THE INFLUENCE OF PSYCHOLOGICAL STRESS AND
PERSONALITY UPON ATHLETIC PERFORMANCE OF
INTERCOLLEGIATE TENNIS PLAYERS

THESIS

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By

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Reed, Rebecca L., *The Influence of Psychological Stress and Personality Upon Athletic Performance of Intercollegiate Tennis Players*. Master of Science (Physical Education), March, 1978, 113 pp., 14 tables, 4 figures, bibliography, 45 titles.

This investigation was designed to study coach and self-appraised groupings of intercollegiate tennis players who yield to stress and withstand stress and to determine if personality differences existed between groups.

Subjects were 75 intercollegiate tennis players from Texas. A stress inventory and the Cattell Sixteen Personality Factor Questionnaire were instruments utilized in the study.

Data were subjected to hierarchical profile-groupings, three-way analyses of variance, and a correlational analysis. Conclusions of the study were that intercollegiate tennis players and male and female players respond to stress differently; intercollegiate tennis players and male and female players who experience different levels of stress have different personalities; and players and coaches do not evaluate the ability to cope with stress similarly.
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CHAPTER I

INTRODUCTION

Recent research has revealed a great interest in the area of stress experienced by the human organism in various situations. The concept of stress was first introduced to the life sciences by Hans Selye in 1936. The term stress, as studied in literature, has been used to connote anxiety; conflict; emotional distress; extreme environmental conditions such as strong wind, crowd reactions, and noise; threat to security; tension; arousal; and other emotions (2).

It seems appropriate to study the relationship between stress and the physical performance of athletes. Assessment of personality characteristics of athletes also may have a direct relationship to performance and the effect of stress upon that performance. Brown and Shaw (4) state that being highly skilled in a particular area only accounts in part for success. Psychological ingredients compose still another dimension of the successful performer. In addition, Alderman (1) suggests that "the ability to withstand the extremely high levels of arousal caused by intense competition and the usually higher vociferous spectator reactions without consequent drop in performance is the hallmark of a successful athlete" (p. 143). Lazarus (10) hypothesizes that the role of personality factors
in the production of stress reactions require a definition of stress in terms of transactions between individuals and situations rather than of either one alone. Biddulph (3) adds that "in view of the present interest in athletics and the stress being placed upon it by our educational institutions today, the relationship of athletic achievement to personal and social adjustment takes on increased importance" (p. 1).

The results of many investigations (1, 5, 6, 7, 11, 12, 13, 14, 17, 18) have supported these contentions of Biddulph and Lazarus. Continued research indicates that the reactions to stress displayed by any one person involves an individual-coping-process. According to Lazarus (9) this coping process depends on the cognitive and appraisal techniques performed by an individual. Both internal and external situations as well as personality dispositions guide that coping process.

Morgan (16) describes the problem of dealing with the competitive stress experienced by athletes in the following manner:

Athletes from various subgroups as well as athletes within a given subgroup possess different personality structures. Therefore, they presumably have different psychic needs and should be handled in a personalized fashion. Application of psychological methods to groups will likely be just as ineffective as the prescription of medication on a group basis; that is, personalized needs must be taken into account. A further implication is that those individuals responsible for an athlete's care and treatment must be thoroughly acquainted with the athlete's personal history (p. 375).

Morgan's concern about competitive stress and the athlete are reinforced by Alderman (1) who expresses a great need and
voices strong encouragement for further research in the areas of successful and non-successful athletes and the factors which lead to these states. In view of the reported concerns for the effect of stress and personality dispositions related to stress upon athletic performance by athletes, it would seem important to specifically study stress and personality of intercollegiate athletes as a subgroup within the athletic realm.

It is hoped that this study will provide additional information concerning the relationship between stress and performance of intercollegiate tennis players. It also will contribute to an understanding of the influence of personality characteristics upon the ability of athletes to cope with stress experienced during competitive situations. The study further seeks to identify qualities which might influence the coaching methodology used by those who work with intercollegiate tennis players. According to Johnson (8),

If coaches can teach their athletes the meaning of controlling powerful emotions which arise under conditions of stress they will not only improve their chances of turning out champions, but will also contribute immeasurably to the boys' [girls'] ability to master themselves and their lives (p. 51).

Statement of the Problem

This investigation was designed to study coach and self-appraised groupings of intercollegiate tennis players who modally yield to stress and groupings of intercollegiate
tennis players who modally withstand stress and to determine if personality differences exist between groups.

Purposes of the Study

The following null hypotheses were submitted:

H₀₁: There is no significant difference between players who yield to stress and those who withstand stress as evaluated by coach and by self-appraisal as measured by "Reed's Situational Inventory for Tennis".

H₀₁ᵃ: There is no significant difference between players who yield to stress of Category I (opponents' influences) and those who withstand this type of stress as evaluated by coach and by self-appraisal as measured by "Reed's Situational Inventory for Tennis";

H₀₁ᵇ: There is no significant difference between players who yield to stress of Category II (situational influences) and those who withstand this type of stress as evaluated by coach and by self-appraisal as measured by "Reed's Situational Inventory for Tennis";

H₀₁ᶜ: There is no significant difference between players who yield to stress of Category III (influence of spectators and expectations) and those who withstand this type of stress as evaluated by coach and by self-appraisal as measured by "Reed's Situational Inventory for Tennis";
H₀₁d: There is no significant difference between players who yield to stress of Category IV (attitudinal influences) and those who withstand this type of stress as evaluated by coach and by self-appraisal as measured by "Reed's Situational Inventory for Tennis".

H₀₂: There is no significant difference between male players who experience stress and female players who experience stress as evaluated by coach and self-appraisal as measured by "Reed's Situational Inventory for Tennis".

H₀₂a: There is no significant difference between male players who experience stress of Category I and female players who experience this type of stress as evaluated by coach and by self-appraisal as measured by "Reed's Situational Inventory for Tennis";

H₀₂b: There is no significant difference between male players who experience stress of Category II and female players who experience this stress as evaluated by coach and by self-appraisal as measured by "Reed's Situational Inventory for Tennis";

H₀₂c: There is no significant difference between male players who experience stress of Category III and female players who experience this stress as evaluated by coach and by self-appraisal as measured by "Reed's Situational Inventory for Tennis";
H_{02d}: There is no significant difference between male players who experience stress of Category IV and female players who experience this stress as evaluated by coach and by self-appraisal as measured by "Reed's Situational Inventory for Tennis".

H_{03}: There is no significant personality difference on any of the sixteen personality factors as measured by Cattell's Sixteen Personality Factor Questionnaire, Form A between players who yield to stress and those who withstand stress.

H_{04}: There is no significant personality difference on any of the sixteen personality factors as measured by Cattell's Sixteen Personality Factor Questionnaire, Form A between male players who experience stress and female players who experience stress.

H_{05}: There is no significant relationship between the rankings of coach-appraisal and player-appraisal of the ability to cope with stress as measured by "Reed's Situational Inventory for Tennis".

The investigator sought to reject each of the above hypotheses at the .05 level of significance.

**Definition of Terms**

The following terms and definitions were used in the study:

1. **Stress (Theoretical).**—"The process that involves the perception of a substantial imbalance between environmental
demand and response capability, under conditions where failure to meet the demand is perceived as having important consequences" (8, p. 9);

2. Stress (Operational).--Psychological demands which prevent an intercollegiate tennis player from responding at his/her previously proven level of ability to demands met during competitive play;

3. "Chokers."--Those intercollegiate tennis players who consistently appear to yield to stress during competitive performance;


Scope of the Study

This study was limited in that the subjects, both male and female, were selected from intercollegiate tennis teams within the state of Texas during the academic year 1977-78. Furthermore, the teams chosen were those who had maintained highly successful win-loss records for three years prior to the date of this study and who had been coached by the same coach for at least one year prior to the date of this investigation.

Summary

Investigators have expressed concern for the effect of stress and personality dispositions upon the athletic performance of athletes. It appears, therefore, important to study
stress and personality of intercollegiate athletes. This investigation studied coach and self-appraised groupings of intercollegiate tennis players who yield to stress and groupings of intercollegiate tennis players who withstand stress. In addition, the study sought to determine if personality differences existed between the groups.
CHAPTER BIBLIOGRAPHY


CHAPTER II

REVIEW OF LITERATURE

An extensive review of literature revealed a limited number of research studies directly related to stress as experienced by tennis players. Many studies have dealt with stress, but from various views and definitions of the term. Studies investigating stress measured by both physiological and psychological means were included in this review, as well as the few studies concerned with stress and tennis players. The literature was replete with investigations concerning personality variables of athletes. This resume included studies related to the personality dispositions of athletes and studies which revealed a relationship between personality variables and the ability to cope with stress.

Physiological Measures of Stress

Ulrich (33) defined physiological stress as "a total bodily reaction to any situation or agent which tends to destroy the homeostatic balance" (p. 160). She measured stress in twenty-eight college women involved in a variety of competitive experiences including class situations, intramural situations, interscholastic situations, and test situations by use of eosinophil count and cardiorespiratory symptoms. The findings of the study were that stress results from
anticipation of a stressful experience, participation in a stressful experience, and denial of participation in an experience perceived to be stressful. Ulrich reported other physiological measures of stress to be work output, cardio-respiratory change, temperature change, reaction time, and hormone assay.

Harmon and Johnson (10) conducted a study to determine competitive stress among nineteen members of the track team and forty-two members of the football team at Boston University in 1949. Pre-contest emotional reactions were measured in four ways: galvanic skin response, systolic blood pressure, diastolic blood pressure, and pulse rate. Increased reactions were noted in three of the four measures in a pre-contest situation.

Johnson (12) used psychogalvanic and word association techniques to explore the emotional aspect of eighty-two sport contestants in the four activities of swimming, wrestling, basketball, and hockey. The psychogalvanometer consisted of an electrode arrangement similar to "lie detectors." Aluminum plates were placed on the palms and finger pads of the subjects to measure skin reactivity. He found increased psychogalvanic response during pre-contest situations in all sport groups tested, particularly in basketball players.

Oxendine (27) stated that physiological changes which may be measured, such as stress, are controlled by the autonomic nervous system. Methods of physiological measurement frequently
used include heart rate, blood pressure, muscle tension, respiration, and galvanic skin response. In addition Cattell (4) formulated an extensive list of physiological variables which are significantly associated with the factor of anxiety. This list included:

- Increase in systolic pulse pressure
- Increase in heart rate
- Increase in respiration rate
- Increase in basal and current metabolic rate
- Increase in phenylhydracylic acid in urine
- Decrease in electrical skin resistance
- Increase in hippuric acid in the urine
- Increase in 17-OH ketosteroid excretion
- Decrease in alkalinity of saliva
- Decrease in cholinesterase in serum
- Decrease in neutrophils and, less clearly, eosinophils
- Increase in phenylalanine, leucine, glycine, and serine
- Increase in histidine in urine
- Decrease in urea concentration
- Decrease in glucuronidase in urine and serum (p. 33).

Psychological Measures of Stress

The psychological aspects of stress were the subject of several investigations. Cofer and Appley (5) defined stress as "the state of the organism where he perceives that his well-being or integrity is endangered and that he needs to devote his total energy to protection" (p. 453). The organism seeks a coping response to deal with his new situation. Stress is greater if a coping action is not discovered. Alderman (1) offered a basic explanation of psychological stress as a situation in which two people seek a reward which will be distributed unevenly. These individuals experience frustration as their search for the reward is thwarted.
Singer (29) provided a different approach to the psychological aspects of stress. He stated that stimuli cause physiological changes which are reflected in outward behavior. Skills performed in practice sessions may not be replicated when performed in a different situation. This is due to stress. Singer suggested that the best way to cope with the stress is to practice skills under the stress conditions in which they will be performed.

Grinker (9) agreed that anxiety causes an inability to function normally and supported this contention by working with stress experienced by subjects who jumped from various heights, including sky divers. His experiment led to the development of a stress survey form based on (1) descriptions of patients' behavior patterns, (2) interviews with patients concerning level of anxiety, and (3) self-ratings by patients on the levels of anxiety they experienced.

Mandler and Watson (19) reported that anxiety is caused by the interruption of an organized behavioral sequence and if the organism cannot complete his/her pattern, stress is experienced. An elaboration of this concept was given by Martens (20, 21, 22). He defined anxiety as a product of stress which may influence behavior. He further explained that anxiety is situationally evoked and should be studied in depth in particular stressful situations. Martens explained that competition commonly causes anxiety through stressful situations and suggested the development of a competition
anxiety scale to initiate in-depth study of the competitive situation and its influence on motor behavior. Variables he believed should be considered in such a study included the nature of the task, the stage of practice, the inhibitory ability of the individual, and personality variables (20).

