asian-Pacific Islander (4)
   _____ Native-American (5) _____ Other (6)

3. Please check your current academic status.
   _____ Freshman (1) _____ Sophomore (2) _____ Junior (3)
   _____ Senior (4) _____ Graduate student (5) _____ Other (6)

Organized sport has been described as an institutionalized competitive activity. Most often sport teams are directed by adult coaches and compete in formal leagues. For the following questions use the description provided above to guide your responses.

4. Have you ever participated in organized sport? _____ Yes (1) _____ No (2)

5. Please identify the organized sport in which you participated the longest.

_____

6. How long did you participate in this sport? _____ years.

7. Have you participated in other organized sports? _____ Yes (1) _____ No (2)

8. Please list those sports.

_____

_____

9. In what organized sport did you experience the most success?

_____

10. At what age did you stop participating in organized sport? _____ years

11. The following statements are representative of characteristics that have been associated with effective coaching. Circle the number on the scale following each statement that best describes the coach for the sport that you identified in question 5. Use the following scale for making your decisions:

Completely True	True	Somewhat True	A Little True	Not True
1	2	3	4	5

The coach understood the players. 1.....2.....3.....4.....5

The coach was a good teacher. 1.....2.....3.....4.....5

The coach spoke calmly when I made a mistake. 1.....2.....3.....4.....5

The coach understood the sport. 1.....2.....3.....4.....5

The coach provided sufficient performance feedback. 1.....2.....3.....4.....5

The coach exhibited high levels of social support. 1.....2.....3.....4.....5

APPENDIX D

MILLER BEHAVIORAL STYLE SCALE

MILLER BEHAVIORAL STYLE SCALE

Self-Perception Scale

Please read each question carefully and check all of the statements that might apply to you. Please be honest with your response. Your responses will be kept in complete anonymity.

1. Vividly imagine that you are afraid of the dentist and have to get some dental work done. Which of the following would you do? Check all of the statements that might apply to you.

____ I would ask the dentist exactly what he/she was going to do.

____ I would take a tranquilizer or have a drink before going.

____ I would try to think about pleasant memories.

____ I would want the dentist to tell me when I would feel pain.

____ I would try to sleep.

____ I would watch all the dentist's movements and listen for the sound of his/her drill.

____ I would watch the flow of water from my mouth to see if it contained blood.

____ I would do mental puzzles in my mind.

2. Vividly imagine that you are being held hostage by a group of armed terrorists in a public building. Which of the following would you do? Check all of the statements that might apply to you.

____ I would sit by myself and have as many daydreams and fantasies as I could.

____ I would stay alert and try to keep myself from falling asleep.

____ I would exchange life stories with the other hostages.

____ If there was a radio present, I would stay near it and listen to the bulletins what the police were doing.

____ I would watch every movement of my captors and keep an eye on their weapons.

____ I would try to sleep as much as possible.

____ I would think about how nice it's going to be when I get home.

____ I would make sure I knew where every possible exit was.

MILLER BEHAVIORAL STYLE SCALE (cont.)

3. Vividly imagine that, due to a large drop in sales, it is rumored that several people in your department at work will be laid off. Your supervisor has turned in an evaluation of your work for the past year. The decision about lay-offs has been made and will be announced in several days. Check all of the statements that might apply to you.

_____ I would talk to my fellow workers to see if they knew anything about what the supervisor's evaluation of me said.

_____ I would review the list of duties for my present job and try to figure out if I fulfilled them all.

_____ I would go to the movies to take my mind off of things.

_____ I would try to remember any arguments or disagreements I might have had with the supervisor that would have lowered his/her opinion of me.

_____ I would push all thoughts of being laid off out of my mind.

_____ I would tell my spouse that I'd rather not discuss my chances of being laid off.

_____ I would try to think which employees in my department the supervisor might have though had done the worst job.

_____ I would continue doing my work as if nothing special was happening.

4. Vividly imagine that you are on an airplane, thirty minutes from your destination, when the plane unexpectedly goes into a deep dive and then suddenly levels off. After a short time, the pilot announces that nothing is wrong, although the rest of the ride may be rough. You, however, are not convinced that all is well. Check all of the statements that might apply to you.

_____ I would carefully read the information provided about safety features in the plane and make sure I knew where the emergency exits were.