Speilberger (31) stated that stress results when a situation is viewed as a threat. He also emphasized that individual differences are important in studying the effect of stress on motor behavior. After extensive exploration in the area of stress, Speilberger developed the State Trait Anxiety Scale (31, 32). Situational anxiety was labeled state anxiety, whereas anxiety which becomes a regular part of an individual's personality was called trait anxiety (4). Speilberger explained that anxiety is created by recognizing the threat and reacting to it. The intensity and duration of the anxiety depends on an individual's interpretation of the threat. Trait-anxious people see more threat than state-anxious individuals. The reaction to the threat as interpreted by the individual influences that person's behavior.

Lazarus and Opton (17) studied stress induced in a laboratory setting through the use of a motion picture. Subjects were not informed that the stressful situations they were experiencing were motion picture deceptions. The threats produced by these deceptive situations caused the subjects to feel stress. This stress was measured by both autonomic means
and self-evaluation by the subjects. They concluded that subjects do not give accurate self-evaluations of the stress they experience.

A major finding of research concerned with stress was that stress is a psychological problem which must be accommodated by athletes in an individual-coping process. Duffy (16) reported that different stimuli affect individuals differently. She said that arousal (high or low) is an individual matter with which coaches should be prepared to help their athletes overcome. Fisher (7) suggested that coaches consider the nature of a task and the skill-level of an athlete in determining how an individual should prepare for an event psychologically.

Genov (8) described a process which he labeled mobilization readiness. This state of immediate readiness prior to activity involves psychic, biological, and motor processes. Psychological readiness refers specifically to athletic competitors and includes cognitive, emotional, and rational control.

Tennis Players and Stress

Literature related more directly to the type of stress experienced by tennis players was reviewed. The findings of several studies (11, 13, 30) were that individual sport competitors experience higher levels of state anxiety than team sport competitors. An example of this research design was the
study conducted by Harrison and Jones (11). These researchers performed an extensive review of thirty-five investigations concerning the personality of female athletes. They concluded that personality differences do exist between team and individual sport competitors.

Johnson (13) compared pre-test emotions of fifteen participants in football and five in wrestling. Subjective testing consisted of observation and interviews of the subjects. Physiological testing included securing the heart rate, blood pressure, and blood sugar. Johnson found wrestlers to have more anxiety and felt it would be significant to teach young men how to handle intense emotions which are experienced during competition.

Krahenbuhl (15) used evaluation of catecholamines to measure physiological stress in six college male tennis players. He determined that the level of stress experienced by players is greater during competition than at a basal state, during practice, or during a period prior to competition.

Personality Dispositions of Athletes

Many studies have been conducted to determine the personality differences between athletes who are considered to be successful and those who are considered to be unsuccessful. After studying various sociometric and psychometric studies which considered the personality of high-level competitors, Ogilvie (25) stated that the following traits should be
encouraged in successful athletes: emotional stability, tough
mindedness, conscientiousness, controlled self-discipline,
self-assurance, relaxed-low-tension level, trusting-free of
jealousy, and for males, increased outgoing personality.

Merriman (23) compared the relationship between motor
ability and personality traits of 808 high school boys and
found that the boys with higher motor ability scored
significantly better on ten variables of the California
Psychological Inventory. The variables included dominance,
capacity for status, sociability, social presence, self-
acceptance, sense of well-being, tolerance, achievement via
conformance, achievement via independence, and intellectual
efficiency (p. 165). The subjects were classified as upper
and lower motor ability groups by scores achieved on the
Phillips JCR; subjects were categorized as athletes and non-
athletes by scores received on the motor ability battery; and
finally, subjects were classified as participants in team
sports, individual sports, and team-individual sports. Few
significant differences were found between mean CPI scores
when athletes and non-athletes were matched according to motor
ability. Few significant differences were found between mean
CPI scores for participants in team, individual, and team-
individual sports. Merriman concluded from this study that
motor ability is related to personality traits.

La Place (16) investigated specific personality traits
associated with success in professional baseball. He
administered the *Minnesota Multiphasic Personality Inventory* to forty-nine major league players and to sixty-four minor league players. His results showed that major league players appeared better able than minor league players to (1) apply their strong 'drive' towards a definite objective by expressing self-discipline; (2) adjust to occupations, such as professional baseball, requiring social contact or the ability to get along well with other people; and (3) exercise initiative.

Morgan (24) developed a series of psychological concepts to be used by coaches, trainers, physical educators, and physicians in sport medicine in leading athletes to success. These concepts include the recognition of each athlete as an individual who should be handled as an individual; acceptance of the fact that outstanding athletes tend to have stable personalities in that they are less anxious, depressed, and confused than other athletes and they also show more psychic vigor; knowledge of the principle that coaches should not try to alter pre-competitive anxiety states to increase performance levels; and recognition of the importance of coaches' concern with the post-competitive psychological condition of their athletes.

Biddulph (2) compared the personal and social adjustment of high school boys of high athletic achievement with the adjustment of boys of low athletic achievement. Four hundred and sixty-one subjects were used from high schools in Salt Lake City, Utah. Each subject completed a test and a re-test
of six items to measure speed, agility, and coordination. The sums of scores were used to determine an athletic achievement index for each subject. The California Classification Plan was used to assign boys for measurement in the test. The fifty high-scorers were designated as superior and the fifty low-scorers were designated as inferior in athletic achievement. Social and emotional adjustment was measured by the California Test of Personality, the Hermon-Nelson Intelligence Test, high school grades, and four teacher ratings on each boy. Biddulph found the group with high athletic achievement to show a particularly greater degree of personal and social adjustment than the group with low athletic achievement.

Brown and Shaw (3) conducted a study to determine if the two personality factors of emotional stability and self-confidence, measured by Cattell's Sixteen Personality Factor Inventory, could aid in predicting an individual's reaction to a specific motor task performed under stress. One hundred and twenty collegiate females were placed either in a control (no stress) or experimental (stress) situation. The results of the study indicated that the emotionally stable person performed a hand-eye coordination task on a rotor pursuit apparatus much better under stress than did a subject with low emotional stability. Subjects with a high degree of self-confidence also performed better than those with little self-confidence. These investigators suggested that coaches consider methods for the development of such traits in athletes. This study also
showed that specific personality traits do have an effect on motor performance.

Malumphy (18) completed a study in which she described and compared personality factors and background of female intercollegiate athletes. Her research tools included a personal information questionnaire, faculty advisor estimation of personality, and the Cattell Sixteen Personality Factor Questionnaire. Her subjects included four groups of junior or senior college women athletes with fifteen individual sport competitors, twenty-eight team competitors, sixteen subjectively judged sport competitors, and eighteen team and individual sport competitors. The individual sports were tennis, golf, archery, swimming, and fencing. The subjectively judged sports were synchronized swimming and gymnastics. The team sports were basketball, field hockey, and softball. The combination of team and individual sports included those mentioned above plus volleyball, badminton, and bowling. Each woman had competed in her sport for at least two seasons. Forty-two nonparticipants also were used as subjects in the study. These subjects were selected from the five largest state universities in Ohio.

The results of Malumphy’s study showed similarities between all groups on fourteen dimensions and significant differences on nine dimensions. Individual and subjectively judged competitors were most alike and also more similar to the nonparticipants than the other groups. Team and
team-individual competitors were alike, but much different than the other three groups. According to the Cattell Sixteen Personality Factor Questionnaire, the significant differences between the groups were:

1. reserved vs. outgoing
2. expedient vs. conscientious
3. tough-minded vs. tender-minded
4. practical vs. imaginative
5. anxiety
6. introvert vs. extrovert
7. tough poise
8. leadership (p. 614).

Other results indicated that faculty members significantly misjudged the athletes. Faculty advisors in the team sports proved most accurate in their evaluations.

Singer (30) undertook a study to determine personality differences between and within sixty-nine baseball and tennis players at Ohio State University at the end of the 1965 season. He administered the Edwards Personal Preference Schedule and then used multiple discriminant analysis to determine significant differences in personality between tennis and baseball groups, or between the twenty highest and twenty lowest ranked baseball players. He compared personality traits between high-and-low skill rated groups of both college baseball and tennis teams and also compared personality traits of baseball players to tennis players. The tennis players scored higher than the baseball players on both Intraception and Dominance. Baseball players showed a higher Abasement score than the tennis players. The high-ranked tennis players scored higher on Achievement and Order than the low-ranked players.
Johnson, Hutton, and Johnson (14) used two projective tests, the Rorschach Test and the H-T-P, to determine personality traits of champion athletes. The subjects included four football players, two lacrosse players, two wrestlers, two boxers, one track man, and one rifle marksman. The twelve national champions acting as subjects for this experiment showed extreme aggression, emotions lacking strict controls, high and generalized anxiety, a high level of intellectual aspiration, and exceptional feelings of self-reliance. These athletes also demonstrated an outstanding ability to apply personality resources toward desired objectives. The researchers concluded that for these athletes it was a psychological necessity to be a champion.

Olson (26) identified personality differences among male tennis champions and "near-greats." Major differences were as follows:

1. Champions tended to be more intent and serious;
2. Near-greats were more aware of crowd reactions;
3. Champions seldom were disturbed during matches while near-greats seemed prone to show their feelings;
4. Champions expressed great excitement after a win and deep depression after a loss;
5. The near-greats seemed more troubled by being expected to win than the champions.

Champions also tended to be inner-directed, pragmatists (finding pleasure in his own attributes rather than those of others), and extroverts. Near-greats tended to be other-directed, non-pragmatists, and not true extroverts due to an inability to free themselves from inner turmoil.
Rushall (28) stated that information discussed concerning personality and behavior responses of athletes could be valuable in aiding the coach when working with his athletes. He feels individual reactions to situations are governed by personality dimensions and situational determinants. More complete knowledge of such information could be valuable to both coaches and players in improving competitive ability.

Summary

A review of the literature revealed a limited number of research studies directly related to stress as experienced by tennis players. However, many studies have been completed when stress was assessed by both physiological and psychological means. A resume of literature for this chapter focused on physiological measures of stress, psychological measures of stress, tennis players and stress, and personality dispositions of athletes.
CHAPTER BIBLIOGRAPHY


CHAPTER III

PROCEDURES

This study was conducted to determine the influence of psychological stress upon intercollegiate tennis players (expressed by coach and self-appraisal) under four different conditions. Further, the study investigated the dimensions of personality related to stress groupings.

Preliminary Procedures

The initial procedure was to conduct a comprehensive review of the literature to evaluate previous methods used in determining stress experienced by tennis players. After the review, the investigator determined that none of the previously used measures of stress were adequate for this study. These tools represented either physiological measures of stress, or if psychological measures, they were not specific enough to athletic competition in tennis to merit use. The investigator, therefore, developed a survey tool to be used for measurement of psychological stress of intercollegiate tennis players.

A slate of ninety-five statements were derived from quotes of professional tennis players concerning play situations which caused them to experience stress. These quotes were extracted from newspaper articles in the *Dallas Morning News* and the
New York Times over a five-year period of time. The ninety-five statements covered six categories or situations which cause stress. A panel of five tennis experts was chosen to review this slate of statements for content validity to determine which statements most accurately measured psychological stress in their opinion. An 80 percent agreement among the judges on any statement was necessary for the item to be included in the final inventory. The investigator met personally with each panel member to explain the purpose of the study and to deliver a slate of statements. The panel of experts included:

1) John Gardner--Men's tennis coach, Southern Methodist University;

2) Barbara Camp--Women's tennis coach, Southern Methodist University; coach of Jr. Wightman Cup team;

3) Mickey Martin--U. S. registered teaching professional; U.S.T.A. official; teaching professional, City of Dallas;

4) Ben Ball--Past president of Texas Tennis Association and Dallas Tennis Association; U.S.T.A. official; U. S. registered teaching professional;

5) Allie Miller-U. S. registered teaching professional, City of Denton.

Appreciation was expressed to the panel members for their help.

After receiving responses from this panel, the final inventory was developed. It consisted of a total of thirty-nine statements measuring stress in four categories. These categorical determinations were based upon face validity and included (1) Opponents' Influences, (2) Situational Influences, (3) Spectators' and Expectations' Influences, and (4) Attitudinal Influences. Each statement was assigned a range of
responses on a Likert Scale of one-to-five. A low choice reflected high frequency of stress experienced; a high response reflected low frequency of stress experienced.

During the pilot study, the constructed instrument was administered to three intercollegiate tennis teams, including both men and women players. All three teams were located in Denton, Texas. A total of twenty subjects completed the inventory, including fourteen females and six males. The coaches of each of the three teams were asked to complete an inventory for each of their players. This procedure was incorporated because results of previous studies, mentioned in the review of literature, reported that self-evaluations were not consistently accurate in relation to actual stress experienced by subjects. Lakie (2) suggested that the validity of an inventory is dependent upon the advice of the panel of experts used and upon the willingness of the subjects used to submit an honest evaluation of themselves. This investigator, therefore, employed two evaluations for each player—one by the coach and one by the subject. Both were treated in the analyses of data for the pilot study.