_____ I would make small talk with the passenger beside me.

_____ I would watch the end of the movie, even if I had seen it before.

_____ I would call for the flight attendant and ask him/her exactly what the problem was.

_____ I would ask for some Tylenol® from the flight attendant.

_____ I would listen carefully to the engines for unusual noises and would watch the crew to see if their behavior was out of the ordinary.

_____ I would talk to the passenger beside me about what might be wrong.

_____ I would settle down and read a book or magazine or write a letter.

MILLER BEHAVIORAL STYLE SCALE (cont.)

5. Vividly imagine that during a change of courts you are sitting on a chair following the conclusion of the first set of a tennis. You are playing the #2 singles position. You lost the first set by a score of 6-3. The coach has emphasized how important it is for the numbers 2,3,&4 players to play well and earn points for the team. Check all of the statements that might apply to you.

_____ I would stare at my racquet and straighten the strings.

_____ I would listen to every word of encouragement that the coach has to offer.

_____ I would put a cool, wet towel over my head.

_____ I would look directly at my coach while he/she is talking.

_____ I would think about going out for pizza after the game.

_____ I would ask my coach about technical aspects of my game

_____ I would take a nice, long drink of water from my water bottle.

_____ I would discuss match strategy with my coach.

APPENDIX E

HARTER SELF-PERCEPTION MEASURES

HARTER SELF-PERCEPTION MEASURES

ATHLETIC COMPETENCE SUBSCALE

WHAT I AM LIKE

SAMPLE SENTENCE

Really True for me	Sort of True for me				Sort of True for me	Really True for me
☐	☐	Some people like to go to movies in their spare time	**BUT**	Other people would rather go to sports events	☐	☐
☐	☐	Some people do very well at all kinds of sports	**BUT**	Other people don't feel that they are very good when it comes to sports	☐	☐
☐	☐	Some people think they could do well at about any new athletic activity	**BUT**	Other people are afraid they might not do well at a new athletic activity	☐	☐
☐	☐	Some people feel that they are better than others their age at sports	**BUT**	Other people don't feel they can play as well	☐	☐
☐	☐	Some people don't do well at new outdoor games	**BUT**	Other people are good at new games right away	☐	☐
☐	☐	Some people do not feel that they are very athletic	**BUT**	Other people feel that they <u>are</u> very athletic	☐	☐

GLOBAL SELF-WORTH SUBSCALE

☐	☐	Some people are often disappointed with themselves	**BUT**	Other people are pretty pleased with themselves	☐	☐
☐	☐	Some people don't like the way they are leading their life	**BUT**	Other people do like the way they are leading their life	☐	☐
☐	☐	Some people are happy with themselves most of the time	**BUT**	Other people are often not happy with themselves	☐	☐
☐	☐	Some people like the kind of person they are	**BUT**	Other people often wish they were someone else	☐	☐
☐	☐	Some people are happy being the way they are	**BUT**	Other people wish they were different	☐	☐

APPENDIX F

PERCEPTIONS OF SPORT-SPECIFIC ABILITY IN TENNIS SCALE

PERCEPTIONS OF SPORT-SPECIFIC ABILITY IN TENNIS SCALE

☐	☐	Some people do very well at hitting a tennis ball	**BUT**	Other people don't feel they are very good at hitting a tennis ball	☐	☐
☐	☐	Some people wish they could be a lot better at hitting a tennis ball	**BUT**	Other people feel they are good enough	☐	☐
☐	☐	Some people think they could do well at just about any new tennis skill they haven't tried before	**BUT**	Other people are afraid they might not do well at tennis skills they haven't ever tried	☐	☐
☐	☐	Some people feel they are better than others their age at tennis	**BUT**	Other people don't feel they can play as well	☐	☐
☐	☐	In tennis, some people usually watch more than they play	**BUT**	Other people usually play more than they watch	☐	☐
☐	☐	Some people don't do well at new tennis skills	**BUT**	Other people are good at new tennis skills right away	☐	☐
☐	☐	Some people are among the last to be chosen for a tennis match	**BUT**	Other people are usually picked first	☐	☐

APPENDIX G

SPORT COMPETENCE INFORMATION SCALE

SPORT COMPETENCE INFORMATION SCALE

Some people really believe that they have all or most of the physical abilities needed to be a good athlete. Other people think they may not have all these physical abilities.

The purpose of this questionnaire is to find out how you, as an individual athlete, know whether or not you have the physical abilities needed to do very well in your sport.