The data were analyzed at the North Texas State University Computer Center. The program run was a hierarchical profile-grouping analysis. This program was made for both the self-evaluation and the coach-evaluation scores for each subject. The program placed the subjects in groups according to their
scores on the stress inventory. Three groups were obtained:

1) a group of low scorers--"chokers";
2) a group of medium scorers;
3) a group of high scorers--"non-chokers"

The groupings were analyzed for the following variables:

1. Self-evaluation total survey score
   a) self-evaluation Category I score
   b) self-evaluation Category II score
   c) self-evaluation Category III score
   d) self-evaluation Category IV score

2. Coach-evaluation total survey score
   a) coach-evaluation Category I score
   b) coach-evaluation Category II score
   c) coach-evaluation Category III score
   d) coach-evaluation Category IV score

The same variables were used in determining difference between male and female scores. Following grouping analysis, a one-way analysis of variance and Fisher's $t$ test were computed to determine if differences existed at the .05 level of significance.

The results of the pilot study showed that the instrument did distinguish groupings of intercollegiate tennis players who could be considered "chokers," "non-chokers," and players who "fluctuate" between the two groups (P=.05).

In observing the difference between coach and self-evaluation, it was noted that the coaches' evaluations resulted in one more "choker" than the players' evaluations. However, there was agreement by grouping on only nine out of the twenty players. In comparing scores awarded to each player by self-evaluation, then by coach-evaluation, one team showed a
definite difference between the scores. This finding was consistent with that of Martens (13) while developing the Sport Competition Anxiety Test. A low correlation was obtained between coaches' ratings of player anxiety and SCAT for all players combined (p. 38). One coach consistently awarded lower scores to each player. The other two coaches matched scores with their players very closely. The difference usually resulted in a higher score from the coach than from the player. It was due to this difference in coach and self-evaluation scores that the investigator chose to use only teams whose coaches had worked with them at least one year prior to the administration of this study. Greater familiarity with team members appeared to provide more consistency between the two scores.

In comparing total scores of males and females, both coach and self-evaluation results showed more females to be "chokers" than males. Males were classified more frequently as players who fluctuated between "chokers" and "non-chokers" rather than as a definite member of either category. Total scores and scores in all four categories were significant at the .05 level for both self and coach-evaluations. Category IV, attitudinal influences, appeared to be the most discriminating of the four categories included in the inventory. On the basis of these results, the investigator revised the inventory (Appendix B) to increase its effectiveness in determining the stress of intercollegiate tennis players. Final
revision included: 1) the deletion of the category of player preparation, 2) the combination of two categories, environmental factors and play situations, into one category entitled situational influences because panel members suggested they did not differentiate types of stress clearly enough to stand as separate categories, and 3) the reduction of statements from ninety-five to thirty-nine because the panel did not reach 80 percent agreement that the deleted questions clearly discriminated stress situations or because statements were redundant.

The administrative feasibility of the developed tool was considered during the pilot study. It was necessary to determine the form and clarity of the selected inventory and specific testing procedures and average time needed for subjects to complete the inventory. The results of this portion of the pilot study revealed no basic problems.

Subjects

The subjects were thirty male and forty-five female intercollegiate tennis players selected from tennis teams within the state of Texas during the academic year 1977-1978. Furthermore, the teams chosen were those who had maintained highly successful win-loss records for three years prior to the date of this study and who had been coached by the same coach for at least one year prior to the date of this study.
### TABLE I
PARTICIPATING INSTITUTIONS

<table>
<thead>
<tr>
<th>SCHOOL</th>
<th>COACH</th>
<th>NO. SUBJECTS</th>
<th>SEX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Texas A. &amp; M. University</td>
<td>Ellen Buchanon</td>
<td>8</td>
<td>F</td>
</tr>
<tr>
<td>Texas Tech University</td>
<td>Emily Foster</td>
<td>10</td>
<td>F</td>
</tr>
<tr>
<td>Trinity University</td>
<td>Marilyn Rindfuss</td>
<td>6</td>
<td>F</td>
</tr>
<tr>
<td>Odessa Junior College and University of Texas at Permian Basin</td>
<td>Virginia Brown</td>
<td>7</td>
<td>F</td>
</tr>
<tr>
<td>Abilene Christian University</td>
<td>Cecil Eager</td>
<td>10</td>
<td>F</td>
</tr>
<tr>
<td>Texas Wesleyan College</td>
<td>Barbara Van Zandt</td>
<td>4</td>
<td>F</td>
</tr>
<tr>
<td>Pan American University</td>
<td>A. G. Longoria</td>
<td>8</td>
<td>M</td>
</tr>
<tr>
<td>Lamar University</td>
<td>Ron Westbrooks</td>
<td>10</td>
<td>M</td>
</tr>
<tr>
<td>University of Texas</td>
<td>David Snider</td>
<td>9</td>
<td>M</td>
</tr>
<tr>
<td>Rice University</td>
<td>Chip Travis</td>
<td>30</td>
<td>M</td>
</tr>
</tbody>
</table>

Other schools which met the criteria but elected not to participate were Southern Methodist University-women's team, Trinity University-men's team, Texas Christian University-men's team, and Texas A. & M. University-men's team.
Test Instruments

A psychological stress inventory which included thirty-nine statements was developed by the investigator, with content validity established by a panel of five tennis experts. The statements considered four different parameters of stress. Category I considered "Opponents' Influences" and included eight statements. Category II assessed "Situational Influences" reflected by the inclusion of six statements. Category III investigated "Spectators' and Expectations' Influences" and included eight statements. Category IV measured "Attitudinal Influences" and incorporated seventeen statements.

<table>
<thead>
<tr>
<th>TABLE II</th>
</tr>
</thead>
<tbody>
<tr>
<td>CATEGORIES AND STATEMENTS IN THE STRESS INVENTORY</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Categories</th>
<th>Related Statements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category I</td>
<td>3, 4, 14, 20, 28, 29, 30, 39</td>
</tr>
<tr>
<td>Opponents' Influences</td>
<td></td>
</tr>
<tr>
<td>Category II</td>
<td>9, 10, 15, 18, 19, 32</td>
</tr>
<tr>
<td>Situational Influences</td>
<td></td>
</tr>
<tr>
<td>Category III</td>
<td>6, 16, 17, 24, 26, 31, 37, 38</td>
</tr>
<tr>
<td>Spectators' and Expectations' Influences</td>
<td></td>
</tr>
<tr>
<td>Category IV</td>
<td>1, 2, 5, 7, 8, 11, 12, 13, 21, 22, 23, 25, 27, 33, 34, 35, 36</td>
</tr>
<tr>
<td>Attitudinal Influences</td>
<td></td>
</tr>
</tbody>
</table>
Each statement was assigned a range of responses of one-to-five. A low choice reflected high frequency of stress experienced; a high response reflected low frequency of stress experienced. The choices were defined as follows:

1) always—A player experiences the feelings described 100% of the times he/she plays under the stated conditions.

2) frequently—A player experiences the feelings described approximately 75% of the times he/she plays under the stated conditions.

3) sometimes—A player experiences the feelings described approximately 30% of the times he/she plays under the stated conditions.

4) rarely ever—A player experiences the feelings described approximately 10% of the times he/she plays under the stated conditions.

5) never—A player experiences the feelings described at no time when he/she plays under the stated conditions (0%).

In order to encourage honest answers from the participants, the title "Psychological Stress Inventory" was changed to "Reed's Situational Inventory for Tennis" during the collection of data. It was feared that the original title which included the term "stress" might unconsciously influence the objectivity of subjects' responses.

The Cattell Sixteen Personality Factor Questionnaire, Form A (1) was used to assess personality. Selection of this instrument was based on its qualities as a highly reliable and valid test. It has been used in many research investigations since its first publication in 1949. A test-re-test method was used to show that the scores on the test were reliable based on a population of 243 high school male and female
subjects and 146 employment counselors and college undergraduates over a one-week period. A reliability coefficient of .74 was determined for the test. The validity of the Cattell Sixteen Personality Factor Questionnaire is based on the concept of construct validity. Test items were chosen as being good measures of the personality factors when directly correlated with the pure factor they were designed to measure.

The test includes sixteen factors designed to reveal sixteen different aspects of one's personality. Each of the personality factors has an alphabetical designation of a low and a high score. The sixteen factors and their low and high score descriptions are as follows: (A) reserved, out-going; (B) dull, bright; (C) affected by feelings, emotionally stable; (E) humble, assertive; (F) sober, happy-go-lucky; (G) expedient, conscientious; (H) shy, venturesome; (I) tough minded, tender minded; (L) trusting, suspicious; (M) practical, imaginative; (N) forthright, astute; (O) self-assured, apprehensive; (Q₁) conservative, experimenting; (Q₂) group dependent, self-sufficient; (Q₃) undisciplined, controlled; (Q₄) relaxed, tense. The average scores for each factor range from 4-7; high description scores range from 8-10; and low descriptive scores range from 1-3.

Ten to thirty items are provided for each scale or factor. The questions are arranged in a roughly cyclic scale or factor to give variety and insure interest for the subject. Three alternative answers are provided for each of the questions to
prevent any "middle of the road" compromise. Questionnaires are often considered susceptible to distortion and deliberate faking. Test construction is aimed to minimize this as much as possible.

Copies of the questionnaire used in this study were obtained from the Counseling and Testing Department and the Department of Health, Physical Education, and Recreation at North Texas State University. Additional copies were purchased from The Institute for Personality and Ability Testing, Champaign, Illinois.

Test Administration

Verbal permission for use of subjects was obtained by phone conversation with the coach at each selected university between September 13 and September 20, 1977. A brief explanation of the project also was given at that time. After receiving verbal agreement, "Informed Consent to Participate" forms with a written explanation of the study were mailed to the coaches and their teams (Appendix A). These forms were mailed on September 20, 1977. Participants were volunteers who signed the "Informed Consent to Participate" forms.

The deadline date for return of the "Informed Consent to Participate" forms was October 3, 1977. Phone calls were made during the week of October 10-October 15 to the respective coaches of institutions which had failed to return materials. The last return was received on November 1, 1977.
Immediately after receipt of the signed "Informed Consent to Participate" forms, the test instruments and complete written instructions were mailed to each coach (Appendix B). These materials were mailed between the dates of October 3 and November 1. Enclosed were addressed and stamped envelopes to be returned with the completed materials by a deadline date set individually for each school according to when its "Informed Consent to Participate" forms had been received. All dates, however, were assigned during the month of November.

The letter of explanation asked each subject to complete both "Reed's Situational Inventory for Tennis" to determine his/her stress status and the Cattell Sixteen Personality Factor Questionnaire, Form A, to determine his/her personality profile. The coaches of each of the teams also were asked to complete a "Reed's Situational Inventory for Tennis" for each of their players and to supervise their players' completion of the test forms.

Follow-up phone calls were made during the last week of November to those schools which had not returned test materials. A final letter of reminder was mailed on December 3 which set the last possible deadline date for December 19, 1977.

Analyses of Data

Data obtained from this research were analyzed at the North Texas State University Computer Center. Scores from "Reed's Situational Inventory for Tennis" were computed with a hierarchical profile-grouping analysis.
After determining groups of players, a three-way analysis of variance was computed to determine if differences existed \((p=.05)\) between groups based upon psychological stress. These data were analyzed to reflect differences in total survey stress groups, categorical stress groups, and male and female groups considered in \(H_{01}\) and \(H_{02}\). The Duncan multiple range test was used to make comparison between means following significant \(F\) ratios.

A three-way analysis of variance was computed to determine if there were significant differences \((p=.05)\) between groups of tennis players distinguished by the hierarchical profile analysis, male and female players, and each of the sixteen factors included on the personality inventory. These analyses were computed for \(H_{03}\) and \(H_{04}\). The Fisher's \(t\) test was used to make comparison between means following significant \(F\) ratios.

The independent variables in the three-way analyses were 1) male and female intercollegiate tennis players, 2) self and coach-evaluations, and 3) personality factors. The dependent variables were 1) the total score from the stress measure, and 2) total scores from the individual personality factors.

A correlational analysis was computed to determine significant relationships between coach and player-evaluations of ability to cope with stress as expressed in \(H_{05}\).
Summary

This chapter described the design and procedures used in the investigation. It included a discussion of the pilot study, subjects tested, development of the test instruments, testing procedures, and the statistical analyses of test results.
CHAPTER BIBLIOGRAPHY


CHAPTER IV

PRESENTATION OF DATA

Findings of the Study

The purpose of the present study was to determine groups of intercollegiate tennis players who frequently yield to stress and groups of intercollegiate tennis players who frequently withstand stress and to determine if personality differences exist between the groups. A second purpose of this study was to ascertain if differences existed between male and female players in reaction to stress and if differences in personality factors existed between the sexes relative to four categories of stress. The investigation also was designed to compare player and coach-appraisals of the ability to cope with stress.