Listed below are a series of items which represent some sources of information that an athlete might use in judging how good an athlete he or she is. YOU SHOULD RATE EACH SOURCE OF INFORMATION AS TO HOW IMPORTANT IT IS TO YOU IN HELPING YOU KNOW WHETHER OR NOT YOU HAVE STRONG PHYSICAL ABILITIES FOR YOUR BEST SPORT.

SOURCE	Extremely Important	Very Important	Somewhat Important	Slightly Important	Not at all Important
My coaches' comments to me about my performance	1	2	3	4	5
My parents' comments to me about my performance	1	2	3	4	5
My teammates' or friends evaluation of my performance	1	2	3	4	5
How well or how poorly I do in practices and games/matches compared to my teammates	1	2	3	4	5
How quickly/slowly I learn new skills in my sport	1	2	3	4	5
How well or how poorly I play in games/matches	1	2	3	4	5
How much or how little I improve in my sport over time	1	2	3	4	5
How much I like playing my sport	1	2	3	4	5
What the win/loss record is	1	2	3	4	5
What the spectators think about me	1	2	3	4	5
Whether or not I meet the performance goals I set for myself	1	2	3	4	5
How I feel before games/ matches (e.g., relaxed tense, psyched up, worried, sick, etc.)	1	2	3	4	5
How hard I work to get better	1	2	3	4	5

SPORT COMPETENCE INFORMATION SCALE (cont.)

Some athletes are pretty confident over most of the season that they are having a good year in their sport. Other athletes doubt from time to time whether they are having a good year in their sport.

Listed below are a series of items which represent sources of information that an athlete might use in judging how well he or she is doing over the season. PLEASE RATE EACH SOURCE OF INFORMATION AS TO HOW IMPORTANT IT IS TO YOU IN HELPING YOU KNOW OVER THE SEASON WHETHER YOU ARE DOING WELL OR NOT SO WELL IN YOUR BEST SPORT.

SOURCE	Extremely Important	Very Important	Somewhat Important	Slightly Important	Not at all Important
How easy it is for me to learn a new skill or play	1	2	3	4	5
Whether or not I win important games/matches	1	2	3	4	5
The praise/criticism I get from my coach	1	2	3	4	5
How much or how little my performance has improved from last season	1	2	3	4	5
What my parents say to me after my games/matches	1	2	3	4	5
How good I feel about myself after practice and games/matches	1	2	3	4	5
How the spectators react to my performance in games/matches	1	2	3	4	5
Whether or not I am performing the way I expected myself to perform	1	2	3	4	5
What my teammates think of me as a player	1	2	3	4	5
How well I do in practices compared to my teammates	1	2	3	4	5
What my performance statistics are in games/matches	1	2	3	4	5
How much effort I have to exert in practices to keep up my skill	1	2	3	4	5
How confident or unsure I am of myself before and during games/matches	1	2	3	4	5

SPORT COMPETENCE INFORMATION SCALE (cont.)

Some athletes believe that they could try out for and do well on almost any team. Other athletes are not really sure that they have the physical skills or capabilities to play at different levels of sport.

Listed below are a series of items which represent sources of information that an athlete might use in judging whether or not he or she could play at the next level of a sport. PLEASE RATE EACH SOURCE OF INFORMATION AS TO HOW IMPORTANT IT IS TO YOU IN HELPING YOU KNOW WHETHER OR NOT YOU COULD PLAY FOR A TEAM IN YOUR SPORT.

SOURCE	Extremely Important	Very Important	Somewhat Important	Slightly Important	Not at all Important
How my teammates evaluate me as a player	1	2	3	4	5
How much or how little I enjoy my sport	1	2	3	4	5
How other people (e.g., classmates, spectators, media) evaluate my performance	1	2	3	4	5
What my coach tells me about my skill level	1	2	3	4	5
How my skill performances compare with others on my team	1	2	3	4	5
What my parent(s) think about my skill ability	1	2	3	4	5
Whether or not I can still improve my performance level (e.g., I have reached my peak or I can still get better)	1	2	3	4	5
How hard I am willing to work in practices and games/matches	1	2	3	4	5
My ability or inability to motivate myself in practices and games/matches	1	2	3	4	5
How my performances statistics compare with other athletes	1	2	3	4	5
Whether or not I have reached the goals I set at the beginning of the season	1	2	3	4	5
My win/loss record	1	2	3	4	5
The amount of time it takes me to learn something new in my sport	1	2	3	4	5