Data secured for the investigation included player and coach scores on a thirty-nine item psychological stress inventory administered to seventy-five subjects. The inventory represented four aspects of stress related to situations involved in intercollegiate tennis competition. Data were examined according to three stress groupings, sex, and four categorical determinations of stress. Data also included scores on a standardized personality inventory, the Cattell Sixteen Personality Factor Questionnaire, Form A. This
inventory represented sixteen factors of personality. A stress grouping by sex by personality design was used to examine the data.

Data received from the stress inventory were treated statistically by use of a hierarchical profile-grouping analysis. Based upon player and coach-appraisals, the players were assigned to one of three groups according to stress reactions (12). The lowest possible score on the stress inventory was thirty-nine. The highest possible score was 195. The low value indicated a player who frequently yielded to stress during play; the high score depicted a player who rarely yielded to stress during play. Three stress groups were computed by the hierarchical profile-grouping analysis.

Data were further treated statistically by use of a 3x2x4 factorial analysis of variance with repeated measures to determine if significant differences existed at the .05 level of probability between the three stress groupings, male and female players, and the four categories of stressful situations depicted in the survey (12). Data which were significantly different were subjected to Duncan's multiple range test for comparison.

Data received from the personality inventory were treated statistically by use of a 3x2x16 factorial analysis of variance with repeated measures to determine if differences existed at the .05 level of significance between the three stress
groupings, male and female players, and the sixteen personality factors (12). Data which were significantly different were subjected to a Fisher's $t$ test. Duncan's multiple range test could not be used due to the large number of cells involved. The lowest possible score that could be received on any factor in the personality inventory was a sten score of one and the highest score was a sten of ten. Stens of five or six are average; four or seven slightly deviant (respectively in a low or high direction); two, three, eight, and nine strongly deviant; and one or ten extreme (2).

Scores on the stress inventory received from player and coach-appraisals were treated statistically by use of the Pearson product-moment correlation with missing data to determine significant relationships between player and coach-appraisals of the ability to cope with stress (12).

The hierarchical profile-grouping analysis designated three stress groups. The results of this analysis are illustrated in Table III.

**TABLE III**

**HIERARCHICAL PROFILE-GROUPINGS IN RESPONSE TO STRESS**

<table>
<thead>
<tr>
<th>Group Number</th>
<th>Survey Scores</th>
<th>Response to Stress</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Low</td>
<td>Frequently yield to stressful play situations</td>
</tr>
<tr>
<td>2</td>
<td>High</td>
<td>Rarely yield to stressful play situations</td>
</tr>
<tr>
<td>3</td>
<td>Medium</td>
<td>Fluctuate in response to stressful play situations</td>
</tr>
</tbody>
</table>
Group 1 scored lower than the other two groups on the stress survey, which revealed a tendency to yield frequently to stress in play situations. Conversely, Group 2 scored higher than the other groups on the stress inventory which depicted players who rarely yielded to stressful play situations. The scores for Group 3 ranged between the high and low groups, revealing a tendency to fluctuate in response to stressful play situations.

Table IV represents the number of subjects included in each stress grouping. The percentage of male and female players in each grouping also is recorded.

<table>
<thead>
<tr>
<th></th>
<th>GROUP 1 (highly stressful)</th>
<th>GROUP 2 (rarely stressful)</th>
<th>GROUP 3 (fluctuating responses)</th>
</tr>
</thead>
<tbody>
<tr>
<td>total</td>
<td>%</td>
<td>%</td>
<td>total</td>
</tr>
<tr>
<td>members</td>
<td></td>
<td></td>
<td>total</td>
</tr>
<tr>
<td>27</td>
<td>33.3</td>
<td>37.7</td>
<td>18</td>
</tr>
<tr>
<td>30</td>
<td>43.3</td>
<td>37.7</td>
<td></td>
</tr>
</tbody>
</table>

The players who tended to fluctuate in response to stress constituted the largest group; while the players who frequently yielded to stress composed the second largest group; and the players who rarely yielded to stress were the smallest group. Percentage of males and females in each group were fairly evenly distributed.
A three-way analysis of variance was computed to determine if significant differences at the .05 level of confidence existed among the groups with respect to sex and to the four categories of stress considered in the inventory. Results of the three-way analysis of variance are included in Table V.

**TABLE V**

**ANALYSIS OF VARIANCE WITH REPEATED MEASURES (GROUP BY SEX BY CATEGORIES)**

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>DF</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Subjects</td>
<td>12048.50</td>
<td>149</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Row (Groups)</td>
<td>2355.88</td>
<td>2</td>
<td>a 1177.94</td>
<td>17.53</td>
<td>0.00*</td>
</tr>
<tr>
<td>Columns (Sex)</td>
<td>104.68</td>
<td>1</td>
<td>b 104.68</td>
<td>1.56</td>
<td>0.21</td>
</tr>
<tr>
<td>Row-Col</td>
<td>26.17</td>
<td>2</td>
<td>a 13.09</td>
<td>0.19</td>
<td>0.82</td>
</tr>
<tr>
<td>Error B</td>
<td>9677.70</td>
<td>144</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within Subjects</td>
<td>76171.50</td>
<td>450</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blocks (Categories)</td>
<td>65798.40</td>
<td>3</td>
<td>c 21932.80</td>
<td>1784.80</td>
<td>0.00*</td>
</tr>
<tr>
<td>Row-Blks</td>
<td>191.34</td>
<td>6</td>
<td>d 31.89</td>
<td>2.60</td>
<td>0.02*</td>
</tr>
<tr>
<td>Col-Blks</td>
<td>160.43</td>
<td>3</td>
<td>c 53.48</td>
<td>4.35</td>
<td>0.00*</td>
</tr>
<tr>
<td>R-C-B</td>
<td>70.50</td>
<td>6</td>
<td>d 11.75</td>
<td>0.96</td>
<td>0.45</td>
</tr>
<tr>
<td>Error W</td>
<td>5308.70</td>
<td>432</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*aF .05, 2/144 df = 3.00.
*bF .05, 1/144 df = 3.84.
*cF .05, 3/432 df = 2.60.
*dF .05, 6/432 df = 2.10.
Examination of Table V reveals no statistically significant differences in the $F$ ratio of 1.56 between sexes, the $F$ ratio of 0.19 for interaction between groups and sex, and 0.96 between groups and sexes and categories. The respective $F$ ratios of 17.53 between stress groups and 1784.80 between categories of stress revealed statistically significant differences at the .05 level. Interaction comparisons also were statistically significant at the .05 level between groups and categories with a $F$ ratio of 2.60 and between sex and categories with a $F$ ratio of 4.35 (17). With significant differences between groups, categories, groups and categories, and sex and categories, the data were subjected to Duncan's multiple range test.

Table VI depicts the significant differences between stress groupings.

TABLE VI
DUNCAN'S TEST FOR SIGNIFICANT DIFFERENCE BETWEEN STRESSFUL, RARELY STRESSFUL, AND FLUCTUATING STRESS GROUPS

<table>
<thead>
<tr>
<th>Initial Groups</th>
<th>Ranked Means</th>
<th>Mean Diff.</th>
<th>Duncan's Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-1</td>
<td>31.69 - 26.90=</td>
<td>4.79</td>
<td>1.82*</td>
</tr>
<tr>
<td>2-3</td>
<td>31.69 - 27.53=</td>
<td>4.16</td>
<td>1.69*</td>
</tr>
<tr>
<td>3-1</td>
<td>27.53 - 26.90=</td>
<td>0.63</td>
<td>1.50</td>
</tr>
</tbody>
</table>

*F .05, 2/144 df= 3.00.
Group 2 (players who rarely yield to stress) and Group 1 (players who frequently yield to stress) were significantly different with a mean difference of 4.79. In addition, Group 2 (players who rarely yield to stress) were significantly different from Group 3 (players who fluctuate in response to stress) with a mean difference of 4.16. These data were significant at the .05 level (17). Group 3 (players with fluctuating response to stress) were not significantly different from Group 1 (players who frequently yield to stress), revealed by a mean difference of 0.63.

Table VII illustrates the significant differences between the four categories of stress included in the inventory. The four categories were Category I-opponents' influences; Category II-situational influences; Category III-spectators' and expectations' influences; and Category IV-attitudinal influences.

**TABLE VII**

**DUNCAN'S TEST FOR SIGNIFICANT DIFFERENCES BETWEEN CATEGORIES OF STRESS**

<table>
<thead>
<tr>
<th>Initial Groups</th>
<th>Ranked Means</th>
<th>Mean Diff.</th>
<th>Duncan's Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-2</td>
<td>46.88 - 19.60=</td>
<td>27.28</td>
<td>0.87*</td>
</tr>
<tr>
<td>4-3</td>
<td>46.88 - 23.25=</td>
<td>23.63</td>
<td>0.84*</td>
</tr>
<tr>
<td>4-1</td>
<td>46.88 - 23.47=</td>
<td>23.41</td>
<td>0.80*</td>
</tr>
<tr>
<td>1-2</td>
<td>23.47 - 19.60=</td>
<td>3.87</td>
<td>0.84*</td>
</tr>
<tr>
<td>1-3</td>
<td>23.47 - 23.25=</td>
<td>0.21</td>
<td>0.80</td>
</tr>
<tr>
<td>3-2</td>
<td>23.25 - 19.60=</td>
<td>3.65</td>
<td>0.80*</td>
</tr>
</tbody>
</table>

*F .05, 3/432 df= 2.60.
Data in Table VII reflects a statistical difference between all categories at the .05 level and at the .01 level except between Category I (opponents' influences) and Category III (spectators' and expectations' influences) (12). Category IV (attitudinal influences) had a higher mean than Category II (situational influences), Category III (spectators' and expectations' influences), and Category I (opponents' influences). Mean differences were 27.28, 23.63, and 23.41 respectively. Category I (opponents' influences) had a significantly higher mean than Category II (situational influences) with a mean difference of 3.87. Category III (spectators' and expectations' influences) had a significantly higher mean than Category II (situational influences) with a mean difference of 3.65.

Table VIII includes the Duncan's multiple range test for significant differences in interaction between the four categories of stress and sex. Significance was determined at the .05 level of confidence (12) (Table VIII, p. 51).

Males showed significantly less stress in Category IV (attitudinal influences) than did males in Category I (opponents' influences), Category II (situational influences), and Category III (spectators' and expectations' influences). Males also showed significantly less stress in Category IV (attitudinal influences) than females in Category I (opponents' influences), Category II (situational influences), and Category III (spectators' and expectations' influences).
### TABLE VIII
DUNCAN'S TEST FOR SIGNIFICANT DIFFERENCES
BETWEEN FOUR STRESS CATEGORIES
AND BETWEEN SEXES

<table>
<thead>
<tr>
<th>Initial Groups</th>
<th>Ranked Means</th>
<th>Mean Diff.</th>
<th>Duncan's Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-2</td>
<td>47.68 - 19.10=</td>
<td>28.58</td>
<td>2.27*</td>
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<td>4-6</td>
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</tr>
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<td>24.28 - 19.10=</td>
<td>5.18</td>
<td>2.17*</td>
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<tr>
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<td>24.28 - 19.93=</td>
<td>4.35</td>
<td>1.93*</td>
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<td>1.87</td>
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<tr>
<td>5-2</td>
<td>22.88 - 19.10=</td>
<td>3.78</td>
<td>1.93*</td>
</tr>
<tr>
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<td>22.88 - 19.93=</td>
<td>2.94</td>
<td>1.67*</td>
</tr>
<tr>
<td>5-7</td>
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<td>22.57 - 19.10=</td>
<td>3.47</td>
<td>1.87*</td>
</tr>
<tr>
<td>7-6</td>
<td>22.57 - 19.93=</td>
<td>2.63</td>
<td>1.59</td>
</tr>
<tr>
<td>6-2</td>
<td>19.93 - 19.10=</td>
<td>0.83</td>
<td>1.78</td>
</tr>
</tbody>
</table>

*F .05, 3/432 df = 2.60.*
There was no significant difference between the scores of males and females in Category IV (attitudinal influences). Females displayed significantly less stress in Category IV (attitudinal influences) than they did in Categories I (opponents' influences), II (situational influences), or III (spectators' and expectations' influences). The amount of stress experienced by females in Category IV (attitudinal influences) was also less than the stress experienced by males in Categories I (opponents' influences), II (situational influences), or III (spectators' and expectations' influences). Thus, "attitudinal influences" were less stressful to both males and females than the other three categories of stress.