APPENDIX H

HUMAN SUBJECT COMMITTEE APPROVAL

MICHIGAN STATE
UNIVERSITY

June 7, 1993

TO: G. Keith Chapin
1806 Linden St.
East Lansing, MI 48823

RE: **IRB #:** 93-270
TITLE: THE INTERACTIVE EFFECT OF ATHLETES' COGNITIVE INFORMATIONAL STYLE AND COACHES' FEEDBACK ON ATHLETES' LEVEL OF AROUSAL, PERCEPTIONS OF ABILITY AND SELF-ESTEEM
CATEGORY: 2-I
REVISION REQUESTED: N/A
APPROVAL DATE: June 7, 1993

The University Committee on Research Involving Human Subjects' (UCRIHS) review of this project is complete. I am pleased to advise that the rights and welfare of the human subjects appear to be adequately protected and methods to obtain informed consent are appropriate. Therefore, the UCRIHS approved this project including any revision listed above. However, one reviewer suggests, "It might improve the clarity of the voluntary nature of subject participation to emphasize this in the cover letter and to make item 3 of the parent consent form more like item 3 of the athlete consent form."

UCRIHS approval is valid for one calendar year, beginning with the approval date shown above. Investigators planning to continue a project beyond one year must seek updated certification. Request for renewed approval must be accompanied by all four of the following mandatory assurances.

1. The human subjects protocol is the same as in previous studies.
2. There have been no ill effects suffered by the subjects due to their participation in the study.
3. There have been no complaints by the subjects or their representatives related to their participation in the study.
4. There has not been a change in the research environment nor new information which would indicate greater risk to human subjects than that assumed when the protocol was initially reviewed and approved.

There is a maximum of four such expedited renewals possible. Investigators wishing to continue a project beyond that time need to submit it again for complete review.

UCRIHS must review any changes in procedures involving human subjects, prior to initiation of the change. Investigators must notify UCRIHS promptly of any problems (unexpected side effects, complaints, etc.) involving human subjects during the course of the work.

If we can be of any future help, please do not hesitate to contact us at (517) 355-2180 or FAX (517) 336-1171.

Sincerely,

David E. Wright, Ph.D.
UCRIHS Chair

DEW:pjm

cc: Dr. Martha Ewing

OFFICE OF
RESEARCH
AND
GRADUATE
STUDIES

University Committee on
Research Involving
Human Subjects
(UCRIHS)

Michigan State University
225 Administration Building
East Lansing, Michigan
48824-1046
517/355-2180
FAX 517/336-1171

Bowling Green State University

Office of the Associate Vice President for Research
and Dean of the Graduate College · (419) 372-2791
Research Services Office · (419) 372-2481
Bowling Green, Ohio 43403-0180
FAX: (419) 372-8569
Cable: BGSUOH

November 19, 1993

TO: G. Heith Chapin
29 College Park Office Bldg.
BGSU

FROM: Dr. Richard Wilson, Chair
Human Subjects Review Board

RE: Status of Human Subjects Protocol Application

PROJECT TITLE: *The Interactive Effect of Athletes' Cognitive Informational Style and Coaches' Feedback on Athletes' Level of Arousal Perceptions of Ability and Self-Esteem*

BOARD ACTION: Approved w/Modification, Expedited #3

PROJECT ID: H94O064FE3

Your project identified above was reviewed at a recent meeting of the BGSU Human Subjects Review Board (HSRB) with action taken as indicated. This information is required when applying for Thesis and Dissertation topic approval to the Graduate College. The following explanations of categories is for informational purposes only. Please retain this letter in your records for this project.

EXEMPTIONS

An exemption can be approved only if the research involves no more than minimal risk and falls into one of six categories. These categories are outlined on the enclosed sheet. If your project is approved as exempt you need not maintain records as indicated below . Furthermore, annual review will not be initiated by the HSRB. You should, of course, notify this office of any changes in protocol which may affect exempt status and of the date of termination of use of human subjects. Certification of exemption for other research will be retained by this office for 36 months from the date of this letter.

EXPEDITED REVIEW & RECORDS KEEPING

Certain research activities involving no more than minimal risk and in which human subjects are involved in special ways are approved by Federal guidelines (46FR 8392) for expedited review. In such cases all records pertaining to the human subjects aspects of your project, including consent forms, debriefing sheets, procedural descriptions, participant lists, etc. should be retained in a secured area for a period of 36 months following termination of the research. Federal law requires project records to be open to inspection, so please bear this in mind as you proceed with your work. Should you leave the University prior to the 36 month expiration period, the location of project records should be made known to your department Chair and to this office.

APPROVAL WITH MODIFICATIONS

If modifications are indicated for your project, some minor changes or additions are needed prior to performance of the research. However, these changes are not deemed by the reviewers to be sufficiently detrimental to warrant deferral of Board action and need not delay project implementation.

For projects approved with modifications, conditional Board approval is given subject to satisfactory completion of the items indicated. The additional information is to be submitted to this office at your earliest convenience. Any changes requested by the HSRB for your project are indicated at the end of this letter.

DEFERRAL

In some instances a project is deferred pending receipt of additional information or until required modifications are made. In these instances the project should not proceed before such changes have been submitted to this office and approved.

ALTERATIONS TO PROTOCOL

Projects are approved only for procedures as proposed in the original application. Any changes in project activities involving human subjects should be communicated immediately to the HSRB via this office. Annual review and recertification of procedures for expedited or full board review projects are required and will be initiated by this office.

PLEASE NOTE: If you are conducting a phone survey, you must identify yourself, your home department, and your protocol approval number. This is for your protection as well as the respondents.

Please notify Barbara Peck, 372-7714, upon completion of your activities with human subjects on this project.

Good luck with your research. Let me know if this office or the HSRB can be of assistance as your project proceeds.

bdp

xc:
Dr. Mary Ann Roberton

Modifications: The protocol indicates that subjects will be debriefed but there is no debriefing form included with the HSRB forms. A written debriefing explaining the experimental design should be submitted.

APPENDIX I

CONSENT FORM

CONSENT FORM

School of Health, Physical Education, and Recreation
Bowling Green State University

1. I have freely consented to participate as a volunteer in the scientific study by G. Keith Chapin, Instructor in the School of Health, Physical Education, and Recreation at Bowling Green State University. Any questions I may have regarding the study can be directed to Mr. Chapin at 372-6909.

2. The study has been explained to me and I understand my participation will involve two data collection sessions.

3. I understand that I am free to withdraw my consent and discontinue my participation in the study at any time without penalty.

4. I understand that the results of the study will be treated in strict confidence and that I will remain anonymous. Within these restrictions, results of the study will be made available to me at my request.

5. I understand that my participation in the study does not guarantee any immediate beneficial results to me.

6. I understand that I can receive additional explanation of the study, at my request, after my participation is completed.

7. I understand that my participation in this research project will not expose me to any risk of personal or psychological harm and will not involve any additional costs to me or my health care insurer.

SIGNED _____

DATE _____

APPENDIX J

MEANS AND STANDARD DEVIATIONS FOR PERFORMANCE ON THE ANTICIPATION TIMING TASK

MEANS AND STANDARD DEVIATIONS FOR PERFORMANCE ON THE ANTICIPATION TIMING TASK

Mean Error Scores (in msec) on the Anticipation Timing Task

	Monitors (n=34)		Blunters (n=22)	
	M	SD	M	SD
Trial block #1				
Trial #1	50.82	48.86	43.73	25.93
Trial #2	42.94	42.64	54.23	48.62
Trial #3	36.29	35.99	65.18	58.03
Trial #4	36.18	27.00	53.00	41.33
Trial #5	45.50	57.41	45.91	32.43
Trial #6	43.00	40.78	54.73	40.22
Trial #7	50.29	59.64	39.91	32.81
Trial #8	44.85	39.53	54.05	51.02
Trial #9	49.77	51.73	45.14	37.64
Trial #10	37.65	37.29	47.91	50.10

MEANS AND STANDARD DEVIATIONS FOR PERFORMANCE ON THE ANTICIPATION TIMING TASK (cont.)

Mean Error Scores (in msec) on the Anticipation Timing Task

	Monitors (n=34)		Blunters (n=22)	
	M	SD	M	SD
Trial block #2				
Trial #11	46.53	54.43	39.14	29.20
Trial #12	38.38	36.21	47.77	28.46
Trial #13	42.77	47.01	56.73	48.83
Trial #14	43.41	37.14	41.05	38.51
Trial #15	41.74	38.31	46.14	45.14
Trial #16	41.09	53.72	58.14	48.24
Trial #17	45.44	49.73	46.96	33.34
Trial #18	46.77	45.68	47.41	38.15
Trial #19	51.00	43.03	50.41	37.21
Trial #20	49.68	46.83	44.73	32.55

APPENDIX K

PHASE 1 POST-TEST QUESTIONNAIRE

Post-Test Questionnaire

Rate how true each of the following statements are for you. There are no right or wrong answers. Please be honest with your response.