Further inspection of Table VIII illustrates that males experienced less stress in Category I (opponents' influences) than males or females did in Category II (situational influences). There was no significant difference in the amount of stress experienced by males in Category I (opponents' influences) and males in Category III (spectators' and expectations' influences), females in Category I (opponents' influences), and females in Category III (spectators' and expectations' influences). Males also reported less stress experienced in Category III (spectators' and expectations' influences) than in Category II (situational influences). The stress experienced by males in Category III (spectators' and expectations' influences) was also less than that experienced by females in Category II (situational influences). There was no significant
difference in the amount of stress experienced by males in Category III (spectators' and expectations' influences) and the amount of stress experienced by females in Categories I (opponents' influences) and III (spectators' and expectations' influences). Females experienced less stress in Category I (opponents' influences) than females or males did in Category II (situational influences). There was no significant difference in the amount of stress experienced by females in Category I (opponents' influences) and females in Category III (spectators' and expectations' influences). Females experienced less stress in Category III (spectators' and expectations' influences) than males or females in Category II (situational influences). There was no significant difference in the amount of stress experienced by females in Category II (situational influences) and males in Category II (situational influences). These findings would suggest that "situational influences" are more stressful to male and female players than "opponents' influences," "spectators' and expectations' influences," or "attitudinal influences."

Figure 1 further illustrates the mean differences between the amounts of stress experienced by male and female subjects in each of the four categories of stress (Figure 1, p. 54).

This figure shows that males and females experienced a greater amount of stress in Category II (situational influences) than in any other category. They experienced less
stress in Categories I (opponents' influences), III (spectators' and expectations' influences), and IV (attitudinal influences) respectively. Males experienced less stress than females did in Categories III (spectators' and expectations' influences) and IV (attitudinal influences) respectively. The amount of stress experienced by males and females in Category I (opponents' influences) was approximately equal. Males experienced more stress than females did in Category II (situational influences), which was the most stressful category to both sexes.
Table IX reports the significant differences in interactions between the three stress groups and the four categories of stress. Statistical differences at the .05 level were determined (12).

**TABLE IX**

**DUNCAN'S TEST FOR SIGNIFICANT DIFFERENCES BETWEEN FOUR STRESS CATEGORIES AND THREE STRESS GROUPINGS OF SUBJECTS**

<table>
<thead>
<tr>
<th>Initial Groups</th>
<th>Ranked Means</th>
<th>Mean Diff.</th>
<th>Duncan's Test</th>
</tr>
</thead>
<tbody>
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<td>8-2</td>
<td>51.86 - 18.43</td>
<td>33.44</td>
<td>2.60*</td>
</tr>
<tr>
<td>8-10</td>
<td>51.86 - 19.18</td>
<td>32.68</td>
<td>2.53*</td>
</tr>
<tr>
<td>8-3</td>
<td>51.86 - 21.78</td>
<td>30.08</td>
<td>2.56*</td>
</tr>
<tr>
<td>8-6</td>
<td>51.86 - 22.06</td>
<td>29.81</td>
<td>2.78*</td>
</tr>
<tr>
<td>8-1</td>
<td>51.86 - 22.17</td>
<td>29.69</td>
<td>2.51*</td>
</tr>
<tr>
<td>8-11</td>
<td>51.86 - 22.63</td>
<td>29.23</td>
<td>2.43*</td>
</tr>
<tr>
<td>8-9</td>
<td>51.86 - 22.92</td>
<td>28.94</td>
<td>2.40*</td>
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<td>8-5</td>
<td>51.86 - 26.33</td>
<td>25.53</td>
<td>2.63*</td>
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<td>8-7</td>
<td>51.86 - 26.50</td>
<td>25.36</td>
<td>2.57*</td>
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<td>51.86 - 45.22</td>
<td>6.64</td>
<td>2.27*</td>
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</tr>
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<td>12-2</td>
<td>45.38 - 18.43</td>
<td>26.96</td>
<td>2.25*</td>
</tr>
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<td>12-10</td>
<td>45.38 - 19.18</td>
<td>26.20</td>
<td>2.17*</td>
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<td>12-11</td>
<td>45.38 - 22.63</td>
<td>22.75</td>
<td>2.06*</td>
</tr>
<tr>
<td>12-9</td>
<td>45.38 - 22.92</td>
<td>22.47</td>
<td>2.04*</td>
</tr>
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<td>18.88</td>
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<td>45.22 - 18.43</td>
<td>26.80</td>
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<td>45.22 - 19.19</td>
<td>26.04</td>
<td>2.21*</td>
</tr>
<tr>
<td>4-3</td>
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<td>4-1</td>
<td>45.22 - 22.17</td>
<td>23.06</td>
<td>2.19*</td>
</tr>
<tr>
<td>4-11</td>
<td>45.22 - 22.63</td>
<td>22.59</td>
<td>2.09*</td>
</tr>
<tr>
<td>4-9</td>
<td>45.22 - 22.92</td>
<td>22.31</td>
<td>2.05*</td>
</tr>
<tr>
<td>4-5</td>
<td>45.22 - 26.33</td>
<td>18.89</td>
<td>2.27*</td>
</tr>
<tr>
<td>4-7</td>
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<td>18.72</td>
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<tr>
<td>7-2</td>
<td>26.50 - 18.43</td>
<td>8.07</td>
<td>2.54*</td>
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</table>
Table IX reveals twelve interactions which were not significant (12). Group 3 (fluctuating stress responders) in Category IV (attitudinal influences) was not significantly
different from Group 1 (highly stressful players) in Category IV (attitudinal influences); Group 2 (rarely stressful players) in Category III (spectators' and expectations' influences) was not significantly different from Group 2 in Category II (situational influences); Group 3 (fluctuating stress responders) in Category I (opponents' influences) was not significantly different from Group 1 (highly stressful players) in Categories I (opponents' influences) and III (spectators' and expectations' influences), or from Group 2 (rarely stressful players) in Category II (situational influences), or from Group 3 in Category III (spectators' and expectations' influences). Group 3 (fluctuating stress responders) in Category III (spectators' and expectations' influences) did not differ significantly from Group 1 (highly stressful players) in Categories I (opponents' influences) and III (spectators' and expectations' influences), or from Group 2 (rarely stressful players) in Category II (situational influences). In addition, Group 1 (highly stressful players) in Category I (opponents' influences) was not significantly different from Group 1 (highly stressful players) in Category III (spectators' and expectations' influences), or from Group 2 (rarely stressful players) in Category II (situational influences). Finally, Group 2 (rarely stressful players) in Category II (situational influences) was not significantly different from Group 1 (highly stressful players) in Category III (spectators' and expectations' influences).
All other fifty-four interactions displayed in Table IX were significantly different at the .05 level of confidence (12). Group 2 (rarely stressful players) experienced less stress in Category IV (attitudinal influences) than did Group 1 (highly stressful players) in Categories I (opponents' influences), II (situational influences), III (spectators' and expectations' influences), and IV (attitudinal influences); Group 3 (fluctuating stress responders) in Categories I, II, III, and IV; and Group 2 (rarely stressful players) in Categories I, II, and III. Group 3 (fluctuating stress responders) experienced less stress in Category IV (attitudinal influences) than did Group 1 (highly stressful players) in Categories I (opponents' influences), II (situational influences), and III (spectators' and expectations' influences); or Group 3 (fluctuating stress responders) in Categories I, II, and III. Group 1 (highly stressful players) experienced less stress in Category IV (attitudinal influences) than did Group 1 in the other three categories; Group 2 (rarely stressful players) in Categories I (opponents' influences), II (situational influences), and III (spectators' and expectations' influences); or Group 3 (fluctuating stress responders) in Categories I, II, and III. Group 2 (rarely stressful players) experienced less stress in Category III (spectators' and expectations' influences) than did Group 2 in Category I (opponents' influences); Group 1 (highly stressful players) in Categories I (opponents' influences), II (situational influences),
influences), and III (spectations' and expectations' influences); or Group 3 (fluctuating stress responders) in Categories I, II, and III.

Further examination of Table IX reveals that Group 2 (rarely stressful players) in Category I (opponents' influences) experienced less stress than did Group 1 (highly stressful players) in Categories I (opponents' influences), II (situational influences), and III (spectators' and expectations' influences); Group 2 (rarely stressful players) in Category II (situational influences); or Group 3 (fluctuating stress responders) in Categories I (opponents' influences), II (situational influences), and III (spectators' and expectations' influences). Group 3 (fluctuating stress responders) experienced less stress in Category I (opponents' influences) than did Group 1 (highly stressful players) in Category II (situational influences); and Group 3 in Category II. Group 3 (fluctuating stress responders) experienced less stress in Category III (spectators' and expectations' influences) than did Group 1 (highly stressful players) in Category II (situational influences); or Group 3 in Category II. Group 1 (highly stressful players) experienced less stress in Category I (opponents' influences) than did Group 1 in Category II (situational influences) and Group 3 in Category II. Group 2 (rarely stressful players) experienced less stress in Category II (situational influences) than did Groups 1 and 3 in the same Category. Group 1 (highly stressful players)
experienced less stress in Category 3 (spectators' and expectations' influences) than did Group 1 and 3 in Category II (situational influences). Group 3 (fluctuating stress responders) experienced less stress than did Group 1 (highly stressful players) in Category II (situational influences).

Figure 2 depicts the mean differences between the four stress categories and the three stress groups of players according to mean scores on the stress inventory.

![Figure 2: Differences of mean scores between four stress categories and three stress groups.](image-url)
Figure 2 shows that Category IV (attitudinal influences) was least stressful to the three stress groups of players. Group 2 (rarely stressful players) experienced less stress than did Group 3 (fluctuating stress responders) in this category and Group 3 experienced less stress than Group 1 (highly stressful players). Category I (opponents' influences) was second less stressful to all groups. Again, Group 2 (rarely stressful players) was least affected stress-wise by the opponents; Group 1 (highly stressful players) suffered the most stress in this category; and Group 3 (fluctuating stress responders) ranked between the other two groups in relation to stress created by opponents. Category III (spectators' and expectations' influences) was the second most stressful category. Group rankings remained the same. Category II (situational influences) caused all three groups to experience the greatest amount of stress. Group rankings were again the same.

A three-way analysis of variance was computed to determine if significant differences existed among the three stress groups with respect to sex and sixteen personality factors, as measured by the Cattell Sixteen Personality Factor Questionnaire, Form A. Results of the three-way analysis of variance are included in Table X (p. 62).

Examination of Table X reveals no significant difference in the F ratio of 2.47 between groups, the F ratio of 2.83 between sexes, or the F ratio of 0.17 for interaction between
### TABLE X

**ANALYSIS OF VARIANCE WITH REPEATED MEASURES**  
*(GROUP BY SEX BY PERSONALITY FACTORS)*

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>DF</th>
<th>MS</th>
<th>F</th>
<th>p</th>
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<tr>
<td>Between Subjects</td>
<td>304.56</td>
<td>74</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Rows (Groups)</td>
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<td>9.93</td>
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<td>11.38</td>
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<td>Row-Col</td>
<td>1.39</td>
<td>2</td>
<td>0.70</td>
<td>0.17</td>
<td>0.84</td>
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<td>277.22</td>
<td>69</td>
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<td>Within Subjects</td>
<td>3844.88</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blocks (P. Factors)</td>
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<td>15</td>
<td>9.36</td>
<td>3.20</td>
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</tr>
<tr>
<td>Row-Blks</td>
<td>258.23</td>
<td>30</td>
<td>8.61</td>
<td>2.94</td>
<td>0.00*</td>
</tr>
<tr>
<td>Col-Blks</td>
<td>128.87</td>
<td>15</td>
<td>8.59</td>
<td>2.94</td>
<td>0.00*</td>
</tr>
<tr>
<td>R-C-B</td>
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<td>6.23</td>
<td>2.13</td>
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<td>Error W</td>
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<td>1035</td>
<td>2.93</td>
<td></td>
<td></td>
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</table>

*af = .05, 2/1125 df= 3.15.  
bf = .05, 1/1125 df= 4.00.  
cf = .05, 15/1035 df= 1.67.  
df = .05, 30/1035 df= 1.46.

Groups and sexes. The F ratio of 3.20 reveals statistical difference between personality factors at the .05 level. Also significantly different at the .05 level are the F ratios for interaction of 2.94 between groups and personality factors, 2.94 between sexes and personality factors, and 2.13 between groups, sexes, and personality factors (17).
With significant differences between personality factors, groups and personality factors, sex and personality factors, and between the three way interaction of the variables, the data were subjected to a Fisher's $t$ test between groups and sex for each of the sixteen personality components. Fisher's $t$ tests were used to follow-up the three-way analysis of variance because the number of interactions between variables was too large to be computed with the Duncan's multiple range test.

Table XI includes the sixteen personality factors and reflects significant differences for each factor between groups and sexes (17). Alpha was .05 (Table XI, pp. 64-65).

Eight of the personality factors were not significantly different when stress groups were compared (17). These Factors were A, B, F, G, I, $Q_1$, $Q_2$, and $Q_3$. Thirteen personality factors showed no significant difference between sexes (17). These were Factors A, B, C, E, F, H, L, M, N, O, $Q_1$, $Q_2$, and $Q_4$. There were significant differences at the .05 level of confidence on eight personality factors among the three stress groups (17). These Factors included C, E, H, L, M, N, O, and $Q_4$. In addition, male and female players differed significantly at the .05 level of confidence on the three personality factors represented by variables G, I, and $Q_3$ (17).

Group 1 (highly stressful players) tended to be more affected by feelings than did players in Groups 2 (rarely
<table>
<thead>
<tr>
<th>Personality Factors</th>
<th>Description of Personality Factors (2)</th>
<th>t&lt;sup&gt;a&lt;/sup&gt; Group</th>
<th>t&lt;sup&gt;b&lt;/sup&gt; Sex</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Reserved vs. Outgoing</td>
<td>1.87, 1.28, 0.77</td>
<td>1.90</td>
</tr>
<tr>
<td>B</td>
<td>Less Intelligent vs. More Intelligent</td>
<td>0.69, 0.01, 0.69</td>
<td>1.36</td>
</tr>
<tr>
<td>C</td>
<td>Affected by Feelings vs. Emotionally Stable</td>
<td>2.64*, 2.58*, 0.39</td>
<td>1.77</td>
</tr>
<tr>
<td>E</td>
<td>Humble vs. Assertive</td>
<td>1.39, 1.81, 3.03*</td>
<td>0.66</td>
</tr>
<tr>
<td>F</td>
<td>Sober vs. Happy-go-lucky</td>
<td>0.54, 0.35, 0.86</td>
<td>1.20</td>
</tr>
<tr>
<td>G</td>
<td>Expedient vs. Conscientious</td>
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<td>2.88*</td>
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<tr>
<td>H</td>
<td>Shy vs. Venturesome</td>
<td>1.23, 3.69*, 2.03*</td>
<td>0.09</td>
</tr>
<tr>
<td>I</td>
<td>Tough-minded vs. Tender-minded</td>
<td>0.35, 1.33, 1.54</td>
<td>2.22*</td>
</tr>
<tr>
<td>Personality Factors</td>
<td>Description of Personality Factors (2)</td>
<td>t Group&lt;sup&gt;a&lt;/sup&gt;</td>
<td>t Sex&lt;sup&gt;b&lt;/sup&gt;</td>
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<td>---------------------</td>
<td>------------------------------------------</td>
<td>-------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>L</td>
<td>Trusting vs. Suspicious</td>
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<td>1.16</td>
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<td>2.87*</td>
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<td>0.30</td>
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<td>1.45</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.09*</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.13</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>Forthright vs. Shrewd</td>
<td>0.22</td>
<td>0.32</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.40*</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.90</td>
<td></td>
</tr>
<tr>
<td>O</td>
<td>Placid vs. Apprehensive</td>
<td>3.20*</td>
<td>0.36</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4.15*</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.43</td>
<td></td>
</tr>
<tr>
<td>Q&lt;sub&gt;1&lt;/sub&gt;</td>
<td>Conservative vs. Experimenting</td>
<td>0.59</td>
<td>1.03</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.97</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.47</td>
<td></td>
</tr>
<tr>
<td>Q&lt;sub&gt;2&lt;/sub&gt;</td>
<td>Group dependent vs. Self-sufficient</td>
<td>1.77</td>
<td>0.18</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.57</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.42</td>
<td></td>
</tr>
<tr>
<td>Q&lt;sub&gt;3&lt;/sub&gt;</td>
<td>Undisciplined Self-conflict vs. Controlled</td>
<td>0.65</td>
<td>4.80*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.64</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.09</td>
<td></td>
</tr>
<tr>
<td>Q&lt;sub&gt;4&lt;/sub&gt;</td>
<td>Relaxed vs. Tense</td>
<td>3.09*</td>
<td>1.11</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.11*</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.38</td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup> 43 df = 2.02, 55 df = 2.00, 46 df = 2.01.

<sup>b</sup> 73 df = 1.99.
stressful players) and 3 (fluctuating stress responders) on Factor C. Group 2 (rarely stressful players) tended to be more humble than did Group 3 (fluctuating stress responders) on Factor E. Group 1 (highly stressful players) was more shy than Group 3 (fluctuating stress responders) on Factor H. Group 2 (rarely stressful players) was also more shy than Group 3, though not as shy as Group 1. Players in Group 1 (highly stressful) tended to be more suspicious than players in either Group 2 (rarely stressful) or Group 3 (fluctuating stress). Group 1 (highly stressful players) was evaluated as more practical while Group 3 (fluctuating stress responders) was more imaginative on Factor M. Group 1 (highly stressful players), scored higher on Factor N indicating that they tended to be more shrewd than players in Group 3. Group 1 (highly stressful players) tended to experience more apprehension than players in Group 2 (rarely stressful players) or Group 3 (fluctuating stress responders). Group 3 players (fluctuating responders) were the most placid of the three stress groups. Group 1 also revealed a higher tendency to be tense than either Group 2 or 3. Group 2 (rarely stressful players) was the most relaxed, evidenced by scores on Factor Q4.

Figure 3 plots the average scores for each of the three stress groups on each of the sixteen personality factors (Figure 3, p. 67).

The mean score for each group was plotted for each personality factor. Significant differences existed between groups on Factors C, E, H, L, M, N, O, Q4.
Figure 3. Mean scores of three player stress groups on personality factors.
Figure 4 plots the average score for male and female players on each of the sixteen personality factors. Further analysis of personality differences revealed that males displayed more conscientiousness in play than females on Factor G. Males also proved themselves to be more tough-minded than females, reflected by Factor I. Males again scored higher than females on Factor Q3, indicating that males showed more self-control than females (Figure 4, p. 69).

A Pearson product-moment correlation with missing data (12) was used to determine significant relationships between coach and player-appraisals of the ability to cope with stress as measured by "Reed's Situational Inventory for Tennis." Table XII depicts the results of this correlation.

<table>
<thead>
<tr>
<th>Inventory Section</th>
<th>Player Mean</th>
<th>Coach Mean</th>
<th>Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Survey Score</td>
<td>120.01</td>
<td>106.39</td>
<td>0.03 slight</td>
</tr>
<tr>
<td>Category I Score (Opponents' Influences)</td>
<td>25.33</td>
<td>21.60</td>
<td>0.01 slight</td>
</tr>
<tr>
<td>Category II Score (Situational Influences)</td>
<td>20.55</td>
<td>18.65</td>
<td>0.16 slight</td>
</tr>
<tr>
<td>Category III Score (Spectators' and Expectations' Influences)</td>
<td>24.36</td>
<td>22.15</td>
<td>0.01 slight</td>
</tr>
<tr>
<td>Category IV Score (Attitudinal Influences)</td>
<td>49.77</td>
<td>43.99</td>
<td>0.00 slight</td>
</tr>
</tbody>
</table>
Figure 4. Mean scores for male and female subjects on personality factors.
Examination of Table XII reveals slight correlation between coach and self-evaluations on the total survey score and on all four categories (12). Coaches consistently evaluated their players as more stressful than the players evaluated themselves on the total survey and in each category of the survey.

Table XIII compares the members of stress groups 1, 2, and 3 with both coach and player-appraisal scores, singularly by coach-evaluation scores, and singularly by player-evaluation scores. Percentage of male and female players is also shown for each group. When players were grouped according to both self and coach-evaluations, Group 1 had twenty-seven members; Group 2 had eighteen members; and Group 3 had thirty members. The members of these groups were compared to the members in Groups 1, 2, and 3 when computed singularly by coach-evaluation and then by player-evaluation. For Group 1 (highly stressful players) only five members were found to be the same in all three evaluations. For Group 2 (rarely stressful players), eight subjects were commonly listed by all three evaluations. No members were found to be the same in Group 3 (fluctuating stress responders) in all three evaluations. Coaches evaluated group membership with thirty-six in Group 1; fourteen in Group 2; and twenty-five in Group 3. Coaches evaluated more players as highly stressful than did the players or players-coaches groupings. Players placed twenty-two members in Group 1; forty-three members in Group 2; and
### TABLE XIII
COMPARISON OF THREE HIERARCHICAL PROFILE-GROUPINGS ON TOTAL SURVEY SCORES

<table>
<thead>
<tr>
<th></th>
<th>Group 1 (highly stressful)</th>
<th>Group 2 (rarely stressful)</th>
<th>Group 3 (fluctuating responses)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>common members</td>
<td>uncommon members</td>
<td>% male</td>
</tr>
<tr>
<td>Coach &amp; Self Grouping</td>
<td>22</td>
<td>33.3</td>
<td>37.7</td>
</tr>
<tr>
<td>Coach Grouping</td>
<td>30</td>
<td>56.6</td>
<td>42.2</td>
</tr>
<tr>
<td>Self Grouping</td>
<td>16</td>
<td>30</td>
<td>28.8</td>
</tr>
</tbody>
</table>

* Members common to self and coach, self, coach groupings (all 3 groupings).

** Members common to self and coach groupings.
only ten members in Group 3. More players tended to evaluate themselves as rarely yielding to stress than did either of the other two groupings. Few players evaluated themselves as fluctuating in their response to stress.

Discussion of the Findings

In the present investigation seventy-five subjects and their coaches, from intercollegiate tennis teams within the state of Texas, completed a psychological stress inventory concerning the player's ability to cope with competitive stress. Each player also completed a personality inventory, the Cattell Sixteen Personality Factor Questionnaire, Form A. The total sample was divided into three subgroups relative to the amount of stress they experienced during competitive play situations. These groups were computed by a hierarchical profile-grouping analysis (12). The three stress groups were examined in relation to significant difference according to sex and in relation to significant difference according to four types of stress included in the stress survey. The three groups were further examined in relation to significant difference according to sex and to the sixteen personality factors included in the Cattell Sixteen Personality Factor Questionnaire, Form A.

Statistically significant differences did exist among the three stress groups of players. This finding indicates that players do react differently to stressful situations and concurs with Lazarus' (6) suggestion that stress is an individual-coping
process. Lazarus further stated that the coping process depends on cognitive and appraisal techniques performed by an individual. Internal and external conditions as well as personality dispositions guide the coping process. It also was found in the present study, that low scores on the stress inventory represented highly stressful players, high scores on the inventory represented rarely stressful players, and that some players fluctuated in their response to stress as their scores ranged between those of high and low scorers. Thus, players of varsity-level status in tennis respond quite differently in the competitive environment. A tennis team frequently is composed of players who range in their abilities to perceive, react, and cope with stress. This information appears to support Duffy's (3) findings in which she reported that different stimuli affect individuals differently. She encouraged coaches to learn to deal with the arousal levels of their athletes on an individual basis.

Significant differences occurred between the three stress groups and the four types of stressful influences included in the stress inventory. All three groups experienced stress most often under "situational influences" such as wind factors and different court surfaces. The influence of "spectators' or others' expectations" was the second most stressful situation for the tennis players. Influence exerted on a player by his/her "opponent" ranked third in frequency of stress experienced. Stress was least often experienced due to the
player's "own attitude" toward a match. Rarely stressful players were less influenced by stress of all four types than players who fluctuated in their response to stress or than highly stressful players. Highly stressful players succumbed to stress in all four categories more frequently than the other two groups of players. A plausible explanation for the players' responses that they are most stressed by "situational influences" or by "spectators' and expectations' influences" could be that most people see themselves as average (4). This self-concept, then, allows a player to perceive both his internal attitudes and the attitudes of his opponents as similar. Therefore, self and opponents can be handled without a great deal of stress because the player perceives most competitors of approximately average ability. However, external factors such as wind, court surfaces, and crowd moods cannot be controlled by the player. These conditions cause a feeling of greater stress than competitor attitudes. Another possible explanation could stem from the attribution theory of motivation (15). This theory explains that a competitor tends to attribute success to personal ability or effort whereas failure is often blamed on environmental conditions or fate, over which the player has no control.