Use the following scale:

Completely True		Somewhat True	A little True	Not True
5	4	3	2	1

The lights provided necessary information about my performance	5.....4.....3.....2....1
The information about my performance was sufficient	5.....4.....3.....2....1
The task was interesting	5.....4.....3.....2....1
I was nervous when performing the task	5.....4.....3.....2....1
I was successful at the task	5.....4.....3.....2....1
The sound from the light switch caused me to look at the light panel	5.....4.....3.....2....1
I wanted to do well on the task	5.....4.....3.....2....1
I wanted more information about my performance	5.....4.....3.....2....1
I knew how well I did on each trial without looking at the light panel	5.....4.....3.....2....1

What were you thinking about or feeling during the trials? (Use the space below).

_____

_____

APPENDIX L

MEANS AND STANDARD DEVIATIONS FOR PARTICIPANTS' HEART RATES IMMEDIATELY FOLLOWING PHYSICAL ACTIVITY

MEANS AND STANDARD DEVIATIONS FOR PARTICIPANTS' HEART RATES (BEATS PER MINUTE) IMMEDIATELY FOLLOWING PHYSICAL ACTIVITY BY INFORMATION CONDITION AND COGNITIVE INFORMATION STYLE

	Monitors				Blunters			
	High (n=16)		Low (n=18)		High (n=11)		Low (n=11)	
	M	SD	M	SD	M	SD	M	SD
Trial block 1	111.69	20.16	113.28	14.40	116.27	16.24	110.36	18.56
Trial block 2	113.56	14.30	113.06	14.66	116.73	13.40	107.00	17.54
Trial block 3	114.44	15.69	110.67	14.02	119.00	13.86	107.73	19.62

APPENDIX M

MEANS AND STANDARD DEVIATIONS FOR PRE-TEST SELF-PERCEPTION MEASURES

MEANS AND STANDARD DEVIATIONS FOR PRE-TEST SELF-PERCEPTION MEASURES

	Monitors (n= 34)		Blunters (n=22)	
Subscale	M	SD	M	SD
Global Self-Worth	15.94	2.86	17.64	2.26
General Athletic Competence	15.35	2.66	16.14	2.90
Sport-Specific Ability in Tennis	15.47	4.23	17.32	3.87

APPENDIX N

MEANS AND STANDARD DEVIATIONS FOR PARTICIPANTS' PERCEPTIONS OF SPORT EXPERIENCE

MEANS AND STANDARD DEVIATIONS FOR PARTICIPANTS' PERCEPTIONS OF THE SPORT EXPERIENCE

	Sample (n=56)		Monitors (n=34)		Blunters (n=22)	
Statement	M	SD	M	SD	M	SD
The coach understood the players	2.43	.83	2.59	.93	2.18	.59
The coach was a good teacher	2.07	.99	2.09	1.03	2.05	.95
The coach spoke calmly when I made a mistake	3.14	1.12	3.41	1.16	2.73	.94
The coach understood the sport	1.52	.81	1.50	.83	1.55	.80
The coach provided sufficient performance feedback	2.32	.91	2.18	.97	2.32	.84
The coach exhibited high levels of social support	2.46	1.03	2.62	1.16	2.23	.75

1= completely true; 5= not true

APPENDIX O

MEANS AND STANDARD DEVIATIONS FOR PARTICIPANTS' PERCEPTIONS OF THE PHASE 2 TESTING SESSION

MEANS AND STANDARD DEVIATIONS FOR PARTICIPANTS' PERCEPTIONS OF THE PHASE 2 TESTING SESSION

	Monitors				Blunters			
	High (n=16)		Low (n=18)		High (n=11)		Low (n=11)	
	M	SD	M	SD	M	SD	M	SD
Information was sufficient	4.47	.64	3.44	1.25	4.00	1.27	3.82	.87
Task was interesting	4.60	.74	4.28	.75	4.27	1.01	4.46	.69
Nervous when performing the task	1.87	1.25	2.56	1.38	2.18	1.40	2.36	1.21
Successful at the task	3.93	.96	2.33	.91	3.09	1.04	3.36	.81
Wanted to do well on the task	4.93	.26	4.44	.71	4.00	1.10	4.64	.51
Wanted more performance information	2.47	1.41	3.28	1.02	2.73	1.42	2.82	1.40
Knew how well I did on each trial	4.53	.74	3.67	.97	4.00	.78	3.46	.93

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