Male and female players differed significantly in response to types of stress influences. "Situational influences" again caused the most stress for both sexes. "Opponent's influences" exerted on the players was experienced as the second most
frequent type of stress. "Spectators' and expectations' influences" caused stress less frequently than "opponent's influences" or "situational influences." Again, "attitudinal influences" caused the least amount of stress to both sexes. Males experienced less stress from "attitudinal influences" or "spectators' and expectations' influences" than did females. However, males were more susceptible to "situational" stress factors than females. Males and females responded similarly to stress exerted on them by an opponent. A probable explanation for the finding that women felt more stress from "attitudinal influences" and "spectators' and expectations' influences" might be the short time-period for female involvement in competitive sport situations or it could be that they have participated in traditional female roles more frequently than the sport roles which often are referred to as masculine in nature. Since women do not have a very long history in sports, they have not had as many opportunities to shape and control their own attitudes during competition as have males. Furthermore, since female athletes have received much criticism during their sport history, it seems a natural reaction that they should be concerned about how spectators and significant-others perceive the quality of their performance. Males, in contrast, have had such a significantly longer sport history than females, it seems possible that they have developed stronger self-attitudes and more resistance toward spectator-interaction than females in the sport arena.
This would leave opportunity for them to experience greater stress from "situational influences" which are constantly changing. These findings agree with Martens' (9) explanation that stress is situationally evoked and is influenced by various personality factors.

When the three stress groups were statistically compared for interaction with the sixteen personality factors in the Cattell Sixteen Personality Factor Questionnaire, Form A, a significant difference was found on eight personality factors. Players who frequently yielded to stressful situations tended to be more affected by emotional feelings than did either of the other stress groups. These stressful players also tended to be more shy and suspicious than other players. Highly stressful players showed increased tendencies toward practicality, shrewdness, apprehension, and tension than the other players. Players who reported that they rarely experienced stress ranked significantly lower on the humble-assertive factor than did players in the middle score group, indicating they were less assertive. These findings are consistent with those of Lazarus (7) who believes that personality factors play an extremely important role in producing stress reactions to various stressful situations. Morgan (11) also stated that athletes who possess different personality structures perform differently in highly stressful competitive situations. After extensive study of the personality of high-level competitors, Ogilvie (13) reported that personality factors such as
emotional stability, tough-mindedness, controlled self-discipline, and low-tension-level should be encouraged in athletes. Morgan (11) stated that outstanding athletes tend to be more stable in personality in that they are less anxious, depressed, and confused. This agrees with the personality factors ascribed to low stress players in the present study. In a study conducted by Brown and Shaw (1), it was found that motor tasks were better performed by subjects with high emotional stability, and it was suggested that specific personality traits do have an effect upon performance. Olson (14) identified characteristics of male champion tennis players as serious, intensive, and able to keep concentration during matches.

Male and female players differed significantly on three personality factors. Males tended to be more conscientious, tough-minded, and self-controlled than did females. It is possible that because males generally have a longer and broader history in competitive sports, they have had more opportunity to develop these characteristics. In addition, the traits of tough-minded and self-controlled are frequently associated with masculinity (16), and it would be expected that a society would attempt to inculcate these behaviors for males. Also, males may tend to be more conscientious due to their past history in sport performance. High expectations of coaches and demanding workouts requiring "100 percent" effort have become routine for many male athletes. In
comparison, females may be applauded just for taking the initiative to compete. Not having experienced a long history of high achievement and records, female competitors may not have yet developed such a conscientious attitude toward sport performance.

A further finding of this study showed very little correlation between coach and player-evaluations of the ability to cope with stress. This reveals that coaches and players do not perceive reaction to stress in the same manner. The coaches tended to rank more players as highly stressful, while players tended to rank themselves as rarely experiencing stress. This could be due to a players' unwillingness to admit the amount of stress he/she experiences, or it could be a true unawareness of the effect stress has on his/her play. It also is possible that coaches are not well enough acquainted with their players to evaluate the effects of stress on their performances.

These findings substantiate previous results obtained by Martens (10) who reported that coaches' and players' evaluation of stress experienced are not similar. Lakie (5) suggested that the validity of an inventory depends on the willingness of subjects to submit an honest evaluation of themselves. Lazarus and Opton (8) studied stress in a laboratory setting where stress was measured by both autonomic means and self-evaluation by the subjects. They concluded that subjects do not give accurate self-evaluations of the stress they experience.
Summary

Data in the present investigation were analyzed by a hierarchical profile-grouping analysis of players to determine three stress groups. A three-way analysis of variance was computed to determine if significant differences existed among the player stress groups, sex, and the four stress categories. Significant differences were subjected to Duncan's multiple range test and were found between player stress groups, categories of stress, stress groups and stress categories, and sex and stress categories.

Data were further analyzed by a three-way analysis of variance to determine if significant differences existed among three player stress groups, sex, and sixteen personality factors as measured by the Cattell Sixteen Personality Factor Questionnaire, Form A. Significant differences were subjected to a Fishers' t test for each personality factor in relation to sex and stress groups. Significant differences were found between groups on eight personality factors and between sexes on three personality factors.

A Pearson-product moment correlation was computed to determine the relationship between coach and self-appraisal of the ability to cope with stress. There was only slight correlation between the two ratings.
CHAPTER BIBLIOGRAPHY


CHAPTER V

SUMMARY, CONCLUSIONS, RECOMMENDATIONS

Purposes and Procedures

The purposes of the study were (1) to determine significant differences between players who yield to stress and players who withstand stress as evaluated by coach and self-appraisal using "Reed's Situational Inventory for Tennis," (2) to determine significant differences between male players who experience stress and female players who experience stress as measured by "Reed's Situational Inventory for Tennis," (3) to determine significant personality differences between players who yield to stress and players who withstand stress as measured by the Cattell Sixteen Personality Factor Questionnaire, Form A, (4) to determine significant personality differences between male players who experience stress and female players who experience stress as measured by the Cattell Sixteen Personality Factor Questionnaire, Form A, and (5) to determine the significant relationship between the ranking of coach-appraisal and player-appraisal of the ability to cope with stress. The areas to be investigated included (1) grouping of players according to the frequency of stress experienced during competition, (2) sex of players, (3) four
categories of stress influences, (4) sixteen personality factors, and (5) coach and player-appraisals of the ability to cope with stress.

The subjects were seventy-five intercollegiate tennis players from universities within the state of Texas. Forty-five subjects were female and thirty subjects were male.

The testing instrument used to determine stress responses was a thirty-nine-item psychological stress inventory designed by the investigator. The inventory was submitted to a panel of experts for verification of content validity. In addition, reliability, assessment of form, clarity of statements, and average time needed for completion of the instrument was determined by conducting a pilot study. The instrument employed the Likert response scale. This scale included five possible degrees of frequency—Always, Frequently, Sometimes, Rarely Ever, and Never—for each statement in the inventory.

A second testing instrument was the Cattell Sixteen Personality Factor Questionnaire, Form A (1). Selection of this instrument was based on its qualities as a highly reliable and valid test. It has been used in many research investigations since its first publication in 1949. The test includes sixteen factors designed to reveal sixteen different aspects of one's personality. Each of the personality factors has an alphabetical designation of a low and a high score. The sixteen factors and their low and high score descriptions are as follows: (A) reserved, outgoing; (B) dull, bright; (C)
affected by feelings, emotionally stable; (E) humble, assertive; (F) sober, happy-go-lucky; (G) expedient, conscientious; (H) shy, venturesome; (I) tough-minded, tenderminded; (L) trusting, suspicious; (M) practical, imaginative, (N) forthright, astute; (O) self-assured, apprehensive, (Q₁) conservative, experimenting; (Q₂) group dependent, selfsufficient; (Q₃) undisciplined, controlled; (Q₄) relaxed, tense. The average score for each factor ranges from 4-7; high description scores range from 8-10; and low description scores range from 1-3. Ten to thirty items are provided for each factor on the test.

A return from thirty male and thirty female subjects was determined prior to the investigation. All subjects were administered the inventories during the months of November and December, 1977.

Data were analyzed by a hierarchical profile-grouping analysis to determine stress groups. The three-way analysis of variance was used to determine if significant differences existed between player stress groups, sexes, and categories of stress. Duncan's multiple range test was administered. A second three-way analysis of variance was used to determine if significant differences existed between player stress groups, sexes, and personality factors. Fisher's t test was computed for items with significant difference. A Pearson-product moment correlation was employed to determine significant relationships between player and coach-appraisals of the ability to cope with stress.
Findings

The following are the results of the present investigation:

1. A significant difference existed between three player stress groups on the survey total score and on category scores of "Reed's Situational Inventory for Tennis." This finding resulted in the rejection of $H_{01}$;

2. A significant difference existed between male and female players on the total survey score and on category scores of "Reed's Situational Inventory for Tennis." This finding resulted in the rejection of $H_{02}$;

3. A significant difference existed between three player stress groups and eight personality factors (Factors C, E, H, L, M, N, O, Q4) of the Cattell Sixteen Personality Factor Questionnaire, Form A. This finding led to the rejection of $H_{03}$;

4. A significant difference existed between male and female players on three personality factors (Factors G, I, Q3) of the Cattell Sixteen Personality Factor Questionnaire, Form A. This finding resulted in the rejection of $H_{04}$;

5. A slight correlation existed between player and coach-appraisals of the ability to cope with stress as measured by "Reed's Situational Inventory for Tennis." This finding led to failure to reject $H_{05}$. 
Conclusions

The results of the investigation would seem to justify the following conclusions:

1. Intercollegiate tennis players respond to stressful competitive situations differently. Of the four stress categories, tennis players experience most stress under situational influences and the least amount of stress under attitudinal influences.

2. Male and female intercollegiate tennis players respond to stressful competitive situations differently. Males are less stressful than females under spectator influences and attitudinal influences, and they are more stressful than females in situational influences.

3. Intercollegiate tennis players who frequently withstand stress and players who frequently yield to stress have different personality factors. Stressful players are shy, shrewd, practical, apprehensive, tense, and more affected by emotional feelings than low stress or middle stress players. In addition, low stress players are less assertive than the fluctuating stress responders.

4. Male and female intercollegiate tennis players who experience stress have different personality factors. Males are more conscientious, tough-minded, and controlled than females.

5. Players and coaches do not evaluate the ability of players to cope with stress similarly.
Recommendations

The following recommendations are offered:

1. This study should be repeated using high school players. The relationship between responses of younger players to competitive stress and personality factors may differ from that of collegiate players;

2. Further investigations should be conducted which would consider coaching methodologies which could be employed to strengthen players' responses to stress.

3. A replication of this study should be conducted after five years to determine if differences continue to exist between male and female players in reaction to types of stress and personality variables as women become more involved in the competitive athletic environment;

4. Further investigations should be completed to consider relationships between ability to cope with stress and player rankings according to proficiency of skill.

Summary

This chapter presented a summary of the purposes and procedures of this investigation, as well as the results and conclusions of this study. Recommendations for future investigations concerning the relationship of stress responses to personality factors were included.
CHAPTER BIBLIOGRAPHY

Dear

I am a graduate student in the Department of Physical Education at North Texas State University. At the present time I am involved in a research project to complete the thesis requirement for a Master of Science Degree. You and the members of your tennis team are being asked to participate in this research project. The study will attempt to determine the ability of intercollegiate tennis players to cope with stressful play conditions and to determine if personality factors influence these abilities.

The procedures would include the following for each team member involved:

1) Complete a self-evaluation form entitled "Reed’s Situational Inventory for Tennis;"

2) Complete the Cattell Sixteen Personality Factor Questionnaire, Form A.

As coach, you will be asked to participate in the following procedures:

1) Complete an evaluation form for each team member entitled "Reed's Situational Inventory for Tennis."

2) Explain and administer the questionnaires to your team members.
3) Mail the completed forms back to the investigator in the provided stamped envelopes. The results of this study will be kept confidential. However, if you participate, you may request a copy of your team's results.

If you and your team members agree to participate in this study, please sign, and have each of your team members sign a copy of the enclosed "Informed Consent to Participate" form and return it to me so that I receive it by October 3. Even though I appreciate your verbal consent to participate, University policies prevent me from officially beginning the study until I have received your consent in writing. Your assistance is greatly appreciated.

Thank you,

[Signature]

Becky Reed
INFORMED CONSENT

NAME OF SUBJECT:____________________________________________________________

1. I hereby give consent to Becky Reed to perform or supervise the following investigational procedure or treatment:

to research the relationship between personality factors and the ability to cope with competitive situations arising during play of intercollegiate level tennis.

2. I have (seen, heard) a clear explanation and understand the nature and purpose of the procedure or treatment; possible appropriate alternative procedures that would be advantageous to me (him, her); and the attendant discomforts or risks involved and the possibility of complications which might arise. I have (seen, heard) a clear explanation and understand the benefits to be expected. I understand that the procedure or treatment to be performed is investigational and that I may withdraw my consent for my (his, her) status. With my understanding of this, having received this information and satisfactory answers to the questions I have asked, I voluntarily consent to the procedure or treatment designated in Paragraph 1 above.

_________________________  __________________________
DATE                     SIGNED:  SIGNED:

Witness                  Subject

or

Witness                  SIGNED:  Person Responsible

Relationship

Instructions to persons authorized to sign:
If the subject is not competent, the person responsible shall be the legal appointed guardian or legally authorized representative.
If the subject is a minor under 18 years of age, the person responsible is the mother or father or legally appointed guardian.
If the subject is unable to write his/her name, the following is legally acceptable:
John H. (His X Mark) Doe and two (2) witnesses.
APPENDIX B

INVENTORIES AND INSTRUCTIONS FOR COMPLETION

October 4, 1977

Dear

The material you have now received contains test booklets and answer sheets for the Cattell Sixteen Personality Factor Questionnaire, Form A; players' copies of "Reed's Situational Inventory for Tennis;" and a coach's copy of the "Reed's Situational Inventory for Tennis." Instructions for the "Reed's Situational Inventory for Tennis" are included with the test material and should be followed in the administration of that test. This test should take twenty to thirty minutes to complete. Instructions to the players are printed on the cover of the Cattell Sixteen Personality Factor Questionnaire, Form A. This test takes forty-five to sixty minutes to complete.

As coach, you are requested to supervise the administration of both tests. Since they are copyrighted, individual players should not take copies from your immediate supervision. It is suggested that each test be administered to your team at a time when every player is present. The "Reed's Situational Inventory for Tennis" should be answered on the test itself. Each player should have both a test booklet and an answer sheet for the Cattell Sixteen Personality Factor Questionnaire, Form A. The tests should be taken in pencil. Please read the
directions orally to your team and allow them to read the directions and answer the examples before starting the test. The players should begin testing at the same time, but may finish at their own pace.

Please check carefully to see that players have answered according to directions and have placed their name on the Cattell Sixteen Personality Factor Questionnaire, Form A answer sheet and on the "Reed's Situational Inventory for Tennis." Each player should place his assigned rank number on each test form along with his name. This is very important!

After you have administered the tests, please return them to me in the provided envelope by November 2. Your cooperation is greatly appreciated. Results will be sent to you when the study has been completed.

Thank you again,

[Signature]
Dear

This survey has been developed to determine frequency of occurrence of psychological stress in intercollegiate tennis players. You are requested to perform an evaluation for each of your players in response to the following questions. A range of choices from one to five exists for each question in relation to how frequently the stated problem is experienced by each player during play. The tennis experience referred to by this survey is only that of each player's collegiate competitive career. The choices are defined in the following manner:

1) always--A player experiences the feelings described 100% of the times he plays under the stated conditions.

2) frequently--A player experiences the feelings described approximately 75% of the times he plays under the stated conditions.

3) sometimes--A player experiences the feelings described approximately 30% of the times he plays under the stated conditions.

4) rarely ever--A player experiences the feelings described approximately 10% of the times he plays under the stated conditions.

5) never--A player experiences the feelings described at no time when he plays under the stated conditions (0%).

For your convenience, separate question and answer sheets have been provided. Please assign each player a number which corresponds to his/her rank order on your team and provide a key on the next page to determine which number represents which individual player. (Example: Joe Blow - #1, John Doe -
#2, etc.). It is important that each player is referred to by the same number on the Cattell Sixteen Personality Factor Questionnaire, Form A and on both copies of "Reed's Situational Inventory for Tennis". Place the score for each player according to his/her assigned number in the space provided by each question on the answer sheet. All results will be kept confidential.

Thank you,

[Signature]

"Reed's Situational Inventory for Tennis" may be used only for this research study--copyright pending.
REED'S SITUATIONAL INVENTORY FOR TENNIS

Please rate each of the following statements according to how frequently they occur in each of your player's games of tennis. Mark the response which best describes each of your player's games under the number which corresponds to each player's rank on your team.

Example:

I lose confidence if my rhythm or timing seems off.

Player: 1 2 3 4 5 6 7 8 9 10 11 12

Question:
1. 5 3 3 1 2 5 4 1 1 2 4 3

Answer Code: 1 2 3 4 5
always frequently sometimes rarely ever never

1. I get tense when I know the match I am playing is important and I have not played for a while.

2. I get tense if I am playing a really important match.

3. A poor call by an opponent or referee causes me to lose concentration on my next shot.

4. I get nervous about playing someone whom I feel has no major weakness in his/her game.

5. I let down in the second set if I win the first one easily.

6. It makes me feel pressured if someone compares me to an outstanding player and expects me to play like that player.

7. When I get nervous, it shows up in my serves.

8. If I lose the first set, I feel I will lose the whole match.

9. I get nervous if I have to play when it is very windy.

10. I cannot concentrate if there are a lot of things going on around the court I am playing on.

11. I lose confidence in myself after losing a couple of matches.

12. When I start making errors, I lose my concentration and get frustrated with myself.
13. Tie-breakers take so much out of me that if I lose one, I keep thinking of that instead of concentrating on the following points.

14. It is difficult for me to come out of a "slump" unless I can play someone I have beaten before.

15. I lose my concentration if I have to stop playing for some kind of delay.

16. I get nervous if there is a crowd watching my match.

17. I feel less pressure if I am not expected to win.

18. If I do not like the court surface I am playing on, I let it bother my game.

19. If my match is interrupted, I find it difficult to get "psyched up" again to continue play.

20. I worry about a match against someone who is known to be good.

21. I get frustrated with my whole game when I am not serving well.

22. I get frustrated when I start missing shots I can usually make.

23. If I lose a close tie-breaker, it disturbs my concentration for the next set.

24. I feel more pressure when I play someone I have beaten before and people expect me to repeat the win.

25. I lose my confidence if my rhythm or timing seems off.

26. I do not play well when a crowd is cheering for my opponent.

27. I lose confidence if I have been in a "slump."

28. I get angry about bad calls.

29. I feel under pressure playing an opponent who has beaten me before.

30. I get frustrated when playing someone who is extremely consistent; someone who gets every ball back.

31. I feel pressured if I know someone expects me to do well because I do not want to disappoint them.
32. I lose my concentration if there is a disruption off the court.
33. If I begin to doubt myself, I tense up.
34. If I play too many matches too close together, I get mentally tired.
35. I get tense in an extremely close match.
36. If I do not feel confident I can beat a player, I do not play well against him/her.
37. I feel pressured when I know people are expecting me to win.
38. I feel nervous playing in front of a large crowd who is rooting for me.
39. I feel more nervous when I play an opponent who has given me a tough match before.
REED'S SITUATIONAL INVENTORY FOR TENNIS

Coach-Evaluation Response Form

Institution: __________________________________________________________

Coach: ____________________________________________________________

Answer Code: 1 always 2 frequently 3 sometimes 4 rarely 5 ever never

Player: 1 2 3 4 5 6 7 8 9 10 11 12

Question:

1. __ __ __ __ __ __ __ __ __ __ __ __ __ __

2. __ __ __ __ __ __ __ __ __ __ __ __

3. __ __ __ __ __ __ __ __ __ __ __ __

4. __ __ __ __ __ __ __ __ __ __ __ __

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14. __ __ __ __ __ __ __ __ __ __ __ __

15. __ __ __ __ __ __ __ __ __ __ __ __

16. __ __ __ __ __ __ __ __ __ __ __ __

17. __ __ __ __ __ __ __ __ __ __ __ __

18. __ __ __ __ __ __ __ __ __ __ __ __
This survey has been developed to determine frequency of occurrence of various emotions in intercollegiate tennis players. Each player is requested to perform a self-evaluation in response to the following questions. A range of choices from one to five exists for each question in relation to how frequently the stated problem is experienced during play. The tennis experience referred to by this survey is only that of each player's collegiate competitive career. The choices are defined in the following manner:

1) always--A player experiences the feelings described 100% of the times he plays under the stated conditions.

2) frequently--A player experiences the feelings described approximately 75% of the times he plays under the stated conditions.

3) sometimes--A player experiences the feelings described approximately 30% of the times he plays under the stated conditions.

4) rarely ever--A player experiences the feelings described approximately 10% of the times he plays under the stated conditions.

5) never--A player experiences the feelings described at no time when he plays under the stated conditions (0%).

Each player is requested to consider each situation carefully and answer as honestly as possible. All results will be kept confidential.

Thank you,

[Signature]

"Reed's Situational Inventory for Tennis" may be used only for this research study--copyright pending.
REED'S SITUATIONAL INVENTORY FOR TENNIS

Please rate each of the following statements according to how frequently they occur in your game of tennis. Circle the response which best describes your game.

Example:

I lose confidence if my rhythm or timing seems off.

1 always frequently sometimes rarely ever never

1. I get tense when I know the match I am playing is important and I have not played for a while.

1 always frequently sometimes rarely ever never

2. I get tense if I am playing a really important match.

1 always frequently sometimes rarely ever never

3. A poor call by an opponent or referee causes me to lose concentration on my next shot.

1 always frequently sometimes rarely ever never

4. I get nervous about playing someone whom I feel has no major weakness in his/her game.

1 always frequently sometimes rarely ever never

5. I let down in the second set if I win the first one easily.

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6. It makes me feel pressured if someone compares me to an outstanding player and expects me to play like that player.

1 always frequently sometimes rarely ever never

7. When I get nervous, it shows up in my serves.

1 always frequently sometimes rarely ever never
8. If I lose the first set, I feel I will lose the whole match.

   1 2 3 4 5
always frequently sometimes rarely ever never

9. I get nervous if I have to play when it is very windy.

   1 2 3 4 5
always frequently sometimes rarely ever never

10. I cannot concentrate if there are a lot of things going on around the court I am playing on.

      1 2 3 4 5
always frequently sometimes rarely ever never

11. I lose confidence in myself after losing a couple of matches.

      1 2 3 4 5
always frequently sometimes rarely ever never

12. When I start making errors, I lose my concentration and get frustrated with myself.

      1 2 3 4 5
always frequently sometimes rarely ever never

13. Tie-breakers take so much out of me that if I lose one, I keep thinking of that instead of concentrating on the following points.

      1 2 3 4 5
always frequently sometimes rarely ever never

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      1 2 3 4 5
always frequently sometimes rarely ever never

15. I lose my concentration if I have to stop playing for some kind of delay.

      1 2 3 4 5
always frequently sometimes rarely ever never

16. I get nervous if there is a crowd watching my match.

      1 2 3 4 5
always frequently sometimes rarely ever never
17. I feel less pressure if I am not expected to win.
1 always 2 frequently 3 sometimes 4 rarely 5 ever never

18. If I do not like the court surface I am playing on, I let it bother my game.
1 always 2 frequently 3 sometimes 4 rarely 5 ever never

19. If my match is interrupted, I find it difficult to get "psyched up" again to continue play.
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20. I worry about a match against someone who is known to be good.
1 always 2 frequently 3 sometimes 4 rarely 5 ever never

21. I get frustrated with my whole game when I am not serving well.
1 always 2 frequently 3 sometimes 4 rarely 5 ever never

22. I get frustrated when I start missing shots I can usually make.
1 always 2 frequently 3 sometimes 4 rarely 5 ever never

23. If I lose a close tie-breaker, it disturbs my concentration for the next set.
1 always 2 frequently 3 sometimes 4 rarely 5 ever never

24. I feel more pressure when I play someone I have beaten before and people expect me to repeat the win.
1 always 2 frequently 3 sometimes 4 rarely 5 ever never

25. I lose my confidence if my rhythm or timing seems off.
1 always 2 frequently 3 sometimes 4 rarely 5 ever never
26. I do not play well when a crowd is cheering for my opponent.
   1 2 3 4 5
   always frequently sometimes rarely ever never

27. I lose confidence if I have been in a "slump."
   1 2 3 4 5
   always frequently sometimes rarely ever never

28. I get angry about bad calls.
   1 2 3 4 5
   always frequently sometimes rarely ever never

29. I feel under pressure playing an opponent who has beaten me before.
   1 2 3 4 5
   always frequently sometimes rarely ever never

30. I get frustrated when playing someone who is extremely consistent; someone who gets every ball back.
   1 2 3 4 5
   always frequently sometimes rarely ever never

31. I feel pressured if I know someone expects me to do well because I do not want to disappoint them.
   1 2 3 4 5
   always frequently sometimes rarely ever never

32. I lose my concentration if there is a disruption off the court.
   1 2 3 4 5
   always frequently sometimes rarely ever never

33. If I begin to doubt myself, I tense up.
   1 2 3 4 5
   always frequently sometimes rarely ever never

34. If I play too many matches too close together, I get mentally tired.
   1 2 3 4 5
   always frequently sometimes rarely ever never
35. I get tense in an extremely close match.

always frequently sometimes rarely ever never

36. If I do not feel confident I can beat a player, I do not play well against him/her.

always frequently sometimes rarely ever never

37. I feel pressured when I know people are expecting me to win.

always frequently sometimes rarely ever never

38. I feel nervous playing in front of a large crowd who is rooting for me.

always frequently sometimes rarely ever never

39. I feel more nervous when I play an opponent who has given me a tough match before.

always frequently sometimes rarely ever never
## APPENDIX C

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